The Relationship of African Apes, Man, and Old World Monkeys

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Abstract. The conclusions of Wilson and Sarich (Proc. Nat. Acad. Sci. USA, 63, 1088–1093 (1969)) that the human lineage diverged from that leading to the African apes about 4 to 5 million years ago is shown to be based upon a wholly unsupported assumption that the Superfamilies Hominioidea and Cercopithecoida were separated from each other some 30 million years ago. This is entirely contrary to most recent palaeontological evidence.

In recent years, Wilson and Sarich have undertaken a great deal of very important work concerned with the quantitative comparison of the serum albumins, transferrins, hemoglobins, and DNA of man, the African great apes, and some of the Old World monkeys. An important summary of their latest findings appeared in the Proc. Nat. Acad. Sci. 63, 1088–1093 (1969), under the title of “A Molecular Time Scale for Human Evolution.” As a result of these studies they have prepared what they call a “hemoglobin evolutionary clock” as well as an “albumin evolutionary clock.” From their data they conclude that “concordance exists between the hemoglobin and albumin results, and that both support the suggestion that the human lineage diverged from that leading to the African apes far more recently than is generally supposed. Considering both the albumin and the hemoglobin data, we would set the most probable date at 4 to 5 million years.”

I am not qualified to discuss the biochemical evidence which they have obtained and which apparently shows, among other things, that “the albumins of Chimpanzee, Gorilla, and Man are only about one sixth as different from one another as they are from the albumin of the rhesus monkey.” They follow this by stating “It then follows from the regularity tests that the African apes and man diverged about six times more recently than did rhesus monkey and man” (page 1091). I would be inclined to accept that this conclusion is likely to be true in view of the extraordinarily great difference between the Hominioidea (i.e., the great apes and man), on the one hand, and the Cercopithecoida (i.e., the Old World monkeys) on the other.

The reason for this note, however, is to draw attention to a serious fallacy which they have put forward upon the basis of their facts—a fallacy, which is due, I believe, to their making use of an unsupported assumption for which there is no palaeontological justification at the present time.
Their conclusion that the lineages leading to man and the African Apes diverged only "about 4 to 5 million years ago" is apparently based on the wholly theoretical assumption which I will quote in their own words: "As the time of divergence between men and monkeys (Hominioidea and Cercopithecioidea) can scarcely be greater than about 30 million years" (the italics are mine) "we have calculated that the lineages leading to man and the African apes diverged about 5 million years ago."

Having drawn this conclusion on the basis of an unsupported theoretical assumption, that the two Superfamilies diverged only 30 million years ago, they then suggest that the available palaeontological evidence is perhaps faulty. I would therefore like to stress the following points. The fossil record shows quite clearly that at the Upper Miocene site of Fort Ternan in Kenya, which can be dated by potassium argon dating as between 12 and 14 million years, there were already present: (a) a true member of the Family Hominidae, *Kenya-pithecus wickeri*, (b) true representatives of the Family Pongidae, represented by both the genera *Dryopithecus* and *Proconsul*, (c) members of the Family Hylobatidae, represented by a primate allied to *Limnopithecus*, and *Pliopithecus*, (d) true members of the Family Oreopithecidae, represented by isolated teeth, (e) some Cercopithecidae, represented by isolated teeth.

The specimens referred to above as *Kenya-pithecus wickeri* are closely related to the Asiatic Mio-Pliocene hominid *Ramapithecus*, and it is very generally accepted by palaeontologists and anatomists that the *Ramapithecus-Kenya-pithecus* stock represents an ancestral stage of the Family Hominidae. If this is correct, the Hominidae, from the palaeontological point of view, were fully distinct from the apes or Family Pongidae about 12 to 14 million years ago. The date of separation suggested by Wilson and Sarich, i.e., only five million years ago, clearly is not in accord with the data available today. Furthermore, when we turn to the early Miocene period of Kenya and Uganda, we find evidence that a true pongid, very similar indeed to the living gorilla, was already present, as well as many examples of several distinct species of the genus *Proconsul*, which is regarded by most authorities as being within the Pongidae. A little Dryopithecoid was also present. Living side by side with these there was a creature which has been named *Kenya-pithecus africanus*. This is represented by parts of some seven different individuals and would appear to be already within the Family Hominidae. The potassium argon age of these early Miocene deposits is about 20 million years. The palaeontological evidence is, therefore, once again strongly at variance with the conclusion that Wilson and Sarich draw from their serological evidence as a result of their making use of the unsupported assumption that "the Hominioidea and the Cercopithecioidea only diverged 30 million years ago."

On the other hand, if we accept their molecular evidence that man and the great apes are six times nearer to each other than any of them are to the Superfamily Cercopithecioidea, it would be possible to argue that we must look for the separation of this Superfamily (or the Old World monkeys) from the Hominioidea (the stock leading to apes and man), about 120 million years ago, or some time during the Eocene period. Even if we do not accept the *Kenya-pithecus africanus*
evidence of a member of the Hominidae in the early Miocene period, and only take the overwhelming evidence of the *Kenyapithecus-Ramapithecus* fossils of Upper Miocene-Early Pliocene times, we would still get a date for the separation of the Hominoidea from the Cercopithecoida, on the basis of the Wilson and Sarich time scale, of some 72 million years (6 X 12 million years).

We know already from the palaeontological record obtained from the Oligocene deposits in Egypt that the Superfamily Hominoidea was already in existence and dividing up by about the beginning of the Oligocene. What we do not know, at present, is the date at which the Superfamily of the Cercopithecoida first appeared. Some authorities suggest that no true monkeys have yet been recorded from any deposit older than the Lower Miocene; others believe that there is evidence of the Superfamily, although not of the Family Cercopithecidae, at the beginning of the Oligocene, and that *Parapithecus* falls within the Superfamily Cercopithecoida, although clearly not a representative either of the Family Cercopithecidae or the Colobidae.

It is unfortunate that fossilized remains of true monkeys are exceedingly rare. This is probably due to the fact that the true monkeys may have been mainly forest-dwelling animals, so that when they died their bones and teeth were consumed by the acids of the forest soils instead of being fossilized. Indeed, fossil remains of the Cercopithecoida become common only at the time when certain genera took to living in the open so that their remains are found in fossil form in association with those of plains animals; for example (a) the fossil primates of Oloregesailie, Omo, and Rudolph, which are associated with antelope, pigs, and equids in deposits of Lower to Middle Pleistocene ages, (b) the numerous fossil primates found in the limestone caves of South Africa, where their remains were apparently brought in by some scavenger and were then fossilized under lime-drip conditions, and (c) the *Mosopithecus* fauna of the Pontian deposits at Pikermi and similar sites in Southeast Europe, where they are associated with fossil antelope, giraffe, and equids.

Until we have much better palaeontological evidence as to the first emergence of the monkeys, it is certainly not wise to assume, as Wilson and Sarich do, that the “Hominoidea and the Cercopithecoida only separated about 30 million years ago” when the conclusion that they base upon this supposition is so much at variance with the available palaeontological evidence today.