



HUMAN EVOLUTION IN A NUTSHELL:

AN INTRODUCTION TO HUMAN EVOLUTION

PART 2.2: THE AUSTRALOPITHECINES OF SOUTH AFRICA

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In part 2.1 we looked at the australopithecines of East Africa. *Australopithecus anamensis* appeared just over 4 million years ago. The best known species was *Australopithecus afarensis*, the species to which the famous Lucy belongs.

In part 2.2 you will learn about:

- The australopithecines of South Africa
- *Paranthropus* - the 'robust' australopithecines
- The origins of the australopithecines

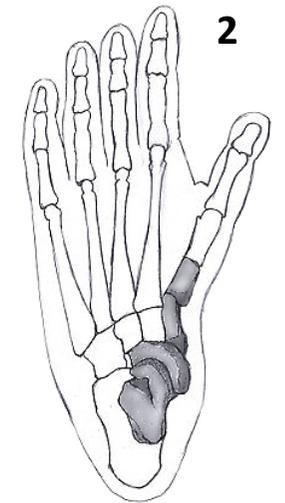
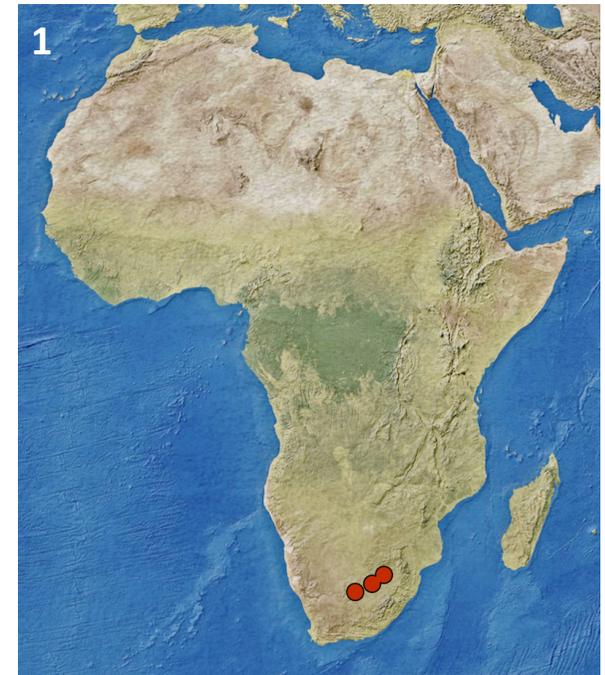
AUSSTRALOPITHECUS AFRICANUS

As described in part 2.1, *A. africanus* was discovered by Raymond Dart in 1924 when he discovered the face and brain (endocast) of a young hominin at Taung, South Africa, dated to 2.5 ma.

The central position of the *foramen magnum* (hole for the spine) on the base of the skull indicated an upright bipedal gait.

Dart also believed that the australopithecines were bloodthirsty predators. It is now thought that the australopithecines were more likely to have been the hunted rather than the hunters and the Taung Child actually has clear eagle claw marks on top of the skull and puncture marks in its eye sockets.

After the finds of Robert Broom in the 1940s there were other notable finds in the intervening decades, all of them from South Africa. One such example is “*Little Foot*”, which was found in a box in 1995 though first excavated in the 1970s! *Little Foot* was found at Sterkfontein and has been dated to as old as about 3.5 ma (fig. 2). It is most notable for still having a divergent big toe, which is an apelike feature and indicates good climbing ability.



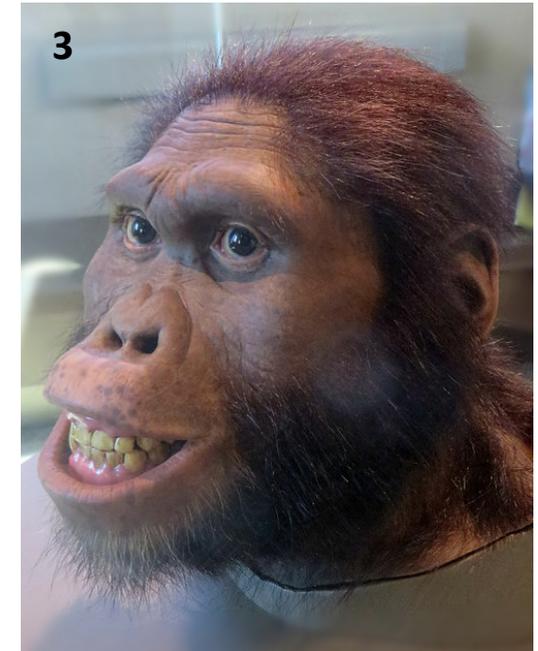
Overview of *Australopithecus africanus*

A. africanus lived from 3.3 to 2.1 million years ago, thus later than *A. afarensis* (3.9-2.9 ma), but nevertheless somewhat overlapping in time. It is the oldest known hominin from South Africa.

A. africanus generally has a slightly larger brain than the East African *A. afarensis* (440 cc vs. 400 cc). It also has a somewhat more human-like face (shorter snout), jaws and teeth than *A. afarensis*. The molars were fairly large and the teeth overall suggest a more generalised diet of fruit, seeds, nuts, and perhaps some meat, and a tougher diet overall than for *A. afarensis*. Overall, above the neck *A. africanus* is more human-like.

Curiously, it seems that *A. africanus* may have been more apelike below the neck than the older *A. afarensis*. The forelimbs were more massive and slightly more apelike in their form. Furthermore, the divergent big toe of “Little Foot” is also more apelike. However, like *A. afarensis*, *A. africanus* was still clearly a biped, but with very good tree-climbing adaptations.

It is also thought that *A. africanus* lived in wooded environments, which is consistent with its anatomy.



AUSTRALOPITHECUS SEDIBA

In 2008-09 a completely new species of australopithecine was discovered in the Malapa Nature Reserve in South Africa. Six skeletons were found at the bottom of a cave and have been dated to just under 2 million years ago, so shortly after the last appearance of *A. africanus*.

The brain size is about the same as for *A. africanus* (about 450 cc). However, the jaw and tooth size are quite similar to early members of the genus *Homo*, though in certain details the teeth do resemble other australopithecines.

Below the neck, *A. sediba* has an interesting mix of features. The hand bones seem very modern, indicating a precision grip, and perhaps by extension tool-making ability. Other aspects, such as the heel bone, are more apelike.

As of yet the exact relationship of *A. sediba* to earlier australopithecines and to *Homo* remains unclear. In terms of anatomy it does seem similar to early members of *Homo*, but as will see in the next part of this course, 2 million years ago is a little too late to be ancestral to *Homo*.



***PARANTHROPUS* - THE ROBUST AUSTRALOPITHECINES**

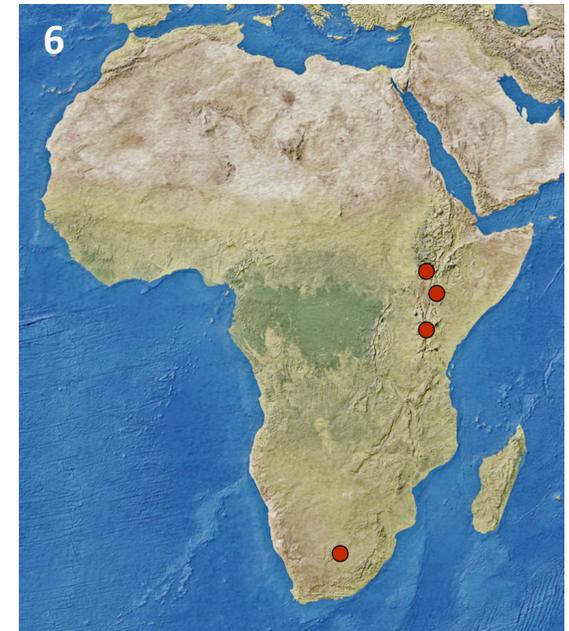
The *Australopithecus* species that we have already looked at are often referred to as the 'gracile australopithecines', gracile meaning slender. They are contrasted with the 'robust australopithecines', of the genus *Paranthropus*. However, the robustness of *Paranthropus* was only of the teeth and jaws.

Paranthropus aethiopicus

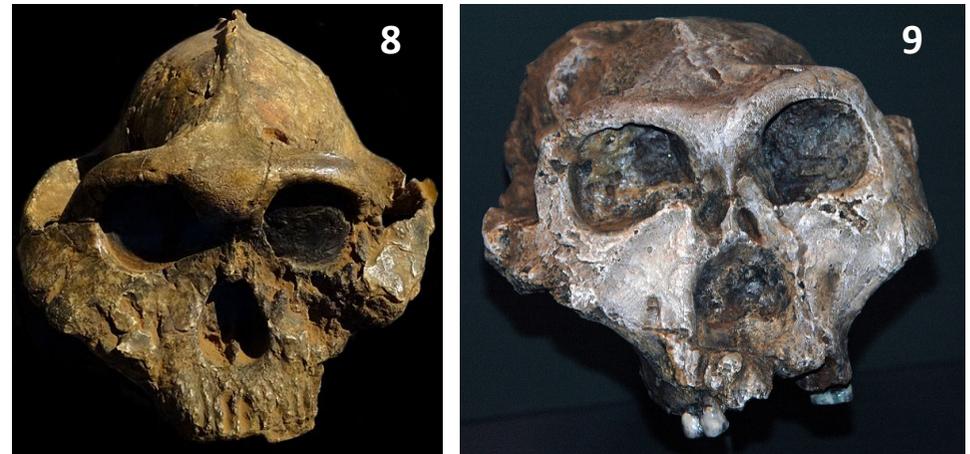
Paranthropus aethiopicus is the earliest Robust, living from 2.7-2.3 ma. The face projected forwards similar to *A. afarensis* but had huge rear teeth. It had a large crest on the top of the skull - the sagittal crest - for the attachment of strong jaw muscles (fig. 7).

Paranthropus boisei* and *Paranthropus robustus

These two species were probably geographical variants of the same species. *P. boisei* lived in eastern Africa while *P. robustus* in southern Africa. They lived from about 2.2 to 1.3 million years and survived long after the appearance of the genus *Homo*.



They had larger brains than *P. aethiopicus* and far flatter faces. Of the two, *P. boisei* had the more robust teeth and jaws (fig. 8). Sagittal crests are also present. Below the neck they seem to have been similar to other australopithecines. The remains of *P. robustus* (fig. 9) have been found associated with digging sticks, perhaps for digging up foods such as roots and tubers.



The Diet of *Paranthropus*

The huge teeth of *Paranthropus* indicate different dietary adaptations - but what exactly?

Bone chemistry suggests it was somewhat omnivorous and so it was not a pure vegetarian. *Paranthropus* teeth show more pitting than for *A. africanus*, which indicates a tougher diet. It is likely that fruit was eaten when available but that hard and tough foods, such as seeds, nuts, roots, and tubers, were eaten as fallback foods during times of the year when fruit was relatively scarce.



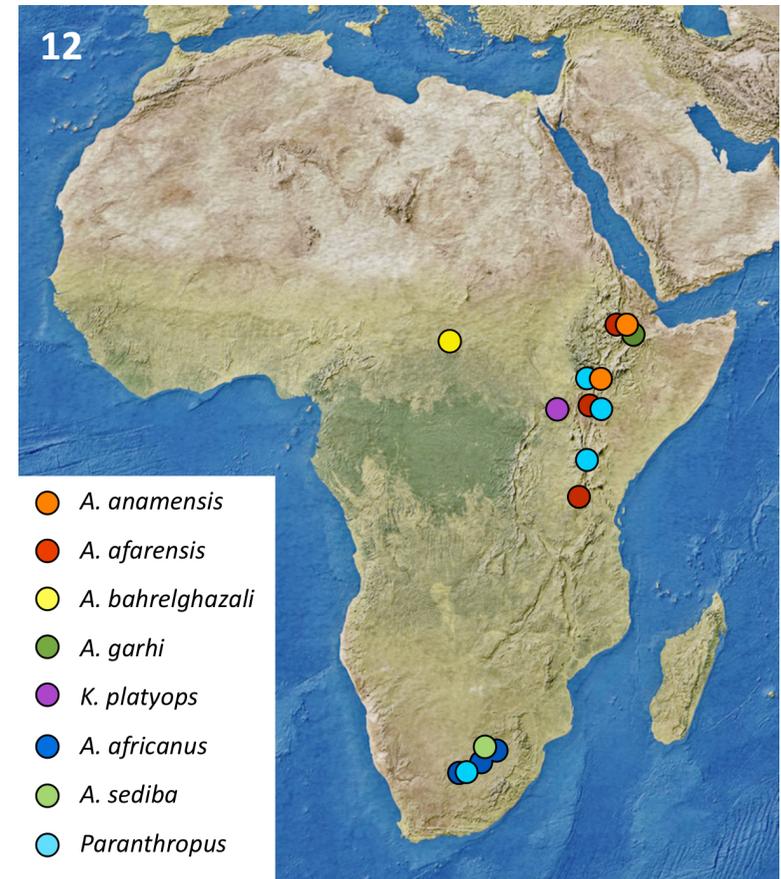
P. boisei (left) and *A. africanus* (right). Note the much wider cheek bones and jaws of *P. boisei*.

OVERVIEW OF THE AUSTRALOPITHECINES

About 4.2 million years ago the australopithecines seem to have originated somewhere in East Africa where most of the earliest hominin fossils have been found, such as *Ardipithecus* or *Orrorin*. However, *Sahalanthropus* found in Chad shows that an origin elsewhere is a possibility. The earliest australopithecines had relatively small teeth and jaws and can be termed *Gracile Australopithecines*, the most famous East African species is *A. afarensis*.

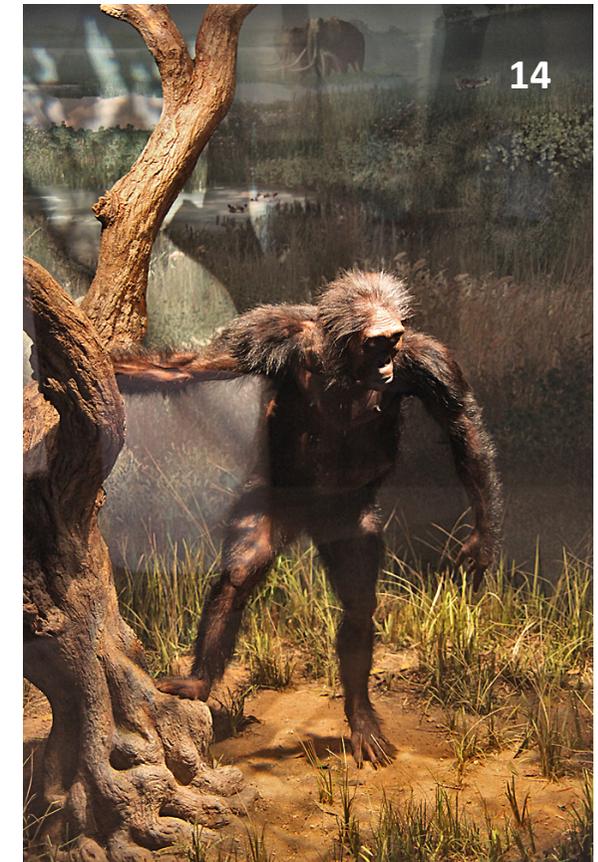
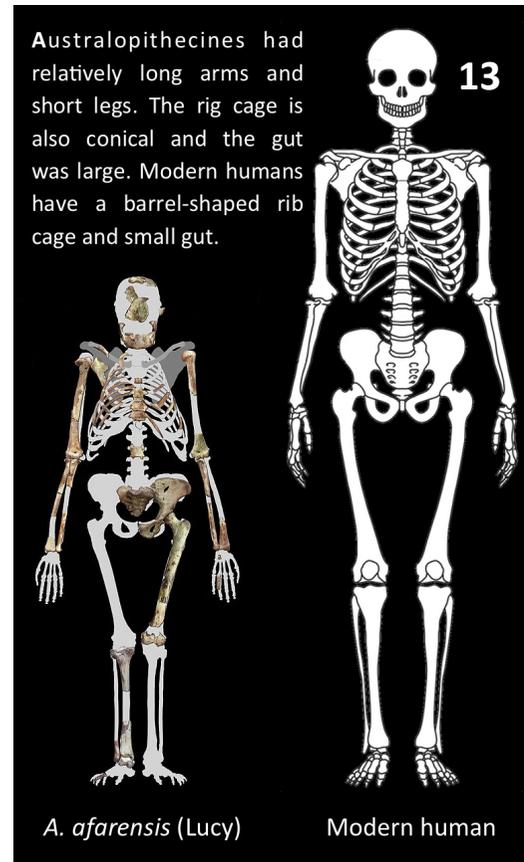
At some point a little over 3 million years ago the ‘graciles’ migrated to southern Africa where we find the species *A. africanus* and *A. sediba*, which survived until about 2 million years ago.

By about 3.3 ma the australopithecines began to diversify in East Africa as shown by the flat-faced *Kenyanthropus platyops*. Further diversification took place with the ‘robust australopithecines’, *Paranthropus*, whose larger teeth indicate an adaptation to tougher, harder food than the graciles. By 2 ma the ‘robusts’ also spread to southern Africa. The robusts are the last known australopithecines, surviving until around 1.3 ma.



In sum, australopithecines can be described as bipedal apes. They were clearly proficient bipeds, though probably rather more walkers than runners. But they also would have had good climbing ability and probably still slept in trees as chimpanzees do. Their brains were also still ape-sized.

All australopithecines had, relative to modern apes, small front teeth (incisors and canines) and large rear teeth (premolars and molars). *Paranthropus* merely took this trend to the extreme and probably specialised in much tougher foods.



Yet we must resist the temptation to view the australopithecines as merely a step towards humanity. They were evolutionarily adapted to a way of life entirely unto itself and practiced this way of living in the trees yet bipedal on the ground for several million years, in one form or another. And one australopithecine was also the ancestor of the genus *Homo*, who we will meet in Part 3.

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