An Examination of the History, Characteristics, and Significance of the Hominid Species *Homo habilis*

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April 12, 2015

Introduction

The earliest identified species within the genus *Homo* is the hominid known as 'the handy-man', or more formally, *Homo habilis*. Originally unearthed in 1960 in Tanzania, this hominid is characterized by an increase brain size relative to its Australopithecine ancestors as well as its extensive tool use.

Discovery

The fossils eventually known as *Homo habilis* in 1964 were initially discovered and identified in 1960 by Louis and Mary Leaky in Olduvai Gorge, Tanzania. The first findings of this species included a molar and a fragment of a mandible in 1959 (Olduvai Hominid 4), but it wasn't until the Leaky's son, Jonathan, discovered the individual Olduvai Hominid 7 (OH 7), which consisted of a juvenile's jaw, teeth, and a few hand bones, that great progress was made in identifying the new species (Fleagle, Grine, and Leaky, 13). After studying these and other fossils found shortly after and comparing them to previously identified fossils, Louis Leaky along with Phillip Tobias and Joseph Napier published their report that placed OH 7 and several other fossils in the new species *H. habilis* (Leaky, Tobias, and Napier 7).

Geologic Context

The fossils found in Olduvai Gorge came from the upper Villafranchian and lower middle Pleistocene geological horizon, which places the fossils around 2 million years ago (Leaky, Tobias, and Napier, 8). The fossils were primarily found in Bed I and the lower part of Bed II of Olduvai Gorge, and the clay stone and tuff of this layer, where most faunal remains were found, reveal the evidence of lake and lake margin deposits in the area (Hay, 47).

The *H. habilis* fossils discovered thus far are dated to be between 2.4 and 1.4 million years ago. The age of Bed I was determined to be between 2.03 and 1.75 million years old (± 0.28) in a

study done in 1968. The stratigraphic layer was dated using the newly discovered potassium argon dating method along with a method known as fission-track dating (Leaky, Reinger, and Rainer, 559). Potassium argon dating measures the amount of radioactive potassium isotopes (K-40) in volcanic rock and uses the known decay rate of K-40 to the gas Argon-40 to determine the age of the rock ("Potassium Argon Dating"). Additionally, fission track dating is a single crystal method that is used to reconstruct low heat temperatures in upper crust rock. This method uses temperature and denudation rates to determine how much sediment is deposited to basins in a given amount of time ("Fission Track Dating Method").

By examining the types of sediment present in Bed I, it was determined that the area contained many lakes, and fossil evidence and root casts in the soil reveal that swamp vegetation and evergreen forests were abundant in the area. At the time of *H. habilis*, the gorge was likely far more humid than today and experienced changing water levels and volcanic lava flows frequently (Hay, 47).

Description

Primarily only fragmented pieces bones like mandibles, molars, and hand and feet bones have been discovered in Olduvai Gorge, but there have been several discoveries of mostly complete skulls that have contributed significantly to the clarification of *Homo habilis* features. As discussed in the original 1964 publication about *H. habilis,* OH 7, which was the first significant discovery to lead to the classification of *H. habilis*, was determined to be the type fossil for the species. Other significant fossil evidence in Olduvai Gorge includes paratypes OH 13 (partial cranium and teeth belonging to a adolescent), OH 8 (hand, feet, and clavicle bones of an adult individual), and OH 6 (greatly fragmented mandible and teeth along with portions of the tibia and fibula) (Leaky, Tobias, and Napier, 8)

The handy-man fossils were determined to have a larger cranial capacity relative to *Australopithecines* but smaller to that of *H. erectus,* and the discovered mandibles and sagittal crests on the occipital bones were similar to modern humans. The molars found were generally smaller than the average *Australopithecine* and slightly larger than *H. erectus* molars, indicating an expected gradual decrease in molar size as the hominids' diets developed *(*Leaky, Tobias, and Napier, 8*)*. Additionally, the foot bones, with developed longitudinal and transverse arches, were very similar in structure to that of modern *H. sapiens*. These observances of the feet, combined with the human like clavicle bone structure and studies of tibia and fibula remains clearly indicate that *H. habilis* had fully striding gait typical of a regular biped (Susman and Stern, 933).

The hand bones discovered of *H. habilis* are more robust than modern humans but have similar phalange characteristics. However, the *H. habilis* phalanges demonstrate a primitive curvature and broken proximal phalanges, which indicates a very strong grasping ability similar to that of modern chimpanzees or gorillas (coordinating with the proposed use of tools that the *H. habilis* is believed to have used) (Susman and Stern, 932).

Taxonomy

When these fossils were initially discovered, anthropologists believed the remains might belong to an *Australopithecine,* but Leaky and other scientists determined this to be incorrect and instead assigned the fossils to the unique classification of *Homo habilis*; the term "habilis", which was suggested by famous anthropologist Raymond Dart, comes from the Latin word for able, handy and mentally vigorous, which consequently led to the species' nickname "handy-man" (Leaky, Tobias, and Napier, 8).

Phylogeny

Homo habilis has been determined to be the earliest species in the genus *Homo* discovered

thus far, and thus an ancestor to the later species *H. ergaster, H. erectus,* and *H. sapiens* (Leaky, Tobias, and Napier, 7). The fossils were found with many stone tools, which suggests that *H. habilis* was likely one of the first species to use stone tools extensively, an important step forward in the cultural evolutionary tree. *H. habilis* is believed to have been a descendent of the *Australopithecines,* and fossil evidence from Olduvai Gorge suggests that *Australopithecines* were still alive when *H. habilis* evolved, and these branches coexisted in Tanzania for many years (Leaky, Tobias, and Napier, 9).

Conclusion

The discovery and classification of *Homo habilis* was a very significant step in determining a more complete phylogenetic tree of *Homo sapiens* as it linked the evolution from *Austrolopithcines* to the genus *Homo*. The increased brain size, which allowed for more cognitive skills like employing stone tools, is an important development in human evolution.

Works Cited

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