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## TWO NEW PRIMATE SPECIES FROM THE AFRICAN OLIGOCENE

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One of the major objectives of the Yale 1961-1962 Paleontological Expedition to the Fayum region of Egypt was to recover a larger sample than previously known of the earliest mammalian microfauna from the continent of Africa, that of the Fluvio-marine formation of the Fayum early Oligocene. During the course of our investigations the expedition staff succeeded in locating specimens assignable to two new species of Primates. In view of the considerable interest in, and rarity of, Old World Primates dating from this epoch it seems advisable to publish a preliminary description of these two forms without delay, so that they will be available for consideration by other authors. It is intended that a fuller analysis of their morphology and relationships will be included in a study of the Fayum mammalian microfauna now being prepared by the writer.

### ACKNOWLEDGMENT

I wish to express my sincere thanks to Dr. Osman Moharam, Director of the Department of Geological and Mineralogical Research, Ministry of Industry, United Arab Republic; Dr.

Riad Higasy, former Minister of Industry, and Dr. Y. Shawki Moustafa, Curator of Fossil Vertebrates, Cairo Museum of Geology, for generously supplying facilities and assistance which contributed greatly to the success of our expedition to the Fayum badlands. The field research of which this report is an outgrowth was made possible by a grant in Geology of the National Science Foundation. Illustrations were prepared by Margaret E. Freeman of New Haven and their execution was partly financed by a grant from the Wenner-Gren Foundation of New York. The photograph (figure 3) was prepared by John Howard of the museum staff.

#### ABBREVIATIONS

- A.M.N.H. . . . . American Museum of Natural History,  
New York.
- Y.C.P.E. . . . . Yale-Cairo, Paleontological Expedition  
(field numbers).
- Y.P.M. . . . . Yale Peabody Museum, New Haven.

#### SYSTEMATICS

Class MAMMALIA

Order PRIMATES

Suborder ANTHROPOIDEA

Infraorder CATARRHINI

**OLIGOPITHECUS,<sup>1</sup> new genus**

**Type:** *Oligopithecus savagei*, new species

**Generic characters:** Lower dental formula 2?. 1. 2. 3., size of mandible approximately that of the living ceboid primate *Leontoccebus rosalius*, slightly smaller than its contemporary *Propliopithecus haeckeli*. Differs from the latter in having a slightly shallower mandibular ramus, more

<sup>1</sup>Named with reference to the Oligocene occurrence of this catarrhine.

anteroposteriorly elongated  $P_3$ , distinct paraconid on  $P_1$ - $M_1$ , lower molar external cingula less distinct and hypoconulid shifted much more lingually than in *Propliopithecus* and not distinctly separated from entoconid. Differs from *Parapithecus fraasi* in its larger size and in possession of undoubted, large canine anterior to  $P_3$ , in absence of metaconid cusp on  $P_3$ ,—present in *Parapithecus*, in possession of anteroposteriorly elongated  $P_3$  not seen in the latter genus, and in having a much more lingually extended paraconid ridge on  $M_{1-2}$ .



Figure 1. External view of left mandible, *Oligopithecus savagei*, Type, Y.C.P.E. 207. x 3 approx.

**Discussion:** In depth of jaw and canine morphology *Oligopithecus* much more nearly resembles *Propliopithecus* than it does *Parapithecus* or *Apidium*, three other primates from the Fayum early Oligocene. On the other hand, the anteroposteriorly elongate  $P_3$ , a feature which typically characterizes post-Oligocene cercopithecoids and pongids, is not to be seen in any specimens of these three Fayum genera. Such a lower  $P_4$  does occur in a damaged mandible, A.M.N.H. 13389 from the Fayum, lacking tooth crowns other than on  $P_3$ , described by Simons (1961), but in spite of this resemblance  $P_3$  of A.M.N.H. 13389 is three rooted, a feature of great rarity among Primates, while that of *Oligopithecus* is more normal in being two rooted. Moreover, A.M.N.H. 13389 is, in comparable measurements, over twice larger than the type of *Oligopithecus*. Presumably the former specimen belongs to yet another Egyptian Oligocene primate species, diagnosis of which will have to await recovery of more satisfactory material; see Simons (1961:3).

The relationship of *Oligopithecus* to *Moeripithecus markgrafi*, also from the Egyptian early Oligocene, is more obscure, since comparison of  $M_{1-2}$  crown patterns in the two forms fails to reveal any significant similarity. The overall morphology of the tooth series preserved in *Oligopithecus* appears to be more like that of certain Eocene prosimians than are these patterns in other Fayum Primates, except that the  $P_{1-2}$  are lost, the horizontal ramus is deep compared to tooth crown height, and  $P_3$  is anteroposteriorly elongate—all similarities to Old World Anthropoidea. Among Eocene Primates perhaps the greatest resemblances of *Oligopithecus* are to Omomyidae, Anaptomorphidae and Necrolemurinae, which fact agrees well with the supposition that Anthropoidea are more closely allied to the so-called tarsioids of Eocene times than they are to other known Eocene, and earlier, families of the order. The lingual position of the  $M_{1-2}$  hypoconulid in *Oligopithecus* creates a partial posterior loph parallel to the anterior loph, between metaconid and protoconid, which might represent an early stage in the transition to the bilophodont lower molar pattern of Cercopithecoidea. This possibility will require further confirmation before definite assignment of this primate to the latter superfamily would be advisable. Placement of *Oligopithecus* among the Hominoidea is also conceivable but  $M_{1-2}$  crown patterns are so primitive that such an association is equally dubious. Clearly, however, the creature is not a ceboid or a prosimian.

### *OLIGOPITHECUS SAVAGEI*<sup>2</sup>

Figures 1 and 4.

**Type:** Left mandibular ramus, with  $\bar{C}$ - $M_2$  inclusive, Y.C.P.E. 207.<sup>3</sup>

**Horizon and locality:** Yale Expedition quarry E, Fossil Wood Zone, Fluvio-marine Formation, early Oligocene age, Fayum Province, Egypt, about 2.3 miles northeast of American Museum Quarry A (1907) and about

<sup>2</sup> Named for Dr. D. E. Savage of Berkeley University who discovered the type and only specimen.

<sup>3</sup> By agreement with the Egyptian authorities concerned, types collected on the Yale 1961-62 expedition will eventually be deposited in the paleontological collections of the Cairo Museum of Geology. Pending such assignment they are here identified by their field numbers.

eight miles west-northwest of Quasr el Sagha Temple, thirty feet below the top of the Fossil Wood Zone, see Beadnell (1905).

**Specific characters:** Not distinguished from generic.

**Discussion:** The species, *O. savagei*, is at present known only from the type individual so that little can be said of variability in this primate. Although  $M_3$  is missing in Y.C.P.E. 207 the fact that it had fully erupted is indicated by the preservation of the anterior root of this tooth in the type. A large wear facet on the anterior crest descending from  $P_3$  protoconid indicates that this species must have possessed a sizeable upper canine which sheared against this facet.

Measurements in millimeters of *Oligopithecus savagei* are listed below in comparison with similar measurements on contemporary Fayum Primates taken from Kálin (1961).

#### Mandibular dimensions (*O. savagei*).

##### Anteroposterior

Length of $\bar{C}$ through $M_2$ . . . . .	19.4
Depth of mandible beneath $M_2$ . . . . .	9.5
Depth of mandible beneath $P_3$ . . . . .	10.2

#### MEASUREMENTS OF TEETH

	<i>Oligopithecus savagei</i> left side	<i>Parapithecus fraasi</i> left side	<i>Propithecus haeckeli</i> left side	<i>Moeripithecus markgrafi</i> right side
Canine				
length . . . . .	3.7	3.2 ( $\bar{C}$ or $P_2$ )	4.0 (right)	
width . . . . .	3.3	2.5 ( $\bar{C}$ or $P_2$ )	4.3 (right)	
$P_3$				
length . . . . .	4.2	3.3	3.5	
width . . . . .	3.1	2.5	3.8	
$P_4$				
length . . . . .	3.3	3.3	3.5	
width . . . . .	3.0	2.5	4.0	
$M_1$				
length . . . . .	4.2	4.2	4.8	5.0
width . . . . .	3.4	3.2	4.5	4.8
$M_2$				
length . . . . .	4.2	4.3	4.8	5.4
width . . . . .	3.5	3.4	4.5	5.4

Genus *APIDIUM* Osborn, 1908

**Type:** *Apidium phiomense* Osborn, 1908.

**Discussion:** Although Osborn (1908) was reluctant to state the ordinal position of this species, it subsequently came to be regarded as a primate, and Gregory (1922) held that it might be related to the basic cercopithecoid stock or to *Oreopithecus*; see Simons (1959: 14). More recently a few authors have again questioned the primate status of *A. phiomense* but its resemblance to *Oreopithecus* seems more than convergent, as was discussed by the writer (1960). Moreover, the discovery of several isolated upper teeth of a species of this genus, (described below) in association in one quarry with several lower jaws of this form, shows us that similarities to *Oreopithecus* in the upper dentition are about equal to those seen in the lower teeth. Nevertheless, *Apidium* species are rather unlike other known Oligocene Anthropoidea in that the cheek-teeth are more polycuspidate, the mandibular ramus is shallow, and the canine may have been small, or alternatively there may have been three premolars—inadequate preservation of the new materials rendering this point equivocal. Clearly the stock of *Apidium* had differentiated from that of other Fayum Primates at a considerable remove in time from their common occurrence in the Early Oligocene of Egypt, but it is in many ways closest to *Parapithecus* insofar as the two forms can be compared. The question, therefore, as to the relation of species of these two genera to the earliest undoubted Old World Anthropoidea is interrelated. Provisionally the study of *Apidium* suggests that it, together with *Parapithecus*, may eventually be ranked with some certainty among the Anthropoidea.

**APIDIUM MOUSTAFAI**,<sup>4</sup> new species

Figures 2, 3.

**Type:** Left mandibular ramus with  $P_3-M_1$ , Y.C.P.E. No. 260.

**Hypodigm:** Type and Y.P.M. numbers 18007, left mandibular ramus with damaged  $P_3-M_3$ ; 18008, unassociated right  $P^1-M^2$ ; 18009 right mandibular ramus with  $P_3-M_3$ ; 18018 left mandibular ramus with  $\bar{C}^1-M_3$ ; 18042

<sup>4</sup> Named in honor of Dr. Y. Shawki Moustafa, whose earnest assistance and advice were most helpful to our Egyptian expedition.



left mandibular fragment with  $P_1$ - $M_1$ ; 18081, unassociated left  $P_1^2$ , left  $M^2$ , left  $M_2$ , left  $M_3$ , all from Quarry G.

**Horizon and locality:** Yale Expedition Quarry G, below upper fossiliferous zone, Fluvio marine Formation, early Oligocene age, Fayum Province, Egypt. One mile due north of American Museum Quarry A and approximately 100 feet above top of lower Fossil Wood Zone.

**Specific diagnosis:** About one-eighth smaller than *A. phiomense*, with slighter development of lateral basal cingula and fewer accessory cuspsules on  $P_1$  heel and on  $M_{1-2}$ , and as a whole, comparatively smaller and more primitive than in *A. phiomense*, with posterointernal angle of  $M_1$  produced more lingually.

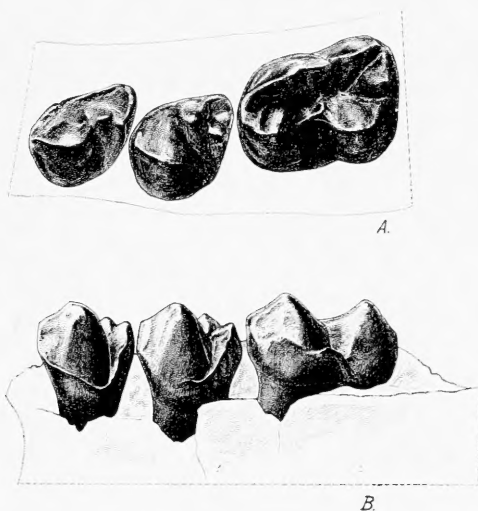


Figure 2. A. Crown view and B. External view, *Apidium moustafai* Type, Y.C.P.E. 260. x 5 approx.

**Discussion:** This species is both smaller and earlier occurring than the type of *A. phiomense*. That a significant lapse of time exists between the populations from which the two species are derived seems probable in view of studies of other faunal elements from the upper part of the Egyptian Fluvio marine Formation now in progress. Although the exact locality of the type of *A. phiomense* is not known, it was reported by Osborn (1908) as having been discovered upon the upper fossiliferous

level, which begins about 100 feet stratigraphically above the horizon of Quarry G. If the practice of some past students of fossil Primates were followed here, a case for generic separation of these two species could probably be made, but this type of splitting should not be attempted until these forms are much better known.

MEASUREMENTS IN MILLIMETERS OF *Apidium moustafai*

	Y.P.M. 18018	Y.P.M. 18009	TYPE: Y.C.P.E. 260
$\bar{C}$ , D $\bar{C}$ , or P <sub>2</sub>			
length .....	2.5	.....	.....
width .....	2.0	.....	.....
P <sub>3</sub>			
length .....	2.7	2.7	2.8
width .....	2.0	1.9	2.0
P <sub>4</sub>			
length .....	2.7	2.7	2.8
width .....	2.3	2.2	2.3
M <sub>1</sub>			
length .....	3.5	3.6	3.7
width .....	2.8	2.7	3.0
M <sub>2</sub>			
length .....	3.6	3.6	.....
width .....	3.2	3.1	.....
M <sub>3</sub>			
length .....	3.6	4.0	.....
width .....	3.0	2.9	.....
Depth of mandible beneath M <sub>1</sub> .....	6.0	7.1	6.8
Anteroposterior length P <sub>3</sub> -M <sub>3</sub> .....	15.3	16.8	.....
A-P length P <sub>3</sub> -M <sub>1</sub> .....	8.6	9.0	8.8

## CONCLUSIONS

Recent collections of Primates from the Fayum early Oligocene deposits of Africa indicate the existence of at least two new forms of Primates. Study of the first of these, *Oligopithecus savagei*, suggests that it is assignable to the Anthropoidea and that it may represent an early stage in the differentiation of Cercopithecoidea. Near agreement in expected size, and approximation in horizon and locality suggests that a catarrhine frontal bone described by Simons (1959) may provisionally be referred to this species. Placement of this frontal with *Apidium* or *Parapithecus*, which are also of suitable size, seems less appropriate in view of non-anthropoidean features such as are to be seen in their anterior dentitions. Known *Propliopithecus* and *Moeripithecus* are probably too large to have had a frontal this size, but of course this skull fragment could well belong to a species otherwise unknown. A second species, *Apidium moustafai*, here described, appears to represent an earlier and ancestral population to *Apidium phiomense* which was recovered from the upper part of the Fluvio-marine Formation. Newly discovered upper teeth of *Apidium* strengthen the view that species of this genus, together with *Oreopithecus bambolii*, represent a fourth major group of Old World Higher Primates distinct from cercopithecoids, pongids and hominids.



Figure 3. Right mandibular ramus of *Apidium moustafai*, Y.P.M. 18009. x 6 approx.

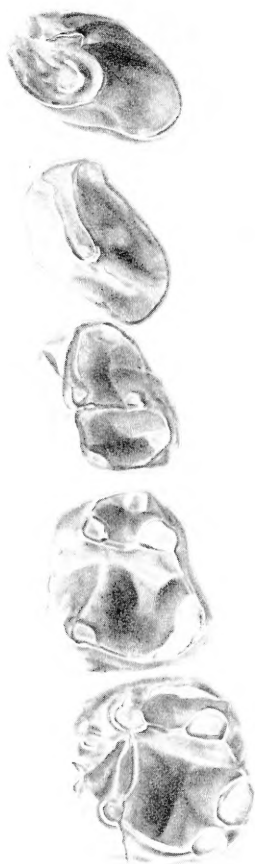


Figure 4. Crown view of dentition, *Oligopithecus savagei*, Type, Y.C.P.E. 207. x 6 approx.

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