

A SPECIES NAMED FROM FOOTPRINTS¹

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ABSTRACT

A reconstruction is presented of the living appearance of the fossil species *Gigantopithecus blacki*; this is then compared with evidence for a reported wild animal in North America. These two forms are provisionally equated, thus giving a formal name to the living animal known as sasquatch, or bigfoot. Alternative taxonomic designations are also suggested in view of the possibility that future discoveries might show this equation to be incorrect.

Gigantopithecus blacki was named by von Koenigswald in 1935 from a giant primate tooth he found in a Chinese drugstore. Weidenreich (1945) described several teeth in detail, and he decided they showed hominid (human) rather than pongid (ape) affinities. They were attributed to "Middle Pleistocene" deposits from southern China on the basis of adhering matrix. A date of about a half a million years ago was suggested at that time.

Subsequent discoveries now include the tooth-bearing parts of three mandibles and perhaps a thousand additional loose teeth (Woo 1962). Another similar mandible was recovered in India that has been named *G. bilaspurensis* (Simons and Ettl 1970). Most opinion would now give the Chinese fossils an antiquity of at least a million years, and the Indian specimen several times that.

Anatomically, *G. blacki* is a higher primate of the hominoid superfamily of man and apes. Its dentition is substantially more human-like than that found in any living ape. The incisors are greatly reduced and vertically implanted; the canines are somewhat reduced and tend to grind down with use. The lower anterior premolars are basically bicuspid, though the labial cusp is much the larger and spreads considerably toward the base; it is slightly rotated and can accurately be called semisectorial. The molars are high-crowned, have thick enamel, and their cusp and fissure pattern is distinctly hominid. In total, the dentition is intermediate, but leans a bit more to the human than to the ape side--much as that of the recently discovered *Australopithecus afarensis*, but not in exactly the same ways. It is clearly more hominid-looking than the briefly famous "Ramapithecus."

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All living hominoids are giant brachiators, or at least have the adaptations for this arm-swinging type of locomotion. It is a reasonable presumption, though not a demonstrated fact, that *G. blacki* also has these same adaptations. Important among these are conspicuously wide shoulders, with long arms oriented laterally rather than ventrally. This also includes a broader-than-deep chest, with the rib cage closely approximating the pelvis. The external tail is missing as well, its base being tucked under to help support the viscera.

Gigantopithecus is large, as the name implies. The mandible of the adult male specimen from China is half again larger than a male gorilla in most lineal dimensions, and over twice as thick. If one mentally completes this mandible, fills in a corresponding maxilla, and adds the necessary muscle-supporting structures for chewing--then a head of phenomenal size results. A normal body weight twice that of the male gorilla would be required just to support this head in a reasonable manner. About 350 kg would be the probable body weight. The smaller female jaw from China suggests a body of something like 250 kg, as it also exceeds the male gorilla in all measurements.

Ratios of jaw size to body size vary somewhat among living and fossil primates, but with those of a given morphological design the ratio is more regular. *Gigantopithecus* does not show the extreme molarized design of the australopithecines, so its jaw would not be as relatively oversized. In fact, a reconstruction of its head and neck, at 40 kg, involves as much mass as the entire body of some australopithecines.

Gigantopithecus jaws are exceptionally broad in the back; their horizontal rami diverge toward the rear to a degree unmatched by any other primate. The dentition diverges to the rear in a corresponding manner, in part resulting from the much reduced incisors. But the jaw spread is the major causative factor here--the divergence of the molar rows being much less impressive than that of the body of the jaw itself. This posterior breadth would mean that the mandibular condyles were also widely spaced on the base of the skull. This spacing would alter the direction of swing of the jaw in each one-sided chewing action, and in turn would render the sectorial complex ineffective. The semisectorial character of the premolar is thus consistent with the jaw design.

The most obvious reason why the jaw should spread in this manner is because the neck must have been situated somewhat between, rather than behind, the ascending rami. Thus we may conclude that the head was habitually placed atop a vertical neck rather than being hung forward from a sloping neck. This in turn implies that the entire body was normally held in an erect position, and they were necessarily bipedal. They would have stood and walked in an essentially human manner.

That the jaw diverges even more than in humans is the allometric result of relatively more massive neck musculature in this absolutely larger body. The high weight-to-strength ratio would also call for a very heavy-set body build in general. Given a weight of 350 kg and a strongly lateral body build, a stature of about 2.5 m can be predicted.

No tools or habitation sites are known for *G. blacki*. They existed within the time range of *Homo erectus*, which was a tool-using, hunting, early form of hominid. It is not likely that two culture-bearing species could have coexisted, so we may safely presume that *G. blacki* was not human in any intellectual sense of the word.

The lack of hunting would also mean they would not have reduced their body hair as part of the human sweat-cooling adaption; they would be hair covered just like other primates.

Their brains would be a little larger than in living apes--perhaps 600 cc. Allometry would suggest this added 100 cc over the gorilla because of their body size. Combining this with much larger facial bones and jaw musculature would give them ape-like faces with tall sagittal crests in both sexes. The small incisors would somewhat reduce their prognathism. The face would project far down, and the shoulders should rise higher than the level of the mouth. No visible constriction at the neck should be expected.

Dentition and ecological logic both point to an omnivorous diet, predominantly vegetarian. They may have been opportunistic carnivores, but no special abilities in this direction are indicated. They would not have had exceptional speed or endurance, nor would they have the fangs or claws of the usual carnivores.

The picture of an adult male *Gigantopithecus* may be summarized from these data and deductions. It was an erect, bipedal primate with the wide shoulders and strong arms of an ex-brachiator. Its body would be ape/human-like in its broad chest, short waist, and lack of external tail. It would weigh about 350 kg (800 lbs.) and stand perhaps 2.5 m (8 ft.) tall, on legs and feet of roughly human proportions and stout design. It would be covered with normal primate hair and have a gorilla-like face. Its intelligence should be in the general area of the living apes, with no cultural capacity or language. The female would be smaller, at 250 kg and 2 m, but other wise the same.

An animal exactly fitting this description is often reported as seen in North America. (Similar reports from other continents are not dealt with here.) Considerable evidence has been collected to support the existence of this sasquatch, but none of it has been definitive in the eyes of most zoologists and anthropologists. Footprints have been observed, photographed, and cast by the hundreds. Eyewitness accounts on record number a thousand or more; and most sightings are probably not reported. At least one film has survived the usual debunking claims in good order. Hair samples and feces have been collected, and sometimes analyzed, with uncertain results. Native American legends and folklore often include creatures that seem similar (Green 1978).

This impressive array of evidence is badly weakened by the fact that much of it has been shown to be in error, faked, or at least highly suspect. Some eyewitnesses saw standing bears, men at a distance, or oddly shaped tree trunks; other have invented their accounts for personal publicity. Many footprints were faked with carved wooden feet. At least some of the

claimed films of sasquatches are demonstrable fakes. Most of the hair and fecal samples were from known animal species, and the rest remain simply unidentified. Indian legends also include many other creatures that are no more real than angels or unicorns.

That the sasquatch *could* be real, is not sufficient argument to say that it *is* real. Definitive evidence must be used to support it that is not subject to hoaxing or misinterpretation. Such evidence is currently available in the form of three footprint casts that show dermal ridges and sweat pores on large areas on the sole of the foot and toes. Silicon rubber molds have been made of these, and exact copies can be produced for further study. The original casts are in my possession.

Expert opinion on these track casts is sharply divided. Most anthropologists and zoologists have summarily dismissed them as fakes. They all agree that real primate skin is represented, but claim that this was somehow transferred from known animals to these out-sized footprints. Most dermatoglyphic experts have declared them to be genuine, and incapable of being faked by any means (Krantz 1983; Berry and Haylock 1985).

The biologists were all on record as denying the existence of this supposed animal--if not explicitly, at least implicitly by failure to include it in their lists of living primates. The policemen have made no such pronouncements; the animal's possible existence was of no professional interest to them. If anything, they were more concerned about the possibility of someone having discovered a technique that could be used for faking fingerprints.

The formal description of new species requires a type specimen. Such a specimen may consist of several parts of the same individual, such as various bones of one skeleton. In this case, the type specimen may consist of three foot impressions of one individual. The circumstances of discovery preclude the possibility that more than one individual is involved.

We need not be concerned that footprints are not the actual remains of the animal itself. Natural casts of bones and shells are routinely used in describing fossil species. In such cases no remains of the animal are directly involved. Rather, we record the physical impact that a part of the animal once made on its environment. Nonskeletal impressions of hair, scales, and features are also found in fossil form; impressions of dermal ridges should be equally valid.

The main logical distinction in the case at hand would appear to be the recency of the impressions. Fossil feather impressions, or even dinosaur tracks, normally have an antiquity measured in tens of millions of years or more. In this instance the footprints were about two hours old at the time of their permanent documentation. I fail to see a good reason why this should make any difference in their acceptability. Obviously it would be desirable to have actual remains of the body, but this desire applies equally to many fossil species as well. Whether the species is recent or ancient, we name it from the best material evidence that is available.

Such a type specimen of the North American sasquatch, or bigfoot, would consist of the three footprints of one individual that were cast on 16 June 1982. These footprints were found by U.S. Forest Service employee Paul Freeman within the Umatilla National Forest, in the Blue Mountains of southeastern Washington state, at a locality known as Elk Wallow. The circumstances of their discovery were recounted in the Newsletter of the International Society of Cryptozoology (1982a, 1982b). A description of the track casts themselves was subsequently published (Krantz 1983). The authenticity of these tracks has also been questioned (Dahinden 1984) and answered (Krantz 1984).

The sasquatch tracks indicate a foot of hominid design--the first toe is not opposed. It is probably too long (38 cm) and definitely too wide (17 cm) to be of *Homo sapiens* origin. The partial pattern of dermal ridges was of a generalized higher primate design. No recognized living species fits this description. *Gigantopithecus blacki*, as described above, would necessarily have left footprints of just this kind; while the maker of Elk Wallow tracks must have had a gigantic, bipedal, primate body. That these modern track makers have reportedly been seen and described allows us to assign some additional traits to them.

The reconstructed appearance of *G. blacki* and the description of the sasquatch are identical in all respects where they deal with the same features. This is true even if we limit our sasquatch data to the "type" footprints. These features are both numerous and distinctive enough that the possibility of two gigantic, bipedal, higher primates species can be considered very unlikely. In spite of this close correspondence, the normal procedure for naming the sasquatch would be to assign it new generic and trivial names. And the normal sequence of events would then be to sink these names as it becomes evident that the sasquatch is indeed *G. blacki*.

Rather than follow this time-honored procedure, I wish to reverse the sequence of taxonomic events here. Its equation with the known fossil form is proposed, then suggestions are made to *upgrade* its level of taxonomic distinction if and when new data should warrant this. It is realized that such upgradings as given here cannot be taken as official names, but it is hoped that they will be considered if and when the time comes.

The three footprints discussed above are hereby referred to the known species *Gigantopithecus blacki*, thus making it pointless to label them as the "type" specimen. Any and all other data relating to the animal commonly known as the North American sasquatch or bigfoot is similarly referred to this species. This genus is also treated as belonging to the family Hominidae on the basis of erect bipedal locomotion. This last point is in agreement with Weidenreich (1945), Woo (1962), Robinson (1972), Eckhart (1972), and Frayer (1974). It should also be noted that the identification of sasquatch with *Gigantopithecus* was suggested by John Green in 1968.

Future events may alter this identification. A temporal separation of about a million years, and a geographic separation of a few thousand kilometers could well mean there is a species-worth of difference between these two animals. The tropical location of the fossils, as contrast with the temperate forest habitat of the living form, should have led to considerable differences in diet and climatic adaptation. As soon as there

emerges a consensus that these contrasts merit a specific distinction, the sasquatch should be designated *Gigantopithecus canadensis*. This trivial name reflects the Nearctic distribution of most of the currently available reports of likely validity, as well as the location of the "type" footprints used here.

The future recovery of osteological remains of the sasquatch might also affect even its generic assignment. For example, gnathic parts might include much reduced canines and fully bicuspid lower anterior premolars. This would almost certainly refer the sasquatch to the other known fossil hominid genus, *Australopithecus*. Given at least the same temporal and geographic distinction as from *Gigantopithecus*, and especially with an additional size contrast, a new species certainly would be warranted. In this eventuality it should be known as *Australopithecus canadensis*.

The future discovery of postcranial remains of the Asian *G. blacki* might show that our presumption of erect bipedalism for the fossil form was incorrect. It is at least remotely possible that *G. blacki* may someday prove to have been a terrestrial quadruped, maybe a knuckle walker like the recent African apes. Such a locomotor contrast with the known bipedalism of sasquatch would require a generic distinction. Assuming in this scenario no reason to link sasquatch with *Australopithecus*, we would then have to create a new genus for it. For this eventuality I propose *Gigantanthropus*, with the same trivial name of *canadensis*. The "anthropus" would fit well with its continued inclusion in Hominidae. The "pithecus" ending of *Gigantopithecus* would become more appropriate, as these fossils would then have to be moved into the Pongidae. (The generic name of "Gigantanthropus" was proposed by Weidenreich in 1945 as being more accurately descriptive of the fossil form, but priority ruled out this usage, and the name is still available.)

The desirability of recovering more physical remains of this species is self-evident, both for the fossil and the living forms. Better evidence is needed for all cryptozoological species, by definition, otherwise they would not have been classed as "hidden" animals. Any and all efforts in this direction should be encouraged. However, I think it is equally important that serious scientific investigation be made of the existing evidence for the sasquatch. The fact that much of this evidence has been fabricated and/or misinterpreted should not rule out such studies. False leads have often hampered science, and they continually plague criminal investigations as well. We have well-established procedures for separating fact from fiction; they need only be applied in an open-minded manner to the subject at hand.

We cannot rule out the possibility, however remote it may be, that our "type" specimen of the sasquatch was somehow fabricated. By exercising the same degree of caution we might also be reluctant to accept many fossil species that have been described from no better evidence. I think it is more prudent to proceed on the assumption that the existence of the sasquatch is at least a reasonable possibility and to give it a formal scientific name. This should serve to structure further inquiry into this matter along sober lines, and to discredit some of the unfounded speculation.

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