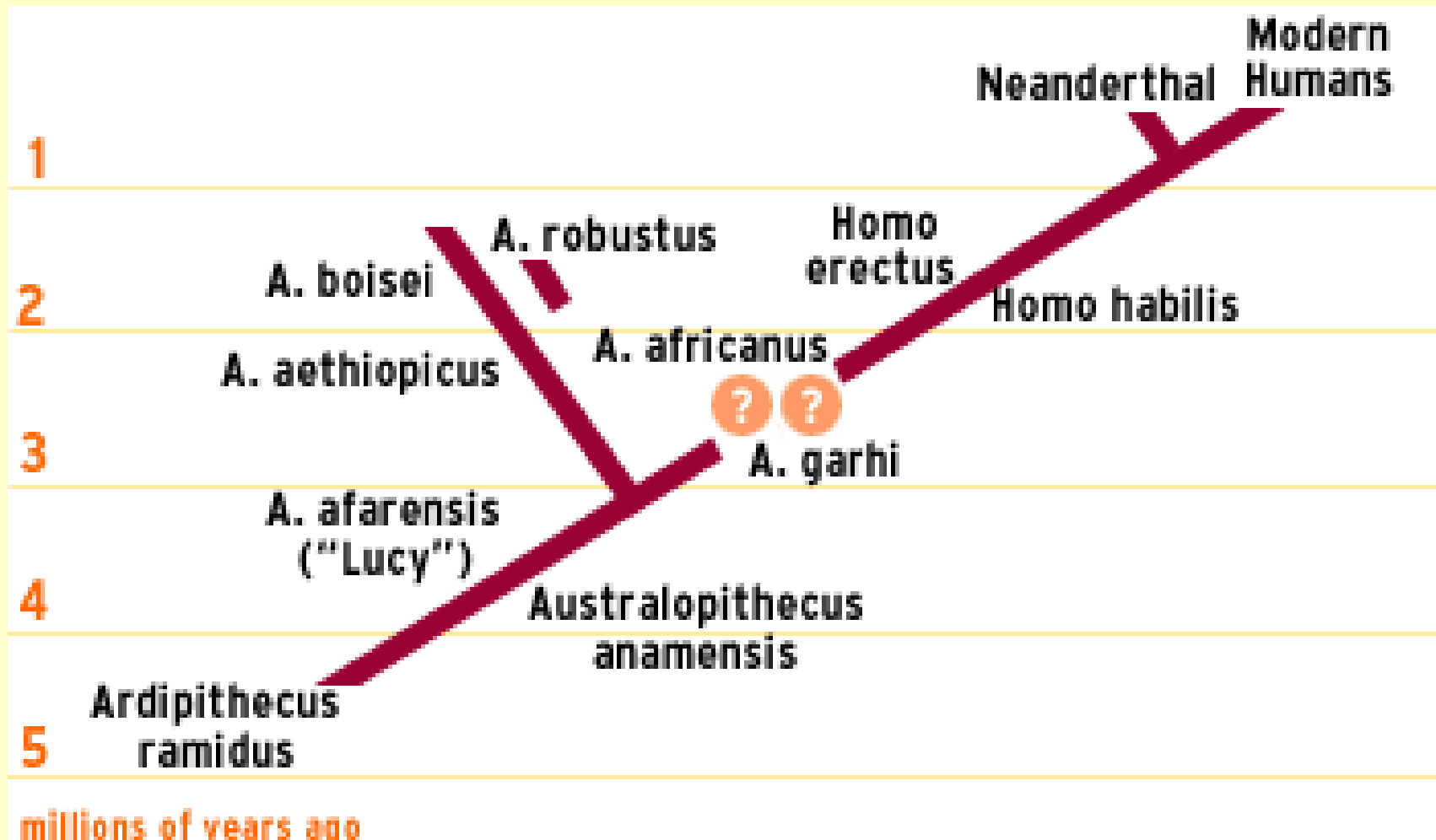


Australopithecus garhi

- Recently discovered 2.5 m.y.a. hominid as a site in Ethiopia
- Associated with crushed bones
- In the right place and dates from the right time to have given rise to later humans
- The skull of *A. garhi* looks very different from *A. africanus*, surprisingly primitive with a protruding apelike face.
- Looks like a scaled-up *afarensis* except its brain stayed small with a capacity of about 270cc

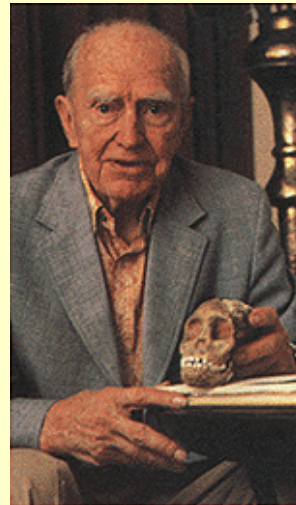


A. garhi phylogenetic relationships



The Taung Baby

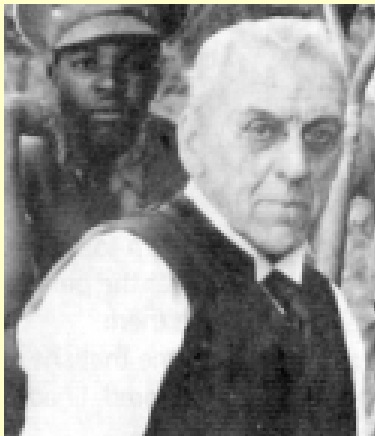
- The first Australopithecine discovery
- Described by Raymond Dart as a hominid based on dental and cranial features
- Given the name:
Australopithecus africanus
- Not accepted at first because of Piltdown



Raymond Dart

Australopithecus africanus

- Initially described by Robert Broom as a new genus, *Pleisanthropus*
- Remains of this comparatively lightly built or "gracile" species of australopithecine have been recovered from sites in South Africa (Sterkfontein, Makapansgat and Taung)
- Its presence in East Africa is subject of dispute

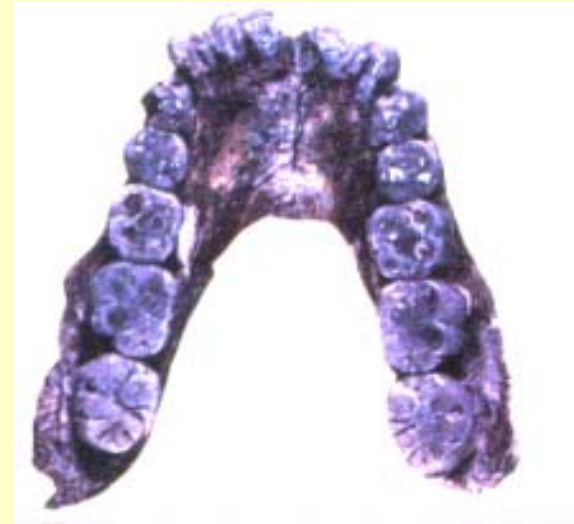


Robert Broom



Australopithecus africanus dental features

- No sectorial canine function, canines only wear on the tip not on the back edge as in *A. afarensis*
- No gap (diastema) between canines and premolars
- Lacks a sectorial lower premolars. premolars are similar in shape and used for grinding
- Molars are bigger than in *A. afarensis*



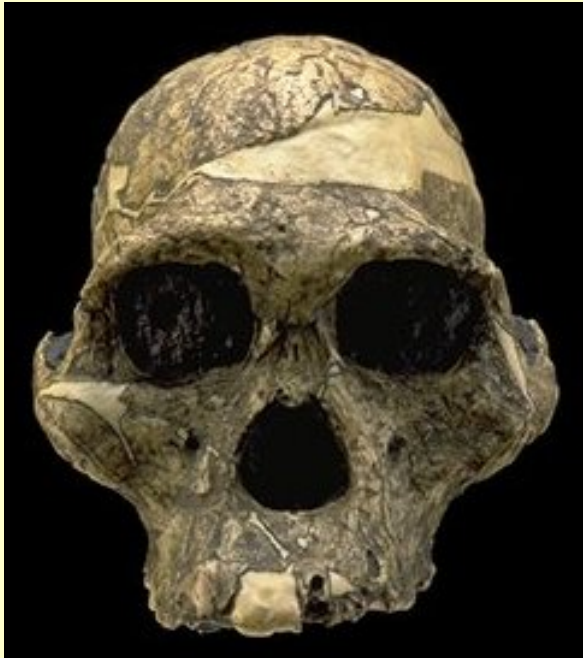
• *A. afarensis*



• *A. africanus*

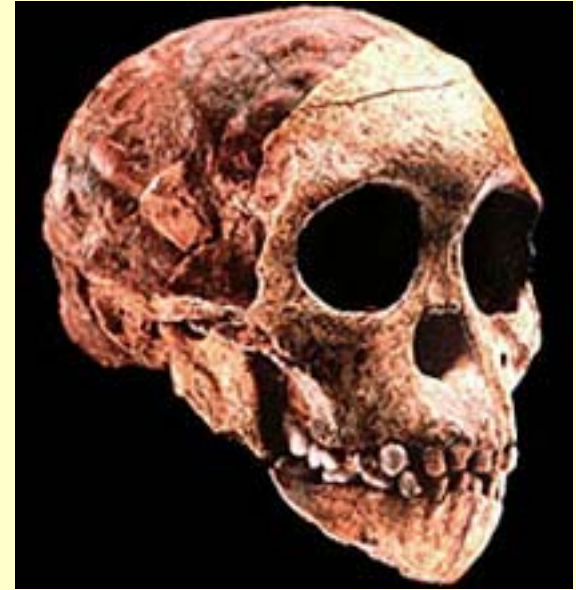
Cranial Features of *Australopithecus africanus*

- Brain case is small and rounded
- Considerable facial prognathism with a "dished out" facial profile



The Brain of *Australopithecus africanus*

- Average cranial capacity around 450 to 500 cc
- Foramen magnum is located under vault for bipedalism
- Studies of internal casts of the braincase indicate an expansion of areas associated with higher cognitive functions.
Whether or not lateralization was present is unclear from available material



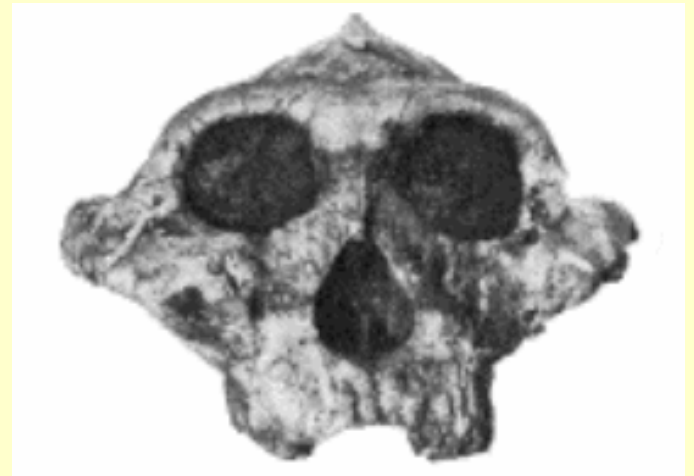
Post-Cranial Features of *Australopithecus africanus*

- Pelvic and femoral anatomy indicates full bipedalism
- Some foot bones have been interpreted as indicating that the feet were adapted for climbing



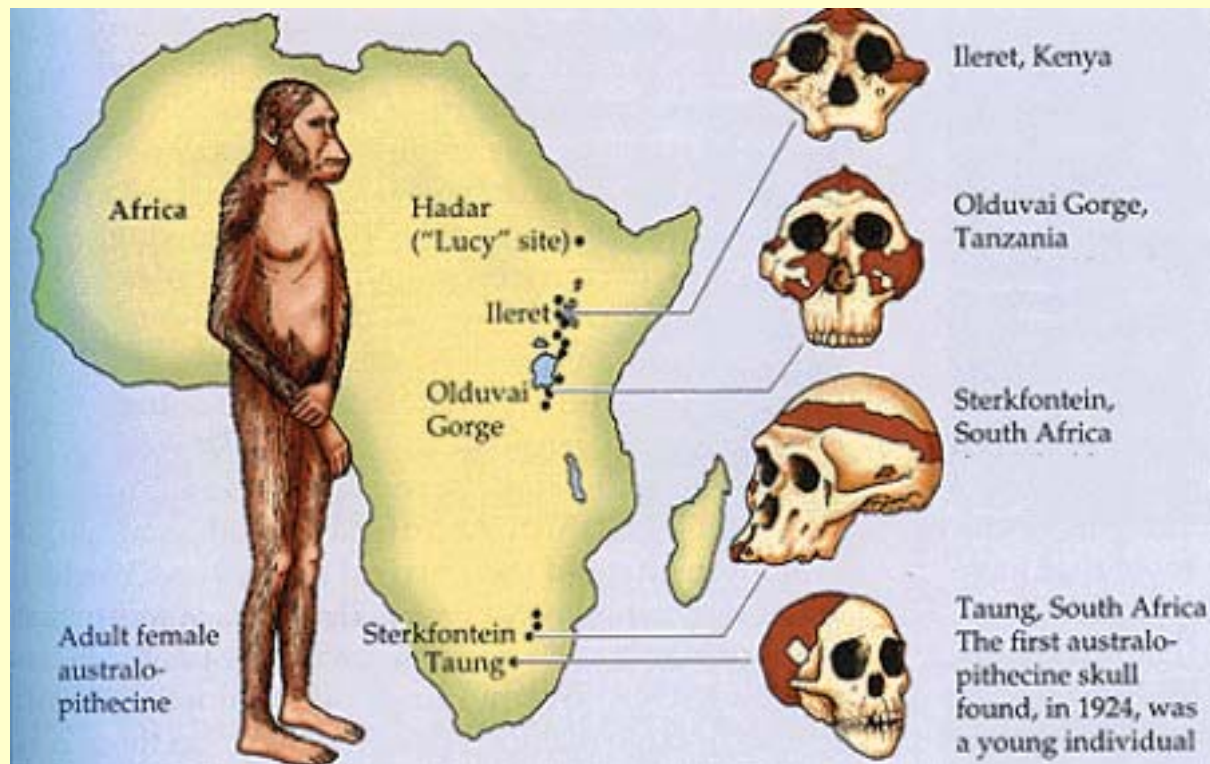
Australopithecus robustus

- Also known as *Paranthropus robustus*
- This is a heavily built species of *Australopithecus* the remains of which date later than those of the *A. africanus*.
- It appears to have evolved into a hyper-robust form known as *Australopithecus boisei* that persisted in Africa until as late as 1.3 million years ago.



Sites containing robust Australopithecine remains

- South Africa (Kromdraai, Swartkrans, Makapansgat)
- East Africa (Omo, Olduvai Gorge, East Lake Turkana)



A. robustus Cranial Features

- Face is less prognathic than in *A. africanus*
- Sagittal crest is frequently present in males
- Heavy cheek bones for attachment of the masseter muscle indicates heavy chewing
- Cranial capacity between 500 cc and 540 cc is somewhat larger than of *A. africanus*



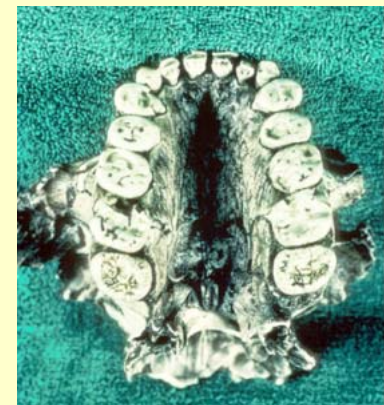
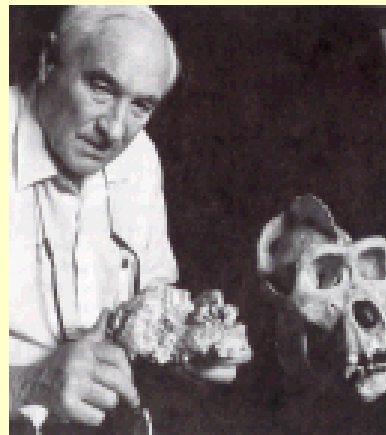
A. robustus Dental Features

- **Parabolic dental arch**
- **Continuation of trend toward increase in molar size**
- **Thick enamel on molars**
- **Evidence of tooth development indicates the rate of maturation was intermediate between that of modern humans and great apes**



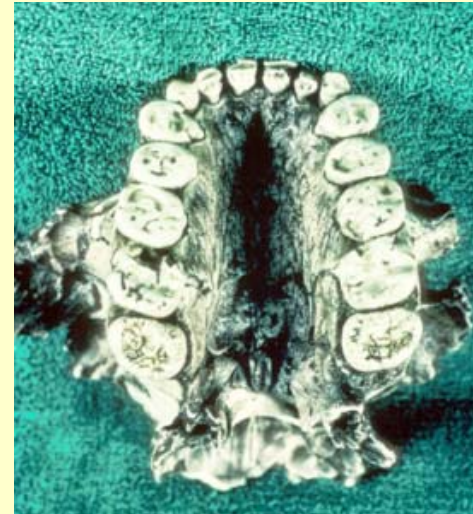
Discovery of *Australopithecus boisei*

- Hyper-robust australopithecine discovered in 1959 by Mary Leakey at Olduvai Gorge, Tanzania,
- Described as a new genus: *Zinjanthropus boisei*
- K-Ar dates on an overlying basalt indicates a date of ca 1.8 mya.



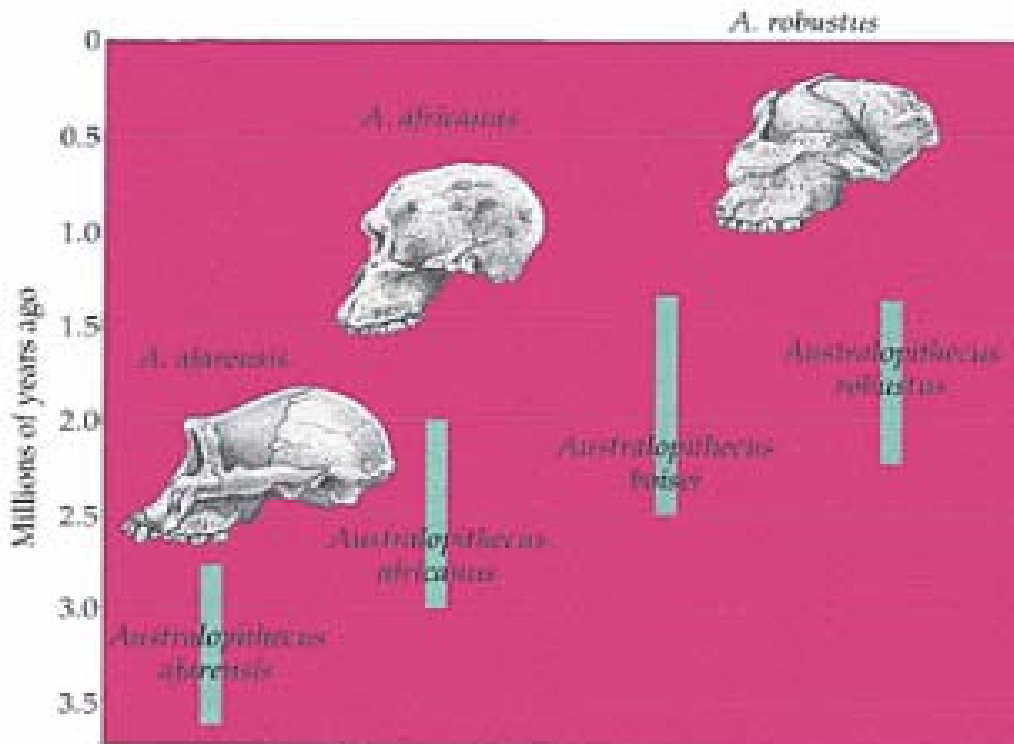
A. boisei dental features

- Massive molars indicate an adaptations that involved heavy chewing
- Reduced canines and incisors suggest foods consumed required little incisor preparation before ingestion



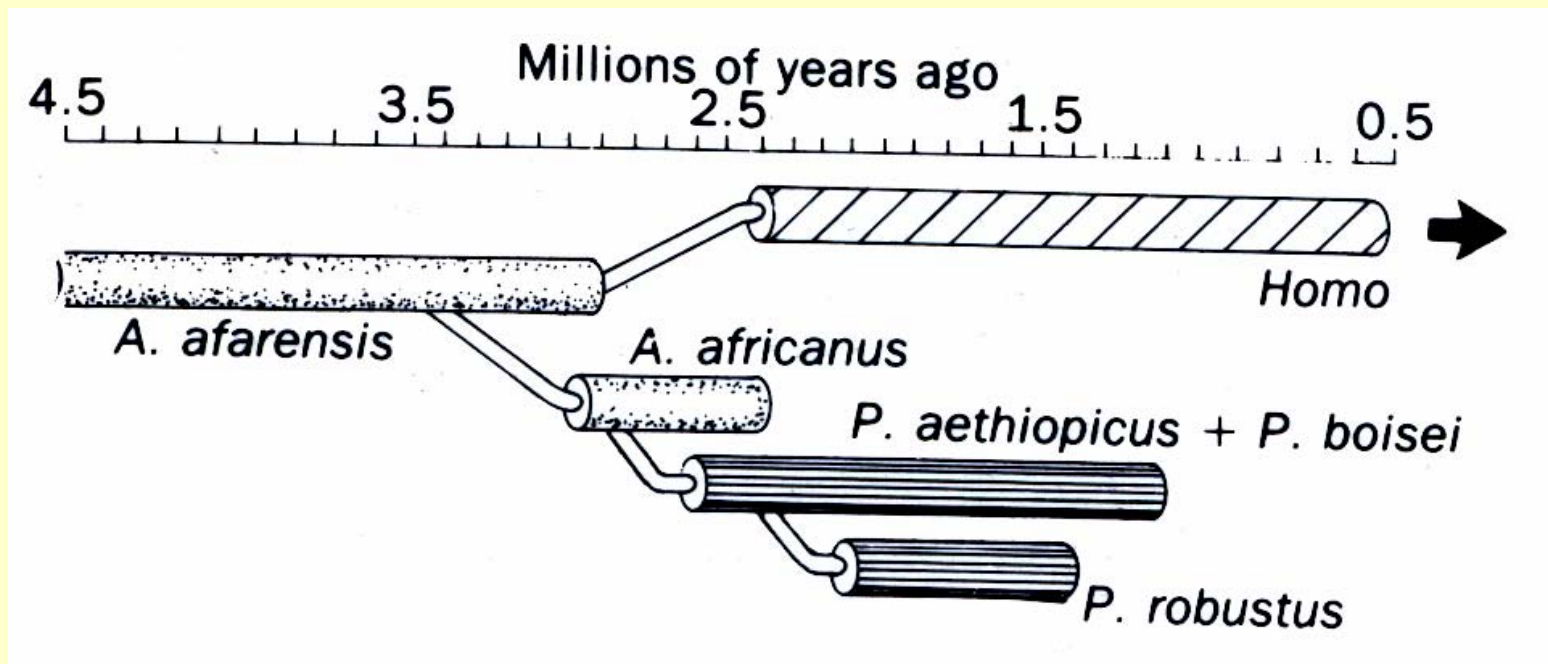
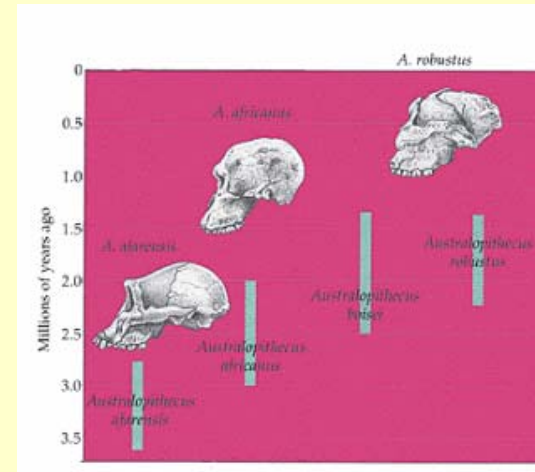
A. boisei cranial features

- Flat face and jaws placed under the cranial base suggest a masticatory adaptation that emphasized heavy chewing



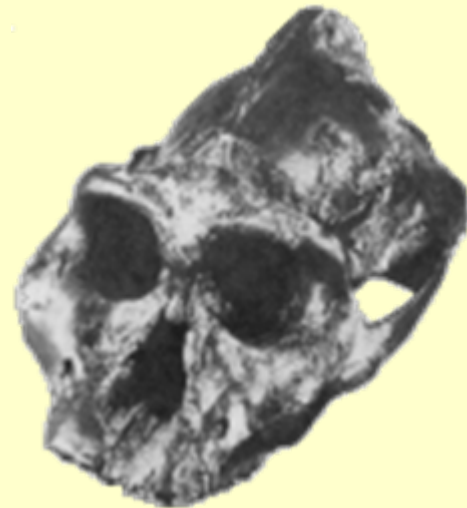
Phylogenetic relationships of *A. boisei*

- Relatively late disappearance suggests that it was a specialized form that became marginalized and eventually was driven to extinction

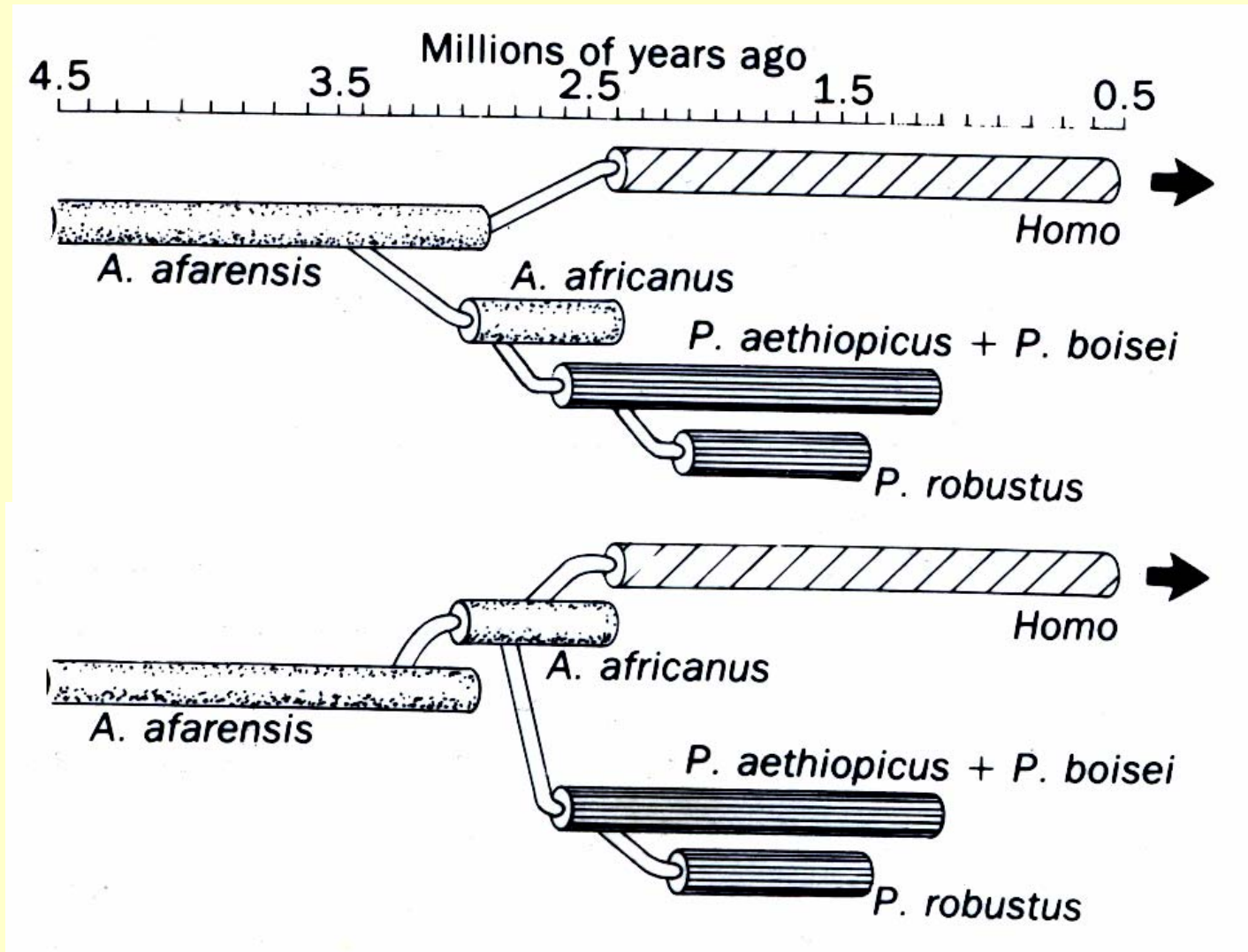


Australopithecus aethiopicus

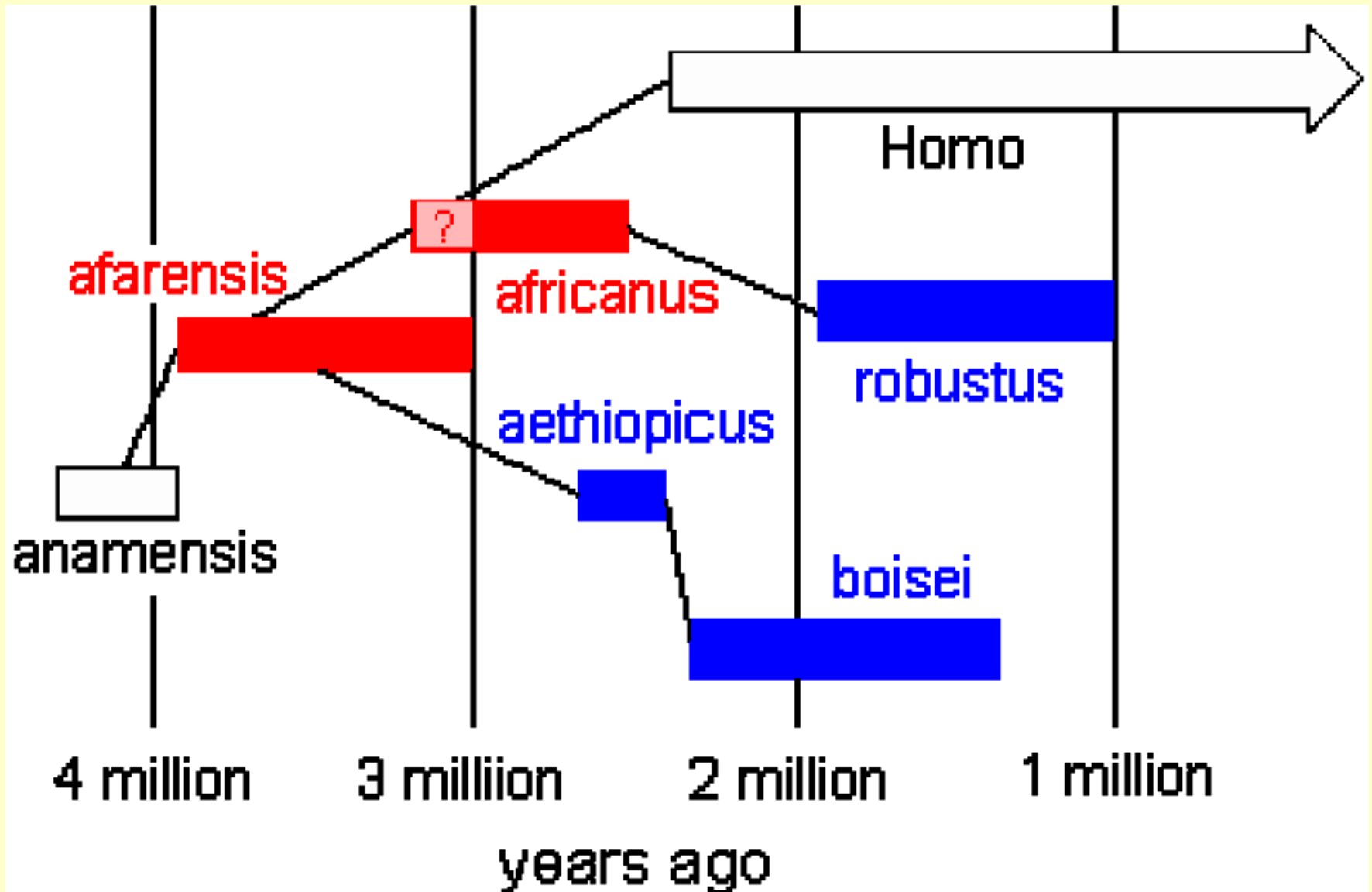
- **Most complete specimen is known as The "Black Skull"**
- **Heavily built, small brained australopithecine**
- **Found in an east African deposit that dates to around 2.5 million years ago**
- **This early date for a robust australopithecine has made paleontologists re-evaluate their theories of australopithecine evolution.**



A. aethiopicus phylogenetic relationships



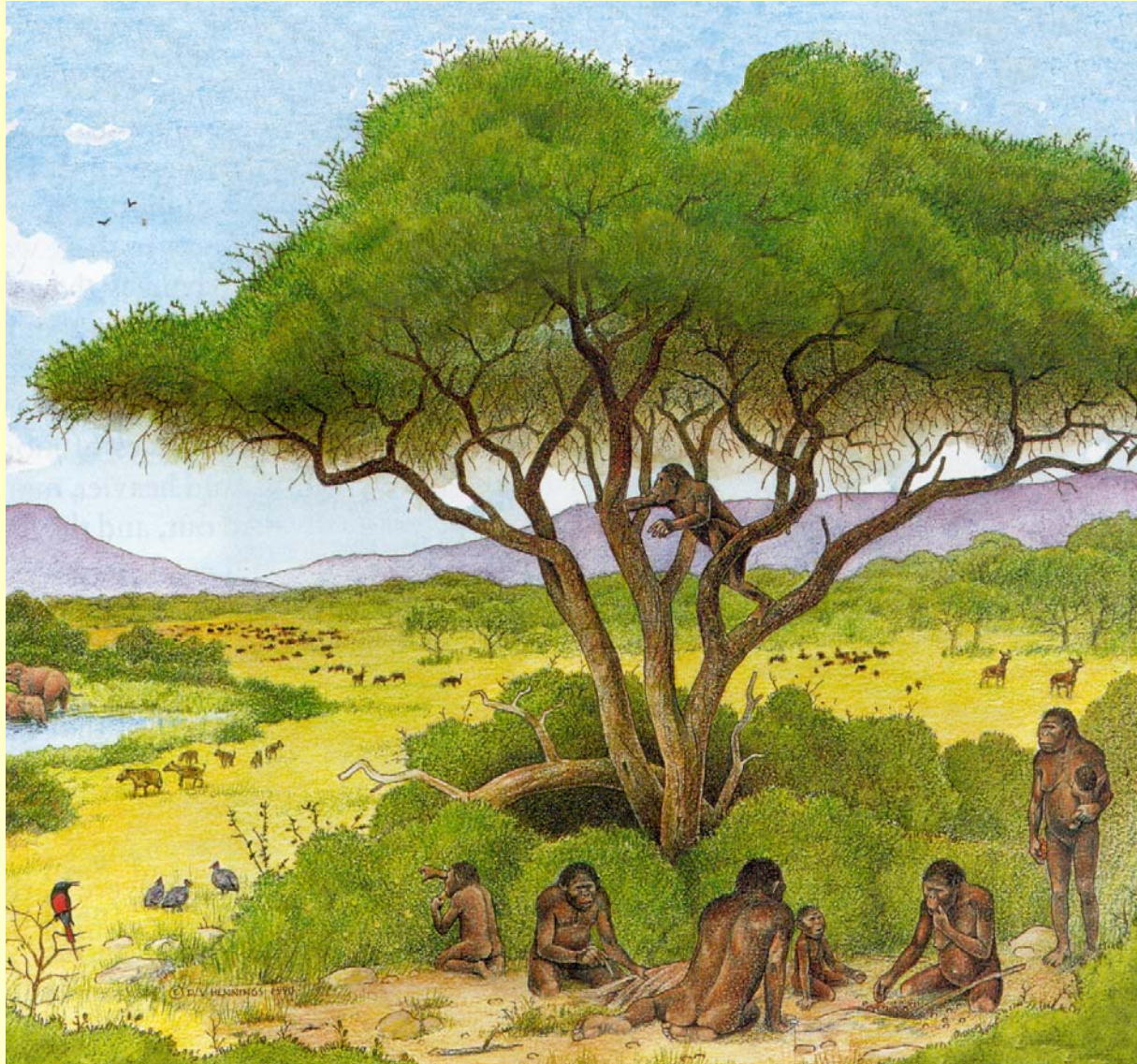
Separate East and South African robust lineages?



Trends in Australopithecine evolution

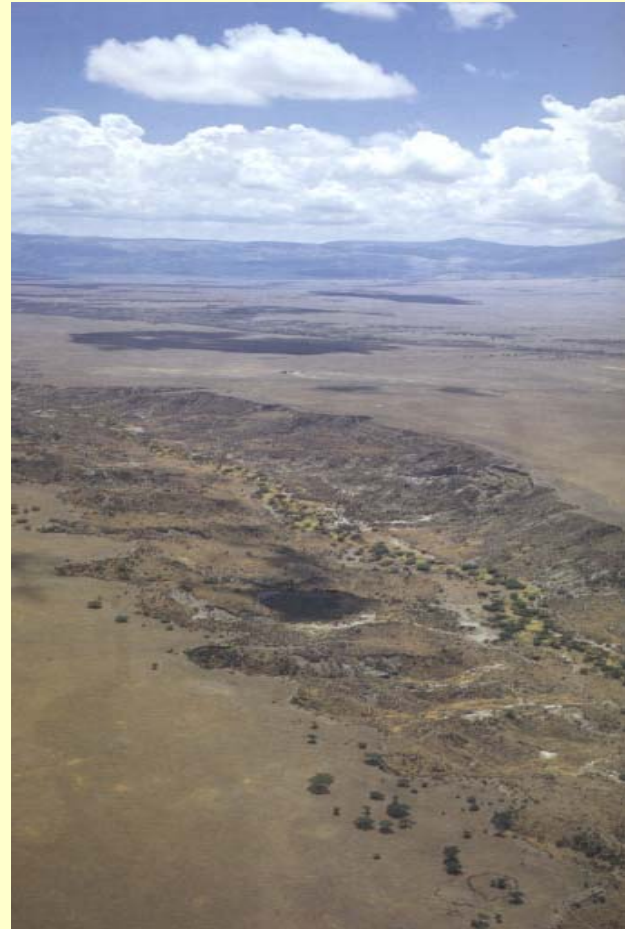
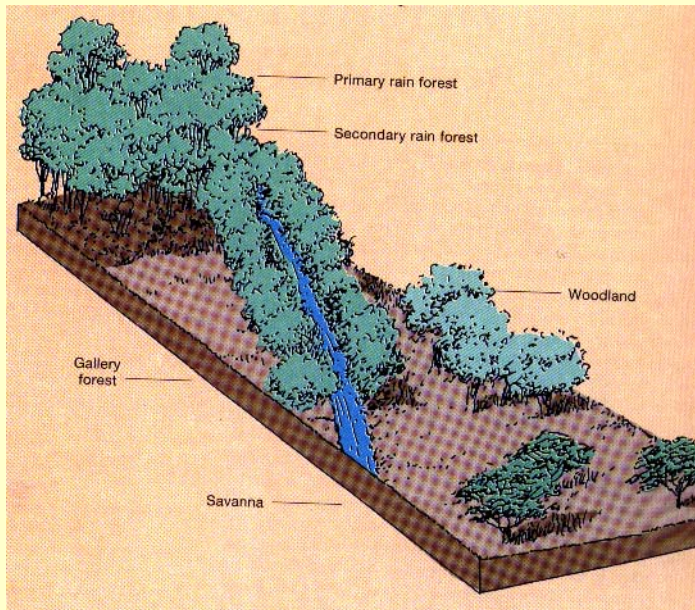
- Premolars lose their shearing function and take on the grinding function of the molars
- The relative size of the molars increases as grinding becomes more important
- There is a reduction in facial prognathism and a development of the cheek bones for heavy chewing muscles
- Increase in brain size and perhaps internal reorganization of the brain accommodates higher cognitive functions
- There is some evidence for an increase in the length of the developmental period over that found in apes

Early Hominid Environments



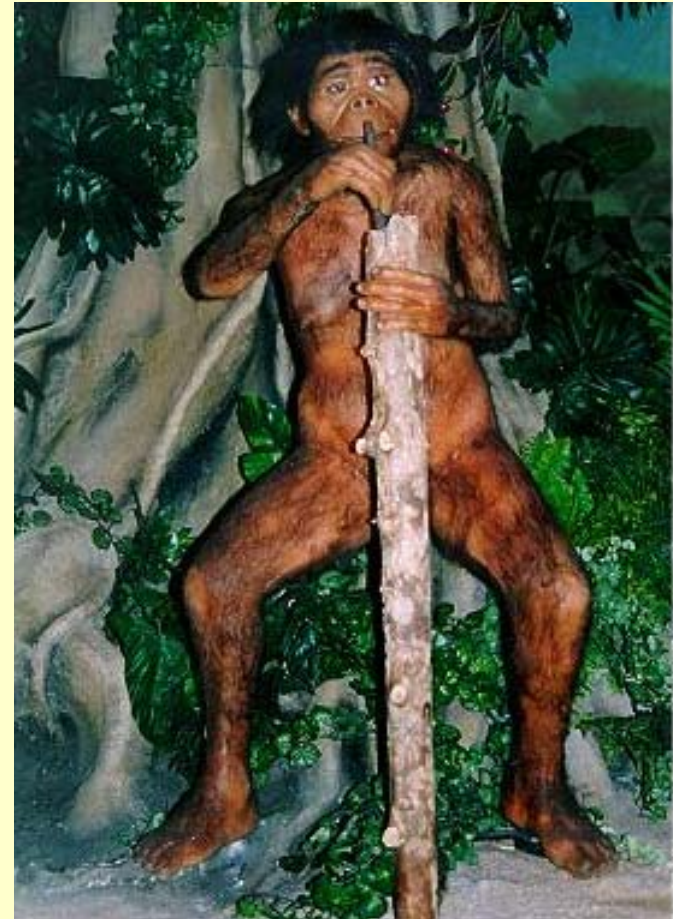
Olduvai paleoecology

- Geological evidence suggests that early hominids were living in a lakeside environment



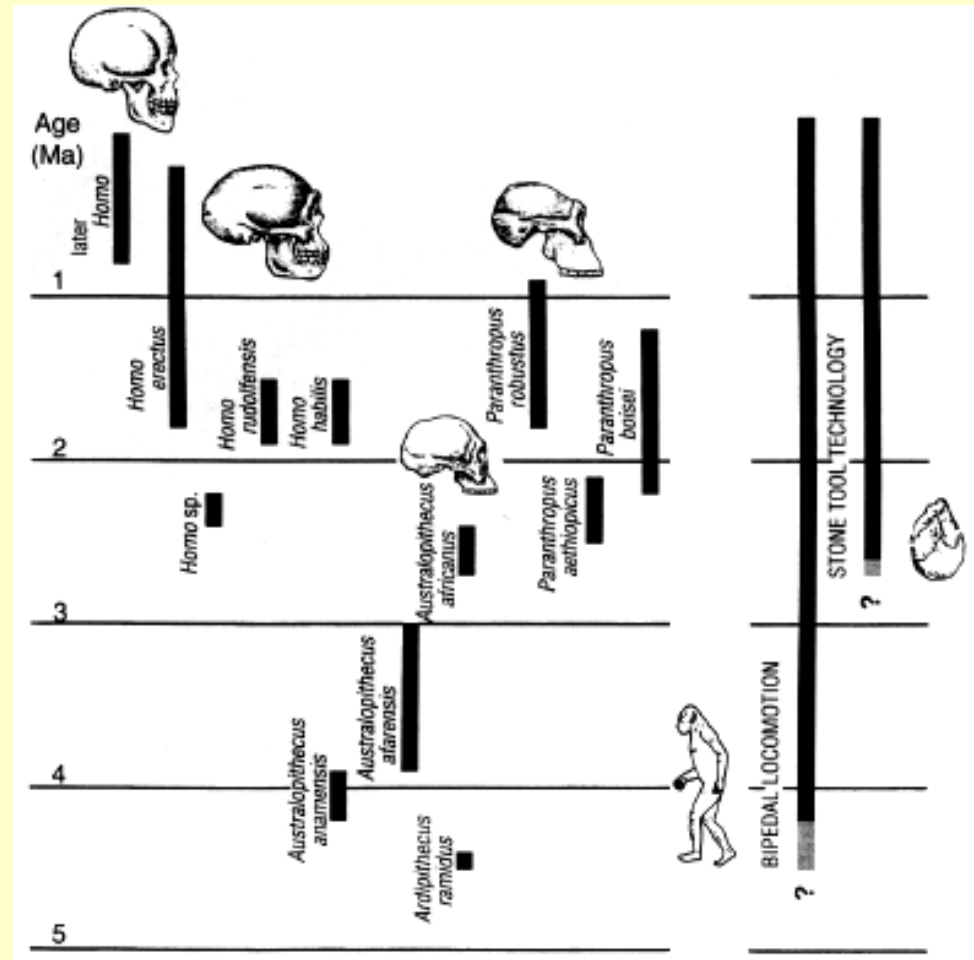
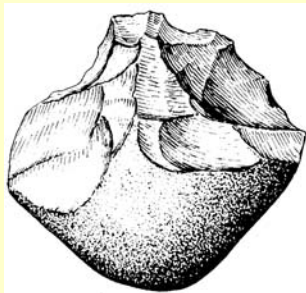
Australopithecine tool use

- Chimpanzee analogy suggests behaviors such as termite “fishing” were well within the capacities of Australopithecus



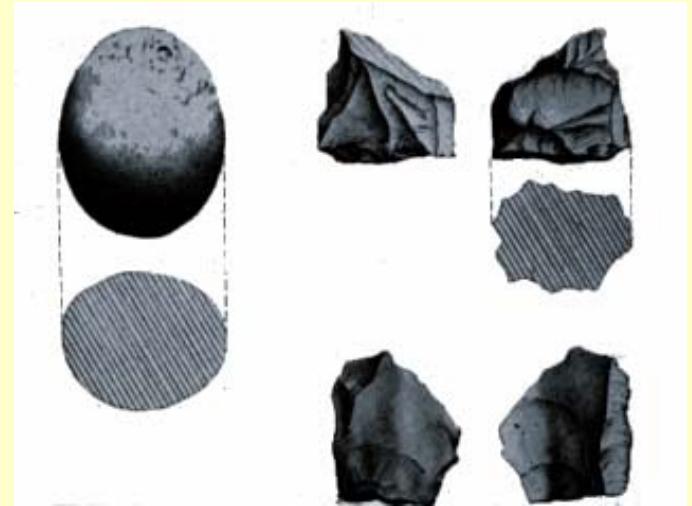
The earliest stone tools

- The earliest recognizable stone tools are from the Omo and date from between 2.5 and 2.0 m.y.a.
- Oldowan is the term used to describe crude stone tools associated with australopithecines.



Oldowan Tools

- Often these consist of only slightly modified pebbles with an edge chipped off to serve as a cutting edge.
- Such tools are difficult to distinguish from naturally broken rocks



Who made Oldowan tools?

- Oldowan tools have been recovered from South African sites.
- These may have been made by *Homo* rather than *Australopithecus*
- Oldowan tools from the early Olduvai Bed I sites are less diverse than those from the lower Bed II.
- This appears to have been a period of comparatively rapid cultural evolution

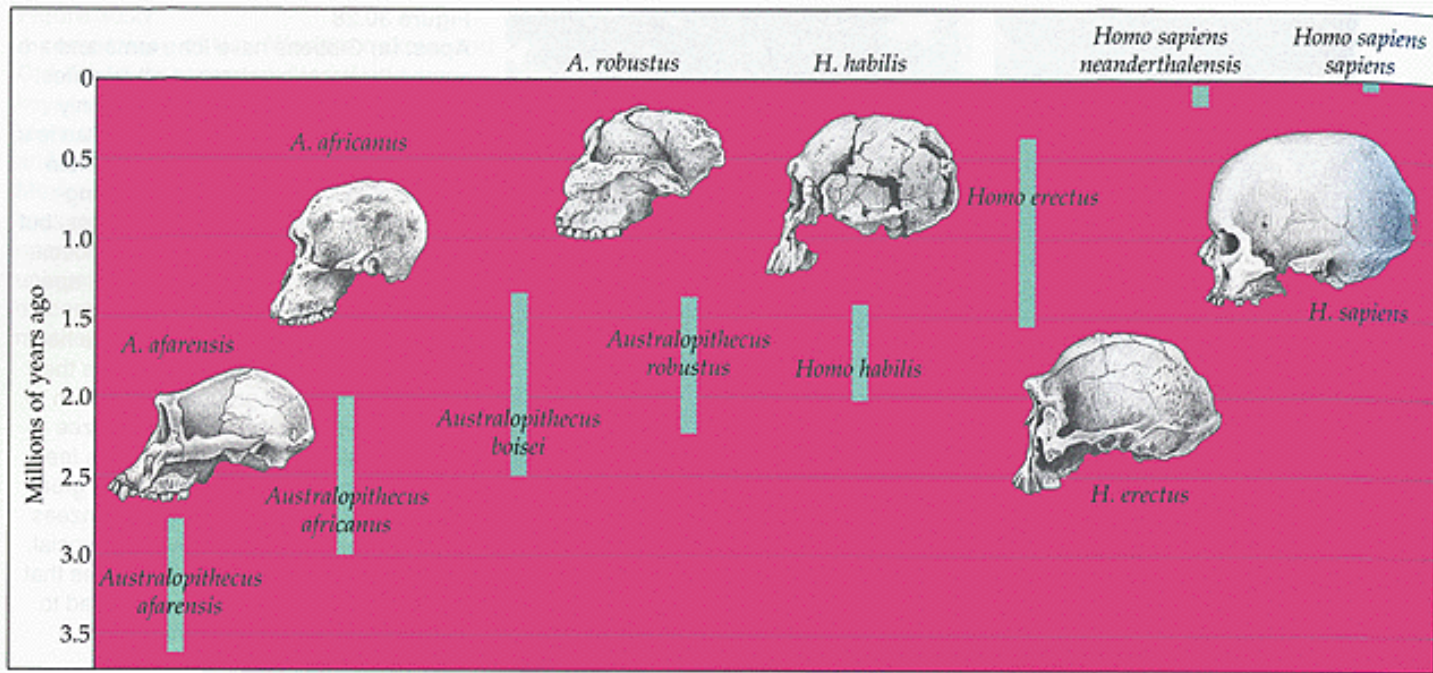
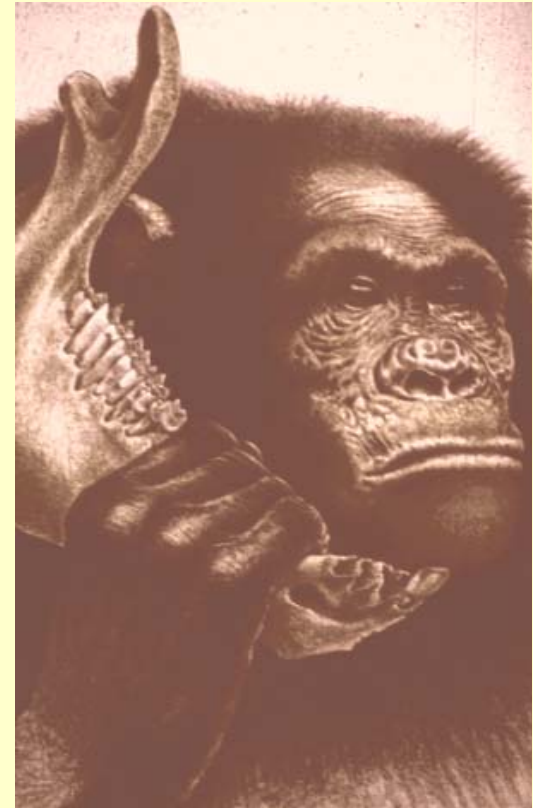


Figure 30.29

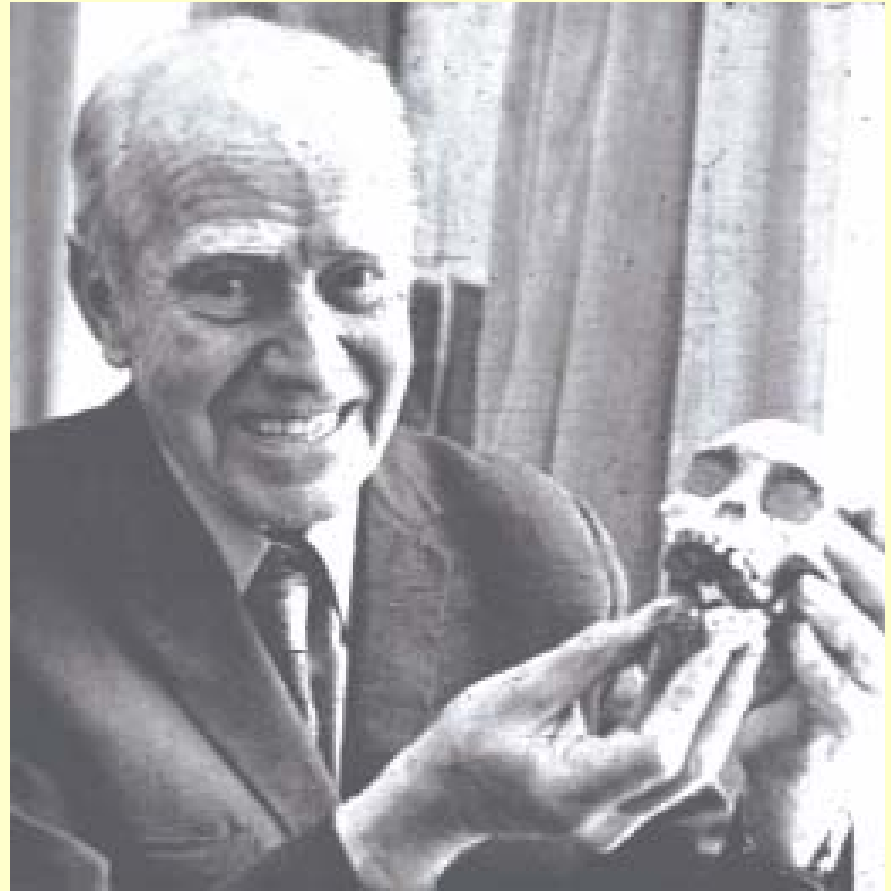
A time line of some hominid species. Notice that there have been times in the history of human evolution when two or more hominids coexisted.

Were early hominids killer apes?



The Osteodontokeratic Culture

- Osteodontokeratic refers to tools made of bones (osteo-), teeth (-donto-) and horns (-keratic)
- Raymond Dart suggested that australopithecines used such implements for hunting the animals found in the South African cave deposits



Evidence of the Osteodontokeratic Culture

- Dart believed the accumulations of bones in the south African caves were a result of hominid hunting activities
- Bones from Sterkfontein and other sites show damage that Dart interpreted as evidence of hominid activity.

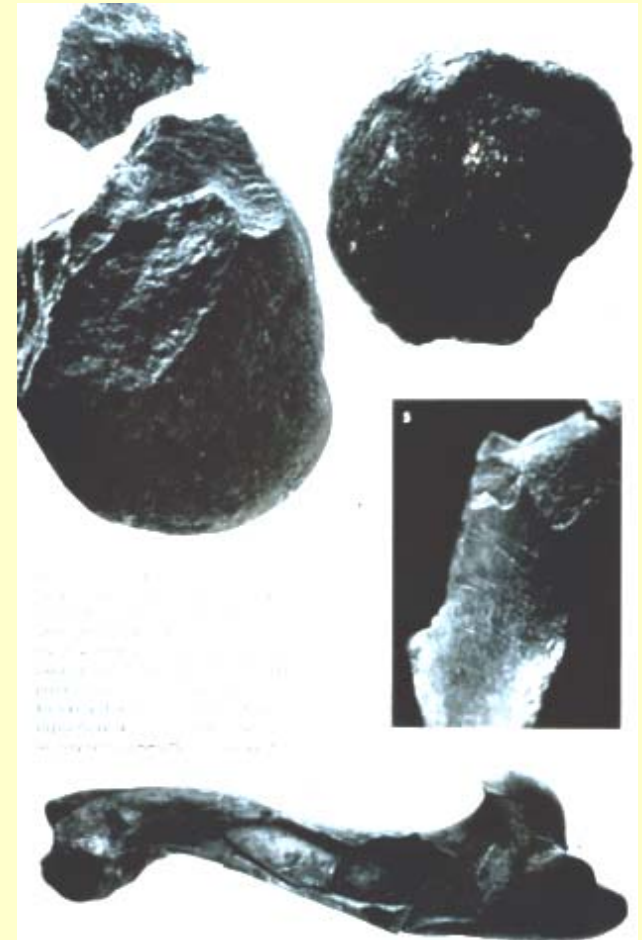
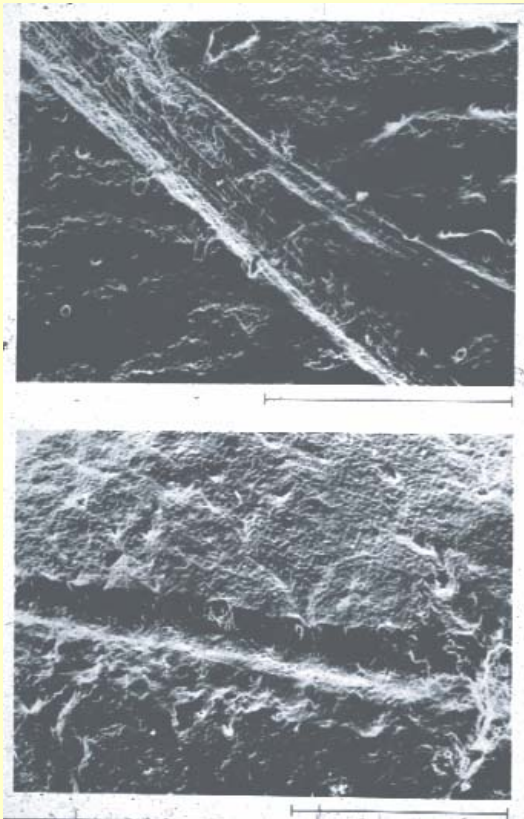


Were early hominids scavengers or hunters?



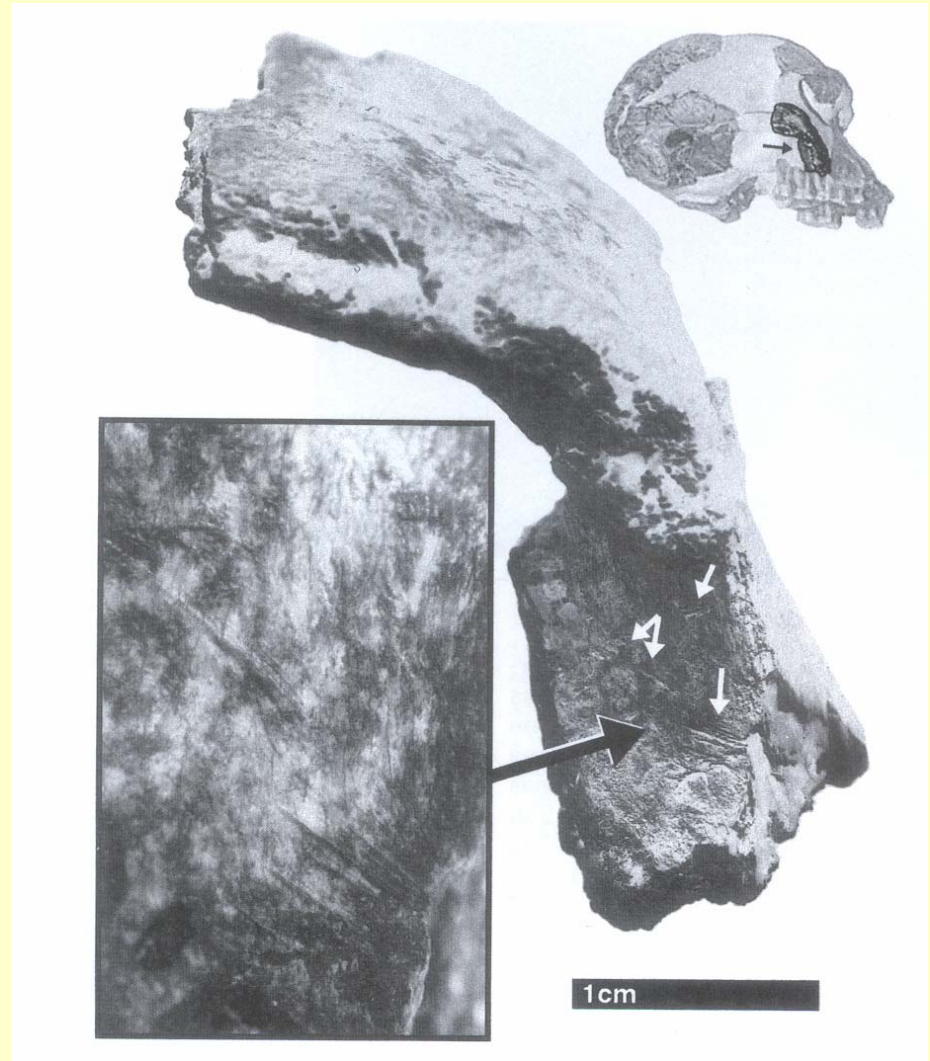
Evidence of scavenging?

- Cut marks
- Signs of crushing



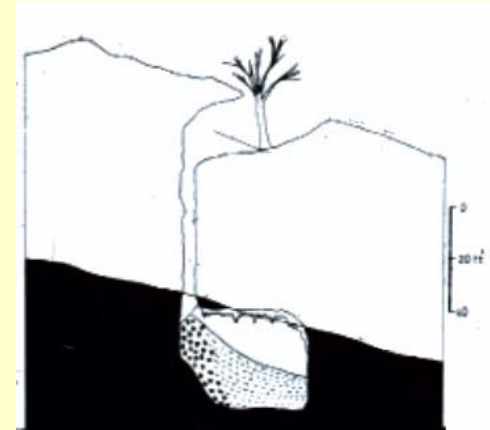
Cut marks on the bone bones of hominids

- Cutmarks on a jaw from Sterkfontein suggests processing of hominids by hominids



An alternative interpretation of the South African cave deposits

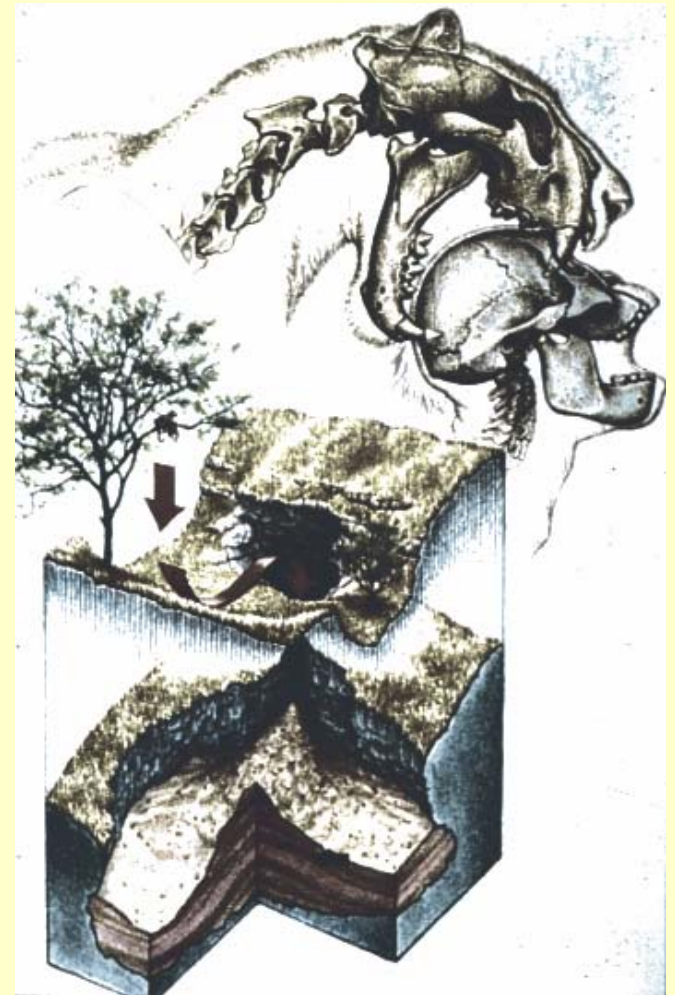
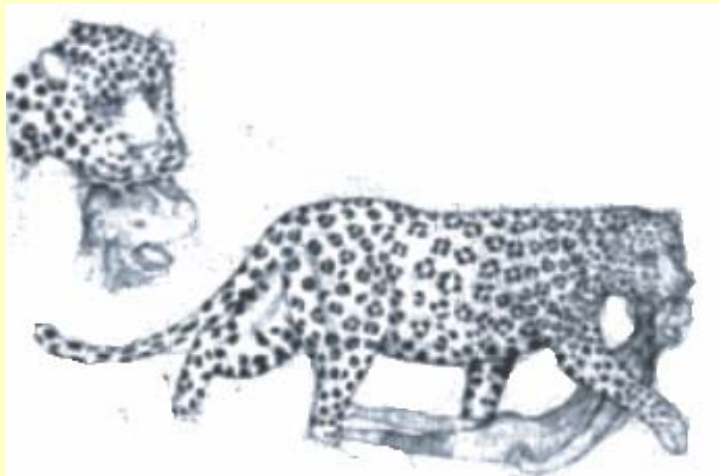
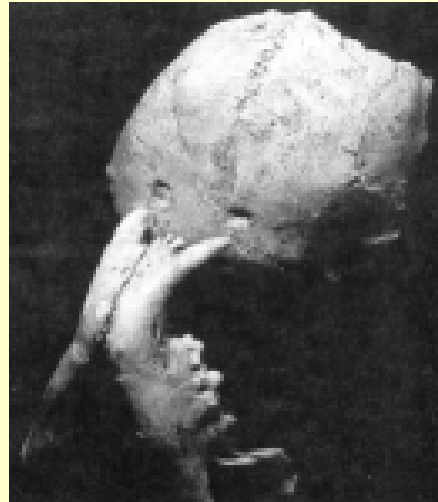
- Dart argued that hominids were responsible for the accumulation of bones in the South African caves.
- More recent studies, however suggest that they were sinkholes that served as traps for animal remains



Were australopithecines preyed upon by carnivores?

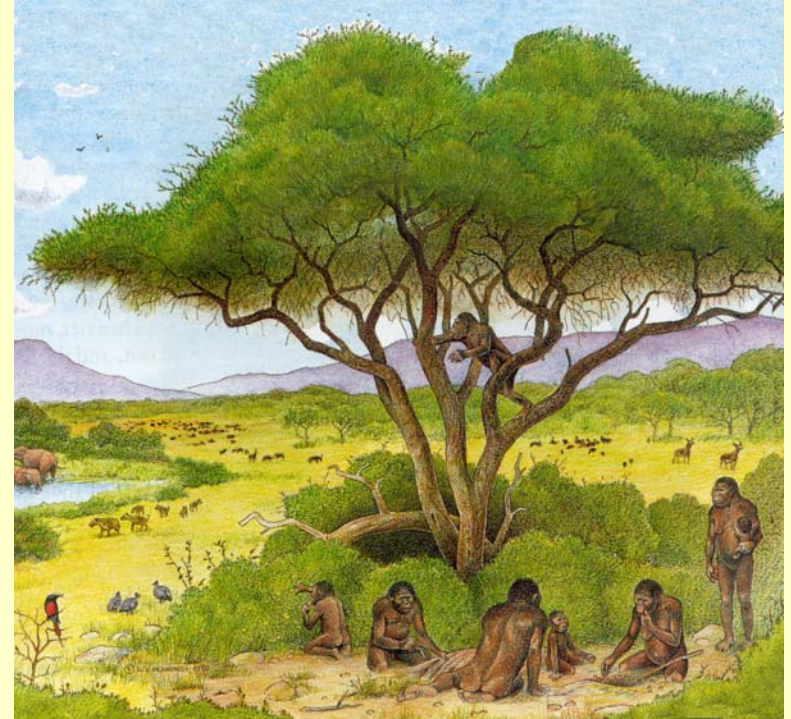


Tooth mark evidence of leopard predation

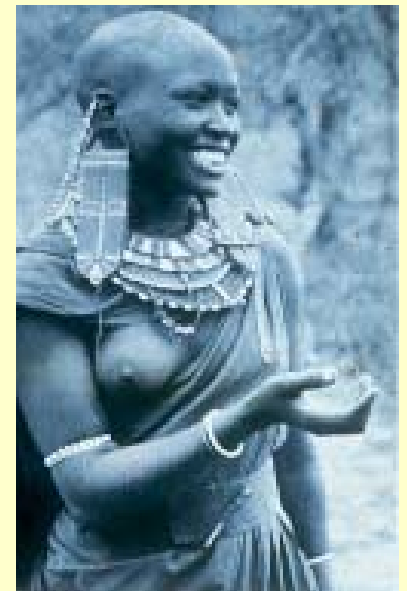
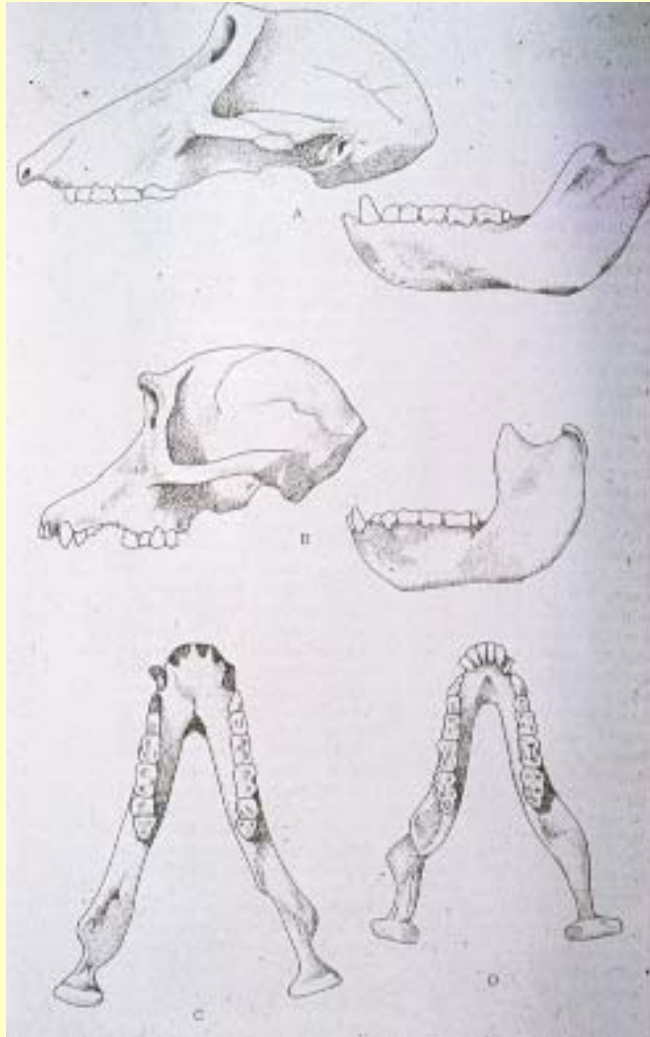


Evidence of Australopithecine Social Organization

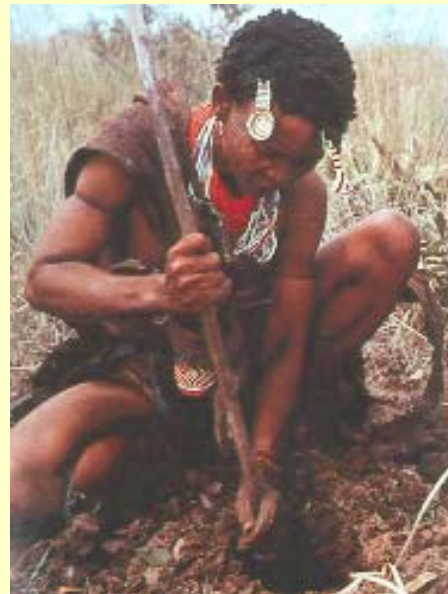
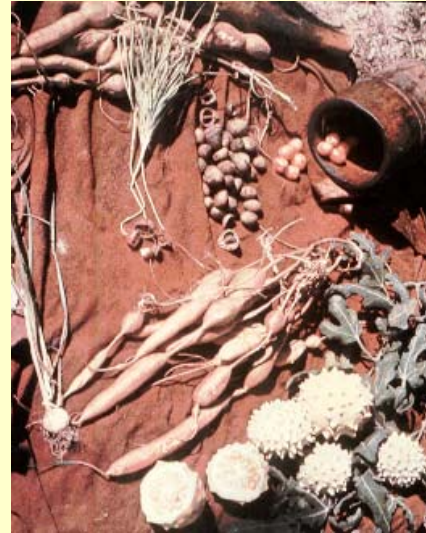
- Some sites appear to be living floors with traces of some kind of shelter.
- This suggests that camps or home bases were maintained.
- It has been suggested that food was brought to these camps and shared.
- Prolonged infant dependency might have resulted in a sexual division of labor



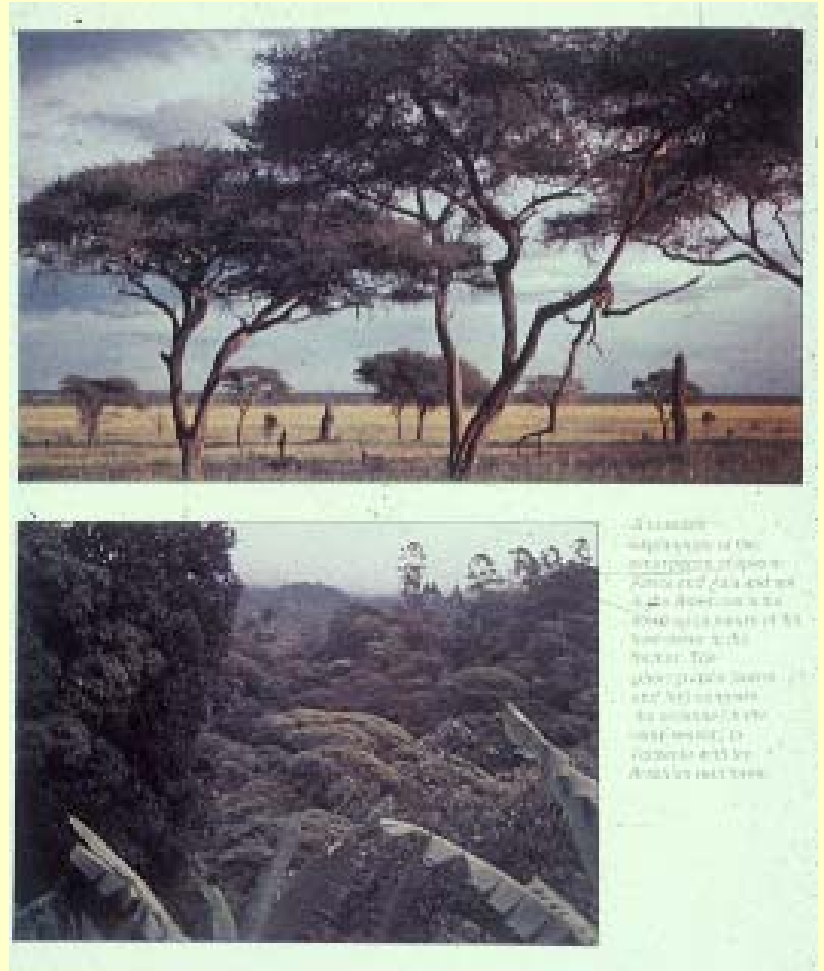
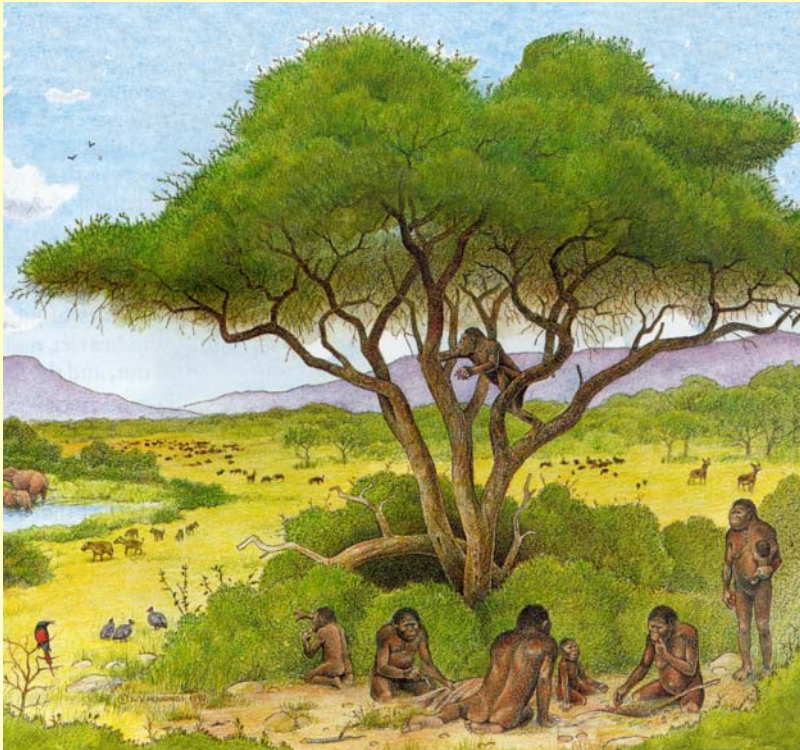
The Seedeater Hypothesis



Pigs and roots, tubers and digging sticks

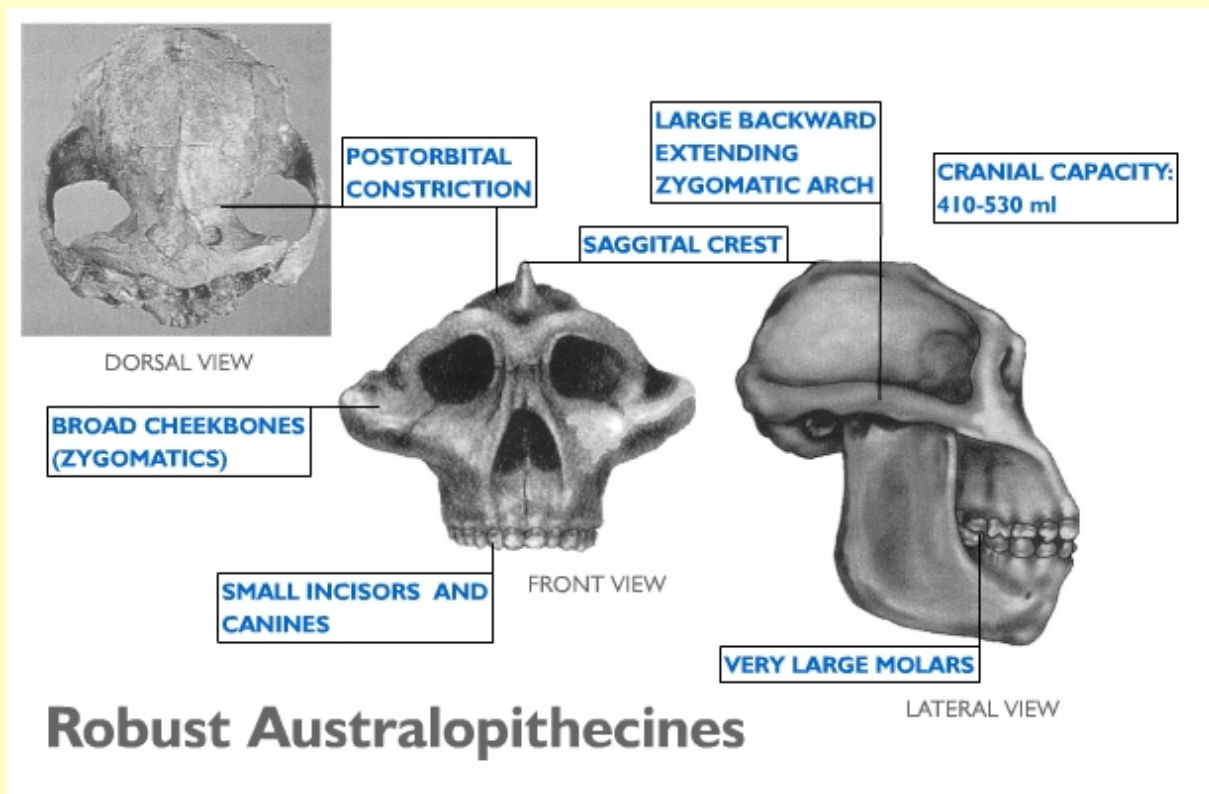


Australopithecine environments

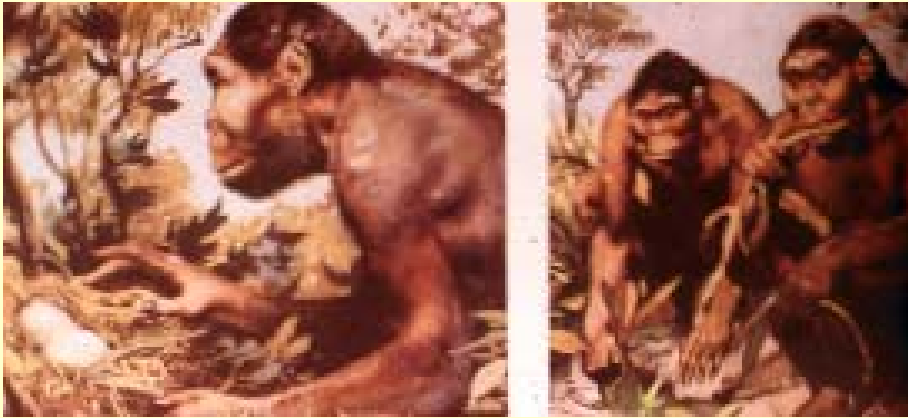


Dietary Differences:

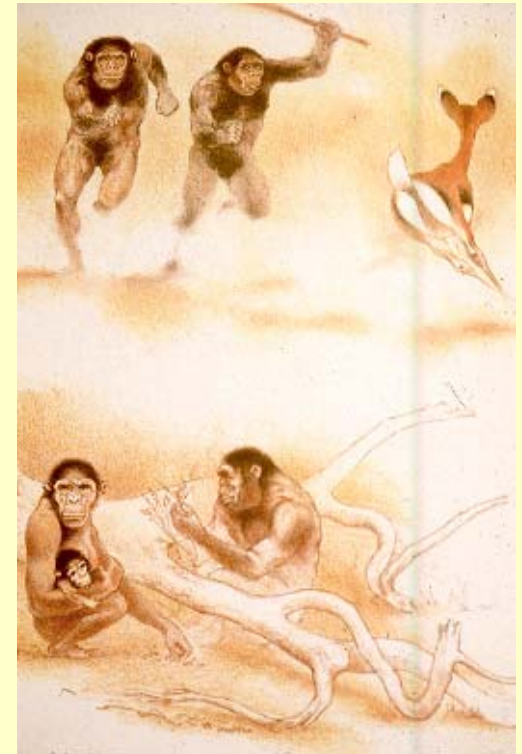
A. africanus vs. *A. robustus*



Dental caries: an indication of carbohydrates in the diet



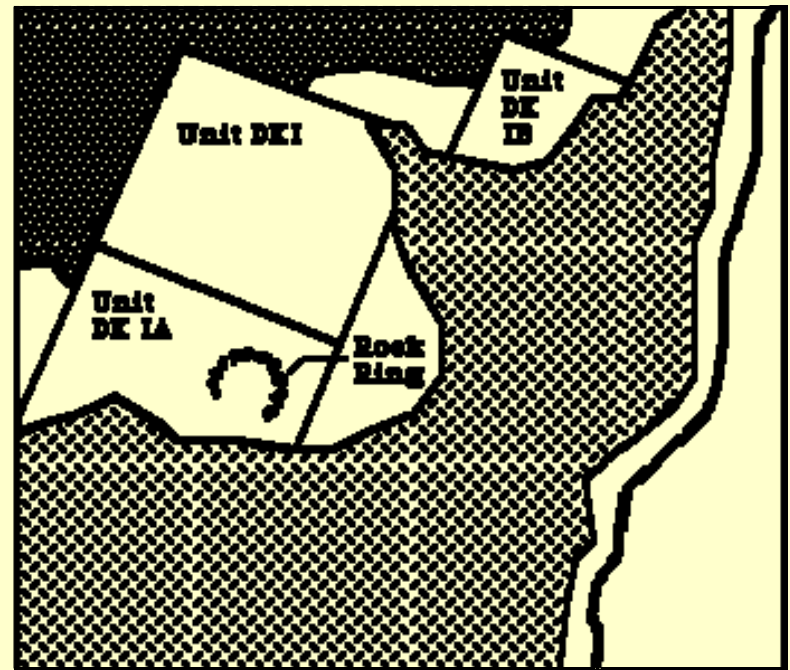
Australopithecus the Hunter?



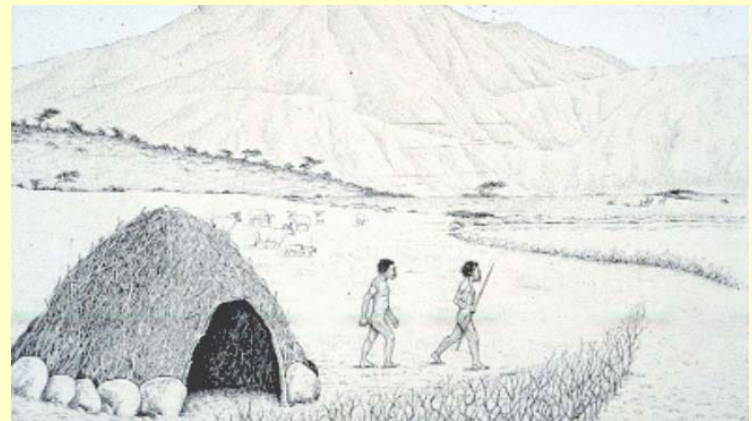
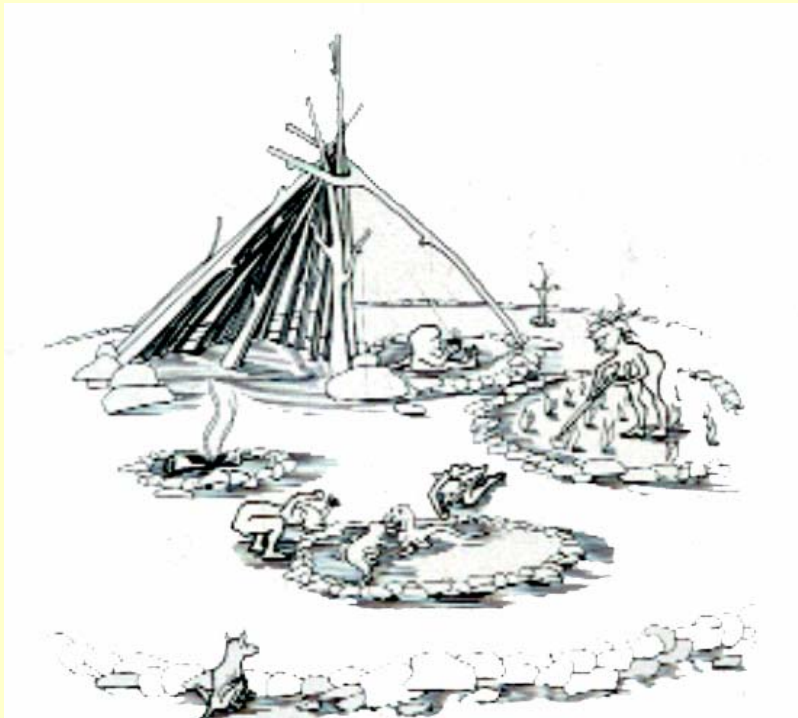
San and Chimp analogies



Olduvai Living Floor: DK1 A



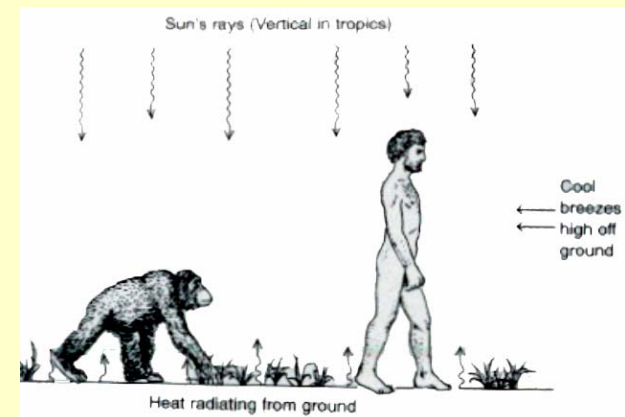
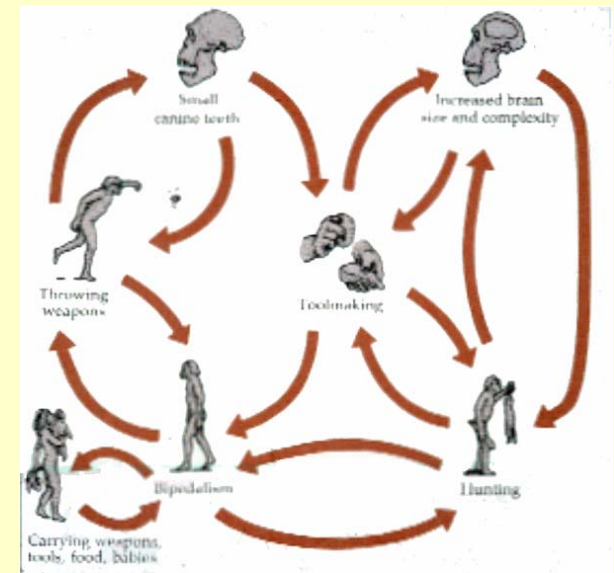
Reconstruction of living floor



Base camps?



Selective Pressures for Bipedalism



Heat load and bipedalism

