

Last time...

- What are monkey grade primates?
- When and where do they first appear in the fossil record?
- What features are found in the earliest representatives that identify them as monkeys?

Questions from last class?

- Where do we find primates in the Oligocene?
- Of the Oligocene primates...
 - Who is the potential ancestor of the Catarrhines?
 - Who is the potential ancestor to the NWM?
 - How did the NWM get to South America?
 - Who is the potential ancestor to the OWM?

Taxonomy

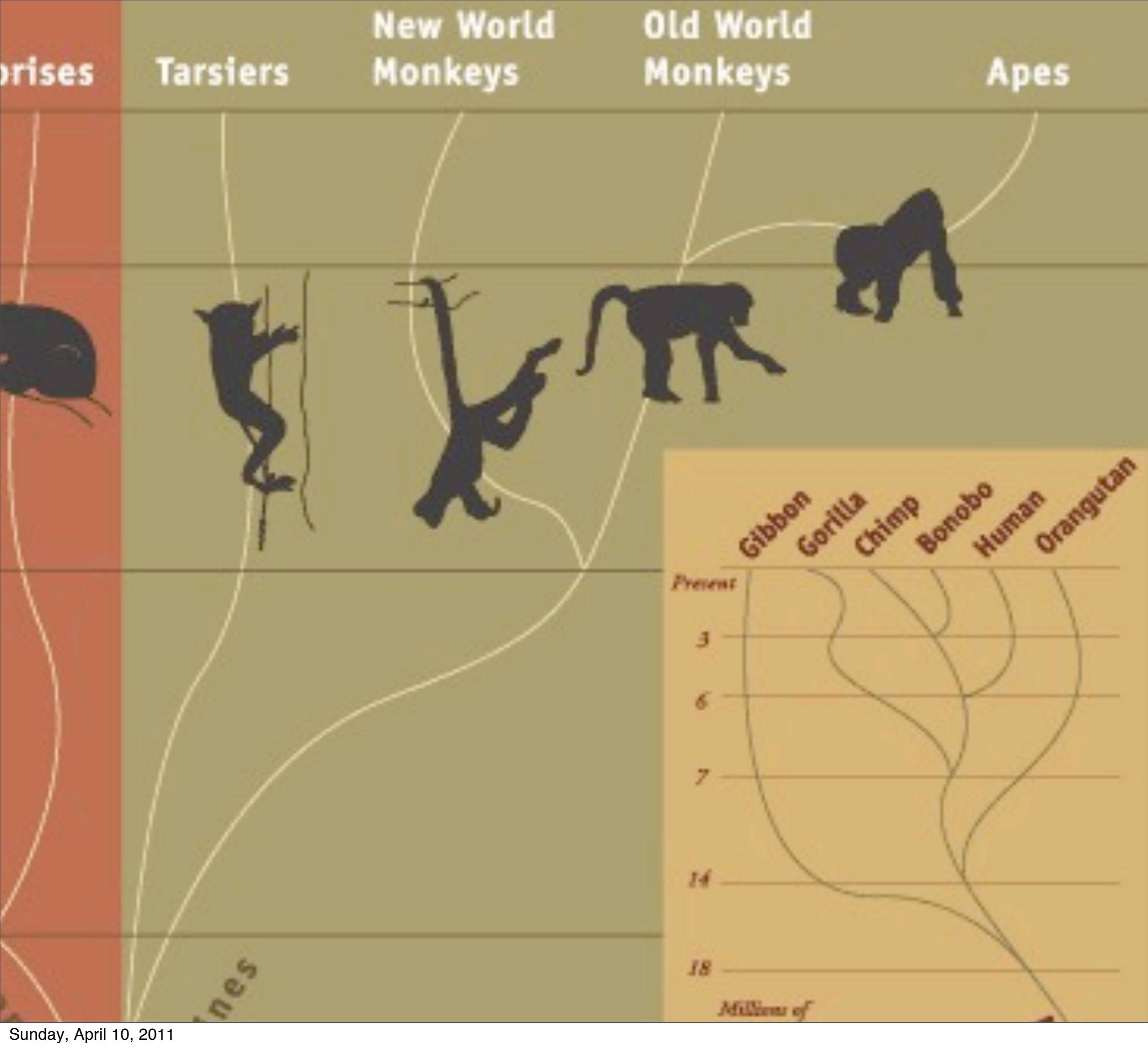
- How are monkeys classified?
 - Order? Suborder? Infraorder?
- What are the two groups of monkeys?
 - How do their classifications differ?
 - How do their characteristics differ?
- Of the Simiiformes, which two groups are most closely related?

New World Monkeys

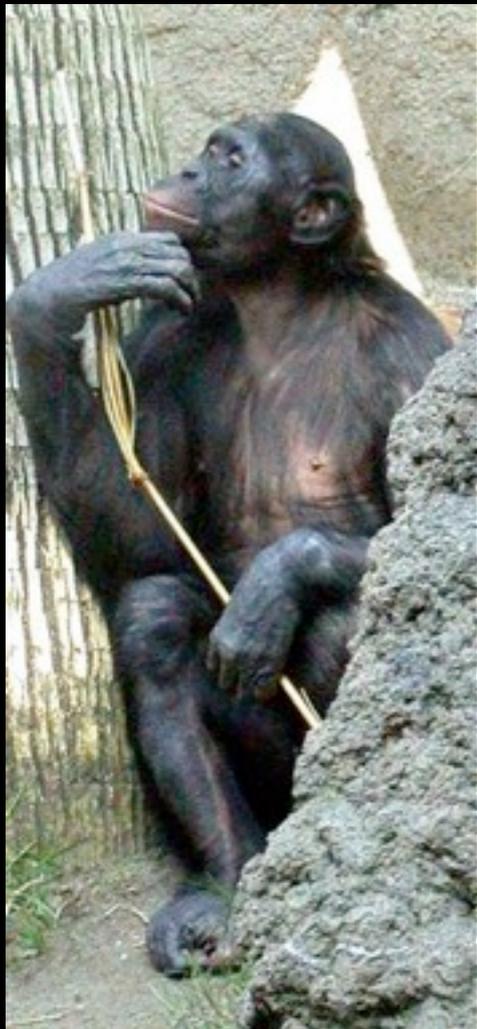
- What are the potential evolutionary sources of the New World Monkeys
- What is their classification?
- What features distinguish them from other primates and in particular from the Old World monkeys?
- What different kinds of monkeys are New World Monkeys?
- How do Callitrichidae differ from the rest of the Ceboidea?

Old World Monkeys

- What are the potential evolutionary sources of the Old World Monkeys
- What is their classification?
- What features distinguish them from other primates and in particular from the New World monkeys?
- What different kinds of monkeys are Old World Monkeys?
- How do Cercopithecinae and Colobinae, the two divisions, differ from one another?



Modern Apes



Living Primates

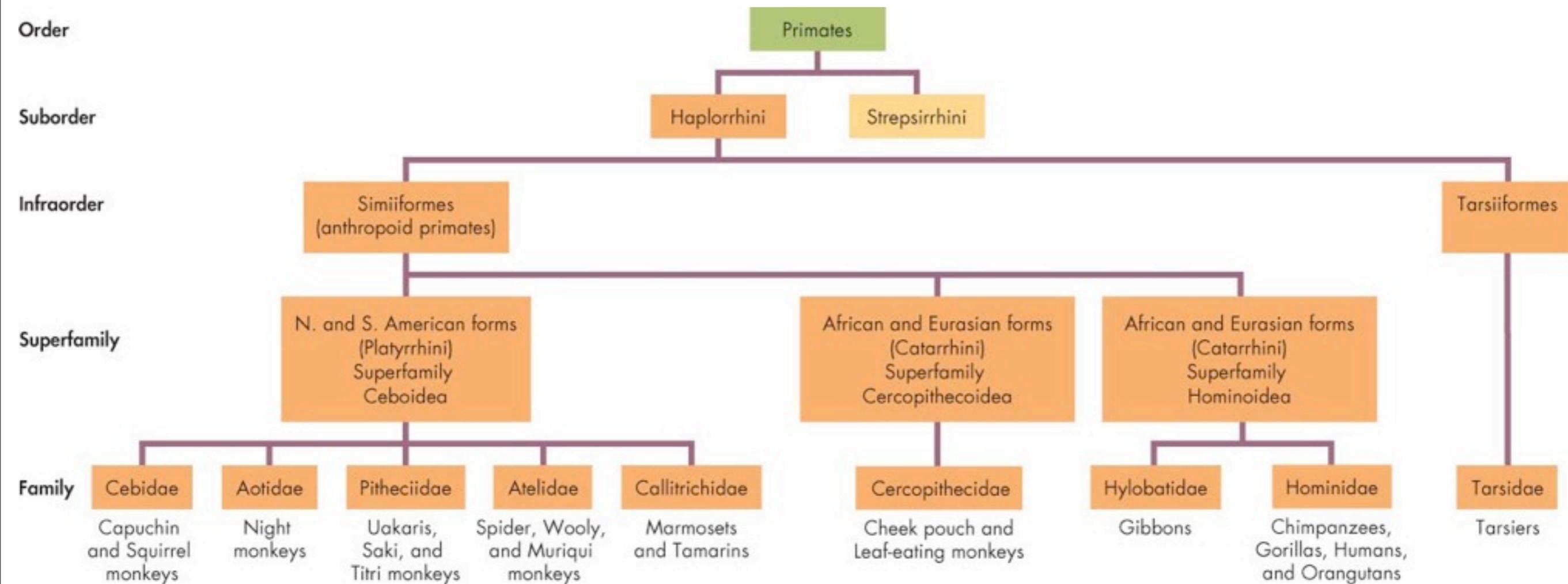
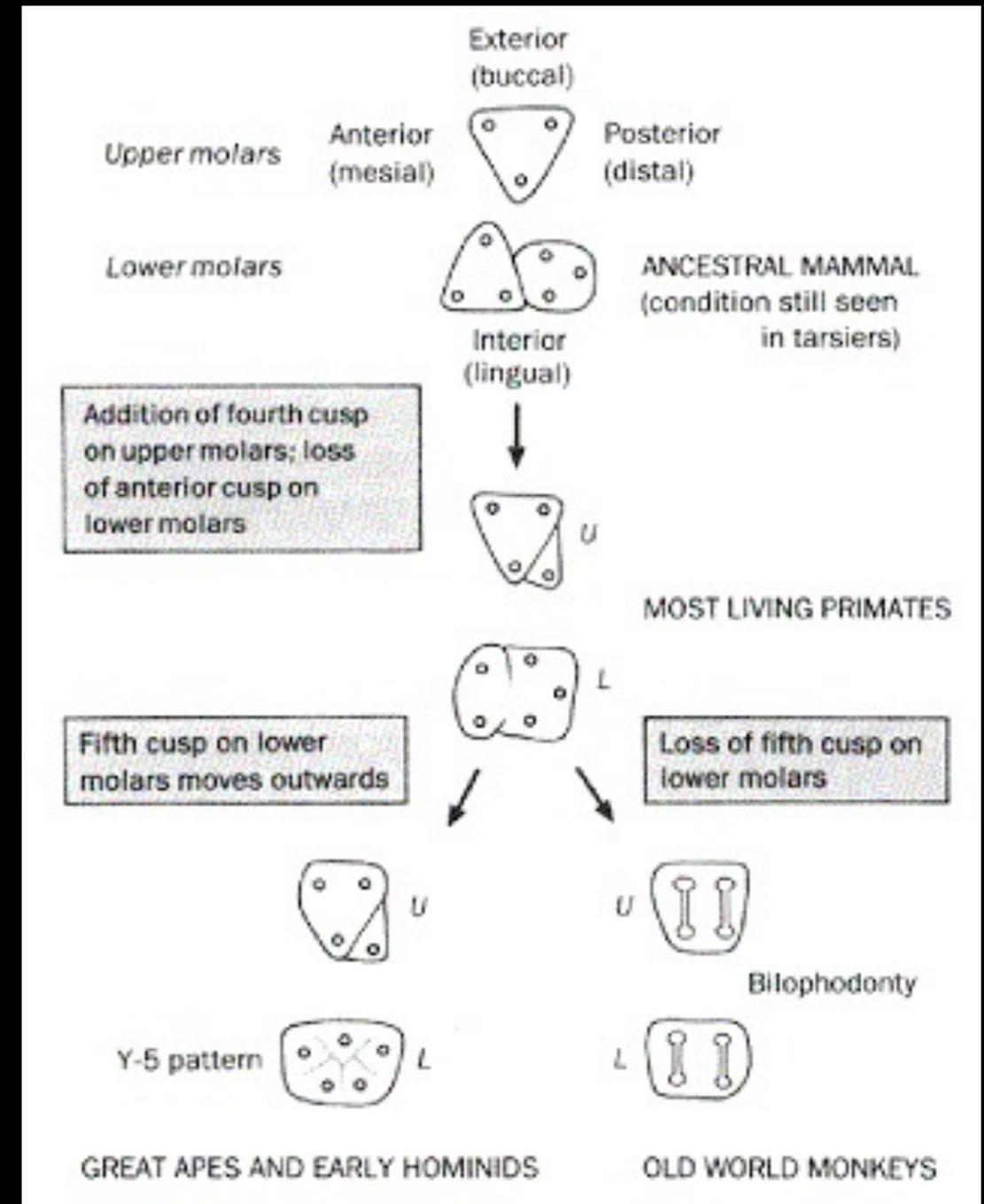


Figure 5.5 Taxonomy of the Haplorrhines to the Family Level

Ape Grade Characteristics

- No tail
- Y-5 Molars
- larger body
- larger brain
- greater social complexity
- shoulder joint adaptations



Miocene 3.5-5 mya

- Ape grade
- Over 30 genera and 100 species of ape
- compared with 6 today
- Africa and Eurasia

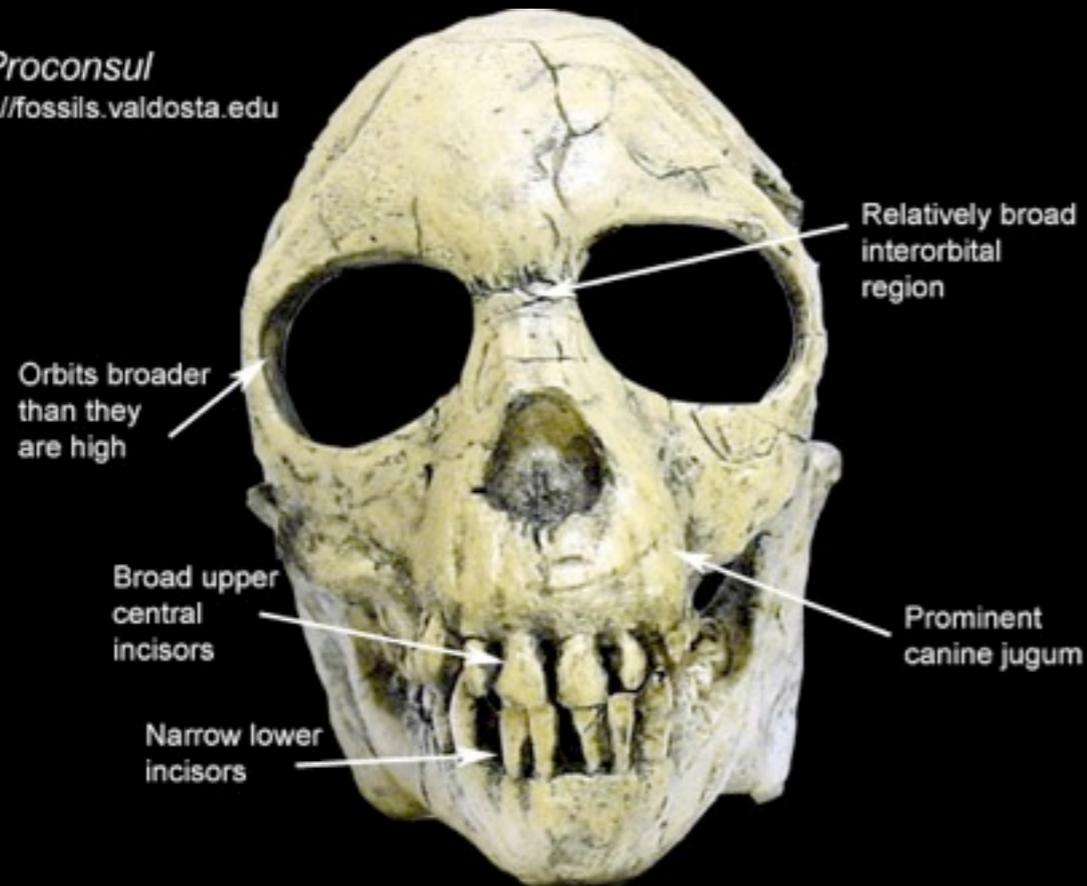
Miocene continents

Middle Miocene 14 Ma

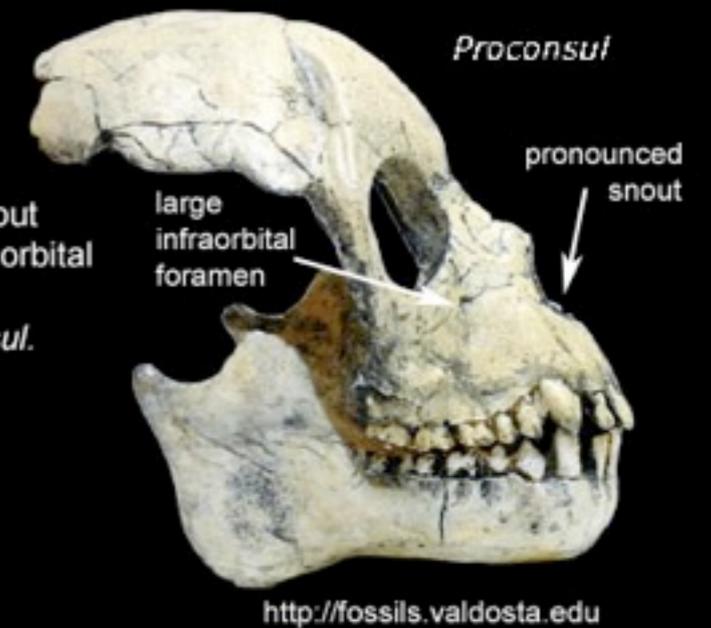


Ancient Landmass 
Modern Landmass 
Subduction Zone (triangles point in the direction of subduction) 
Sea Floor Spreading Ridge 

Proconsul
<http://fossils.valdosta.edu>

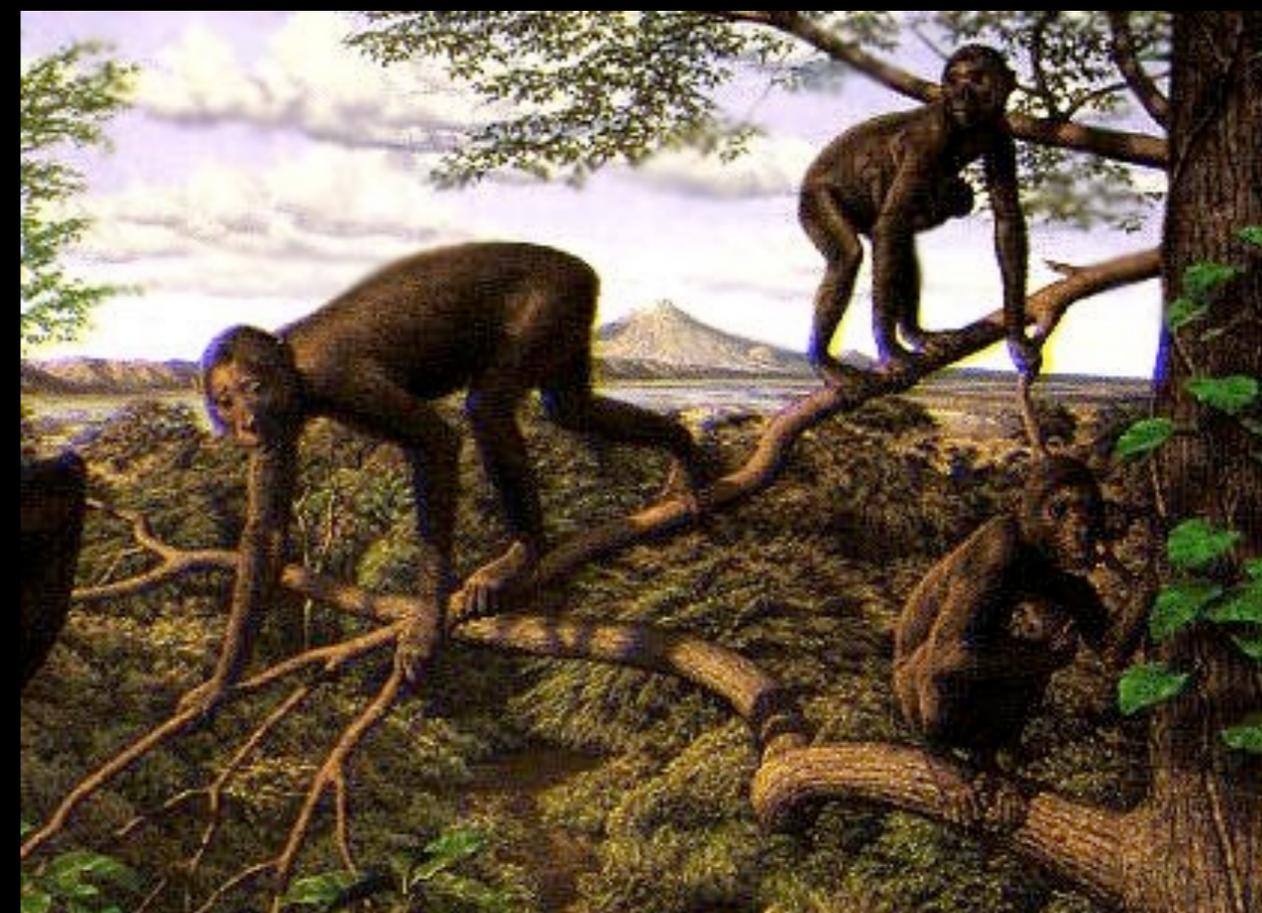


Note the pronounced snout and the single large infraorbital foramen, which are characteristic of *Proconsul*.



Note the prominent canine jugum (facial pillar) on the *Proconsul* skull, which is a trait *Proconsul* shares with other early hominoids, which holds the root of the upper canine. *Proconsul* is also characterized by a broad interorbital region and broad orbits.

Also notice how the upper central incisors are larger than the lateral ones, which is similar to later apes, and how narrow the lower incisors are.

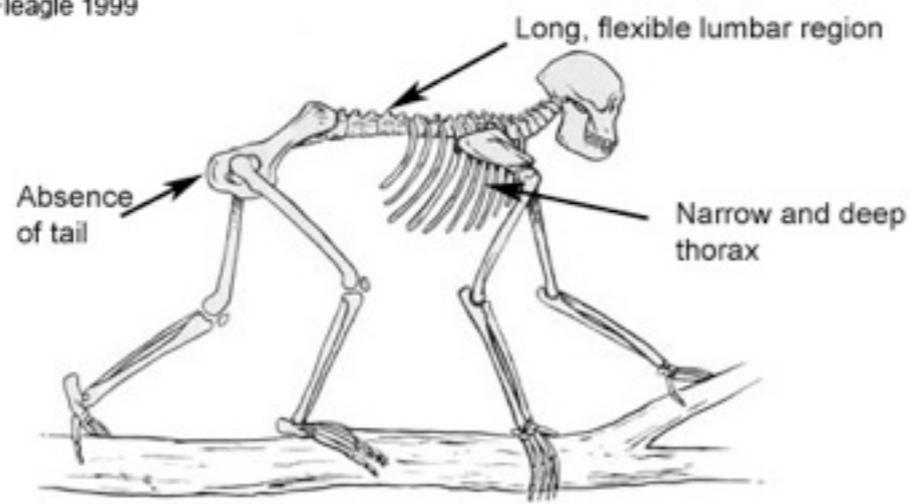


Unlike later suspensory apes, *Proconsul* was an arboreal quadruped.

<http://www.mc.maricopa.edu/~reffland/anthropology/anthro2003/origins/primates/evolution.html>

Juvenile *Proconsul heseloni*

Fleagle 1999



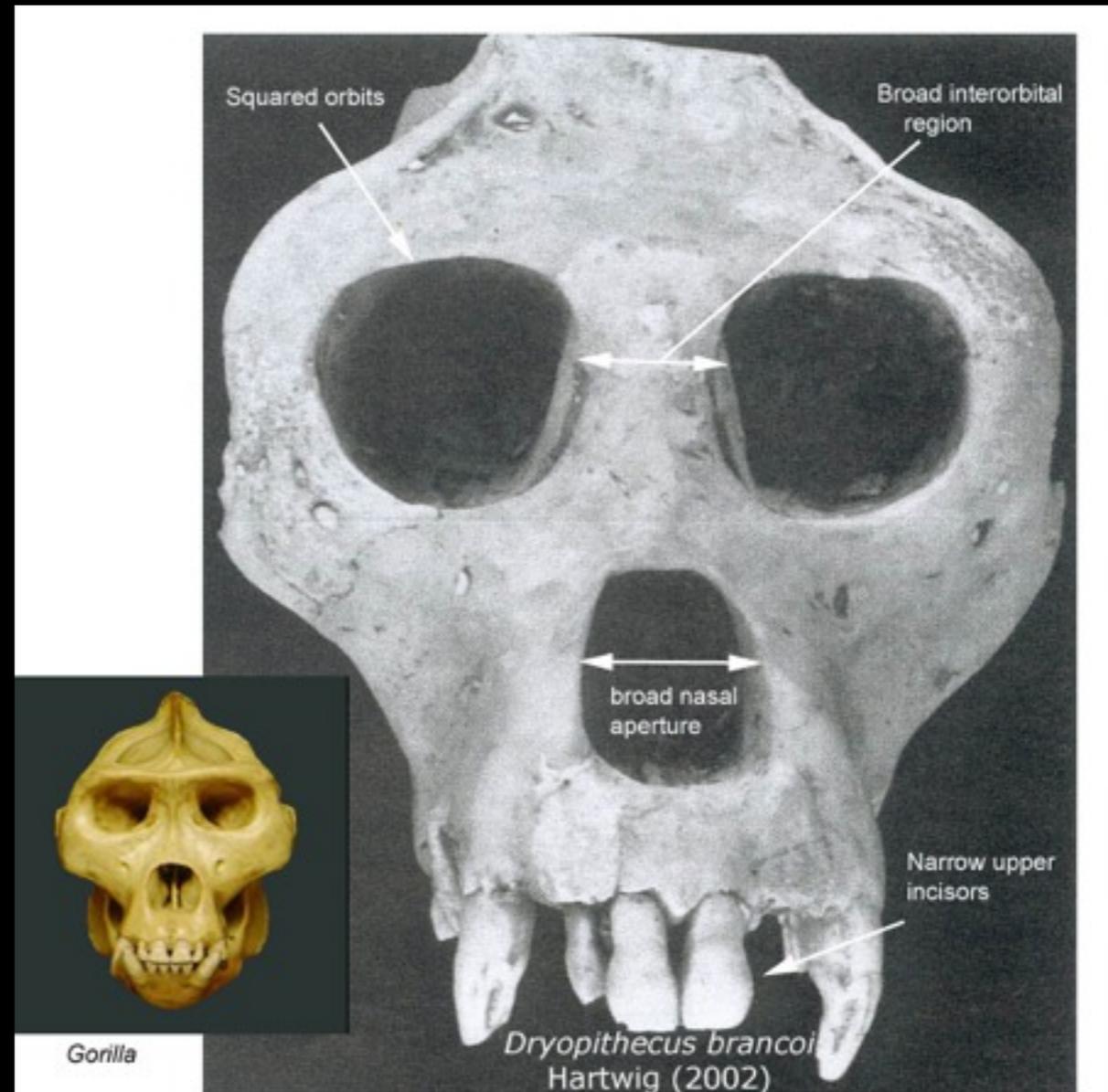
Like quadrupedal primates, *Proconsul* has a narrow and deep thorax and a long flexible lumbar region. It likely had six lumbar vertebrae, similar to cercopithecoids and some gibbons, and lacked the specialized lumbar reduction and stiffening of the great apes.

While resembling quadrupedal monkeys in many postcranial features, *Proconsul* shares the derived loss of a tail with the extant apes, among other features.

Morotopithecus



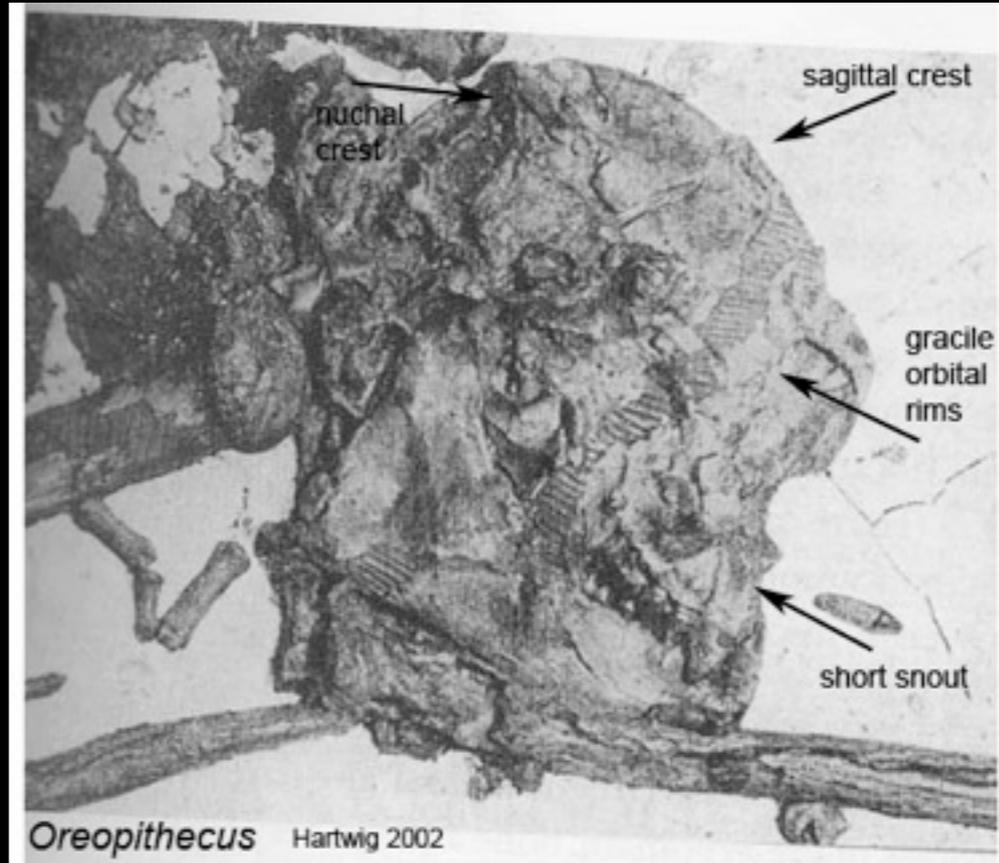
Dryopithecus



Dryopithecus shares nasal aperture and periorbital morphology with the African great apes. Also notice the narrow upper incisors, which are a derived trait unique to this genus.

Gorilla image source: http://www.amonline.net.au/human_evolution/skulls/

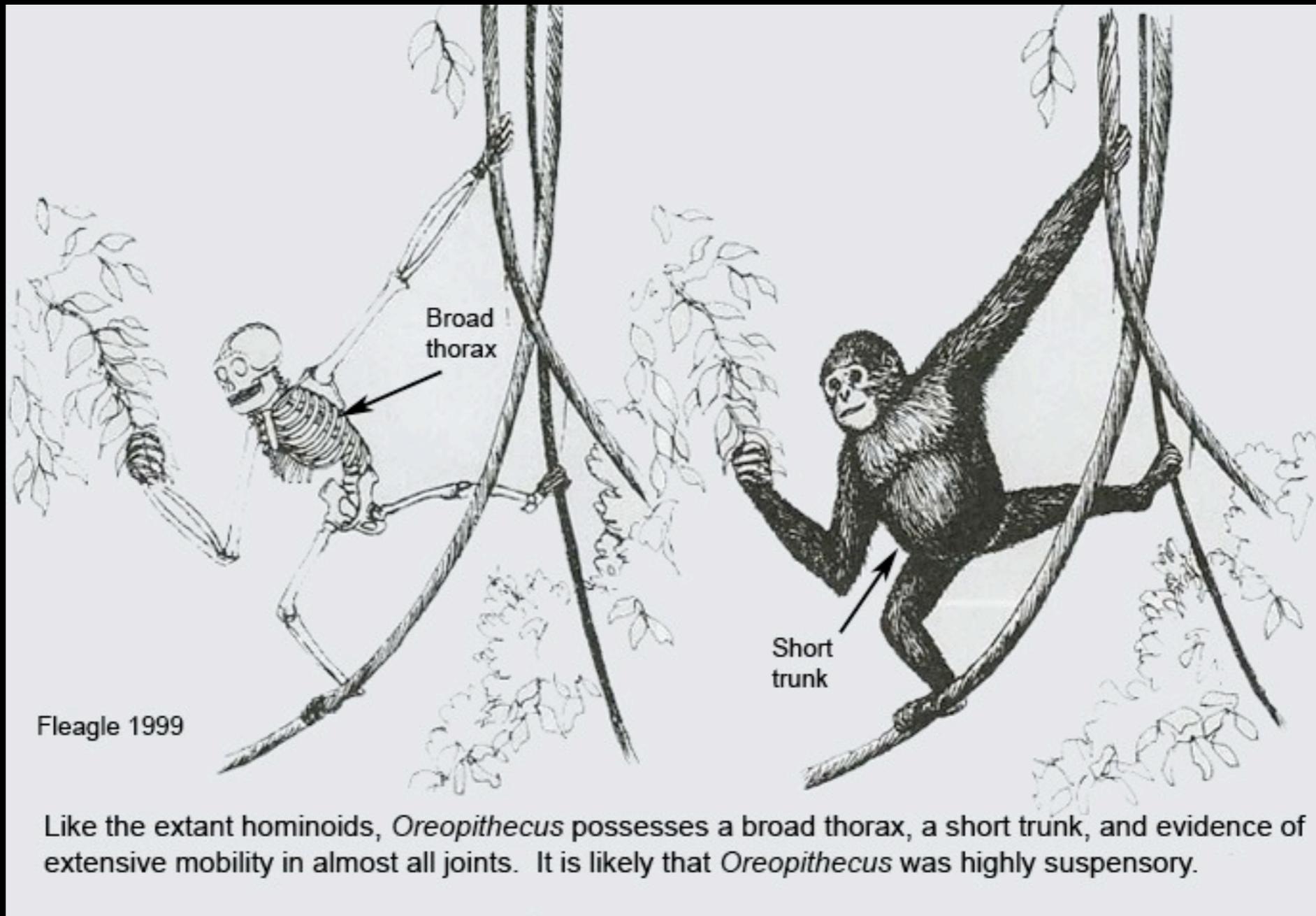
Oreopithecus



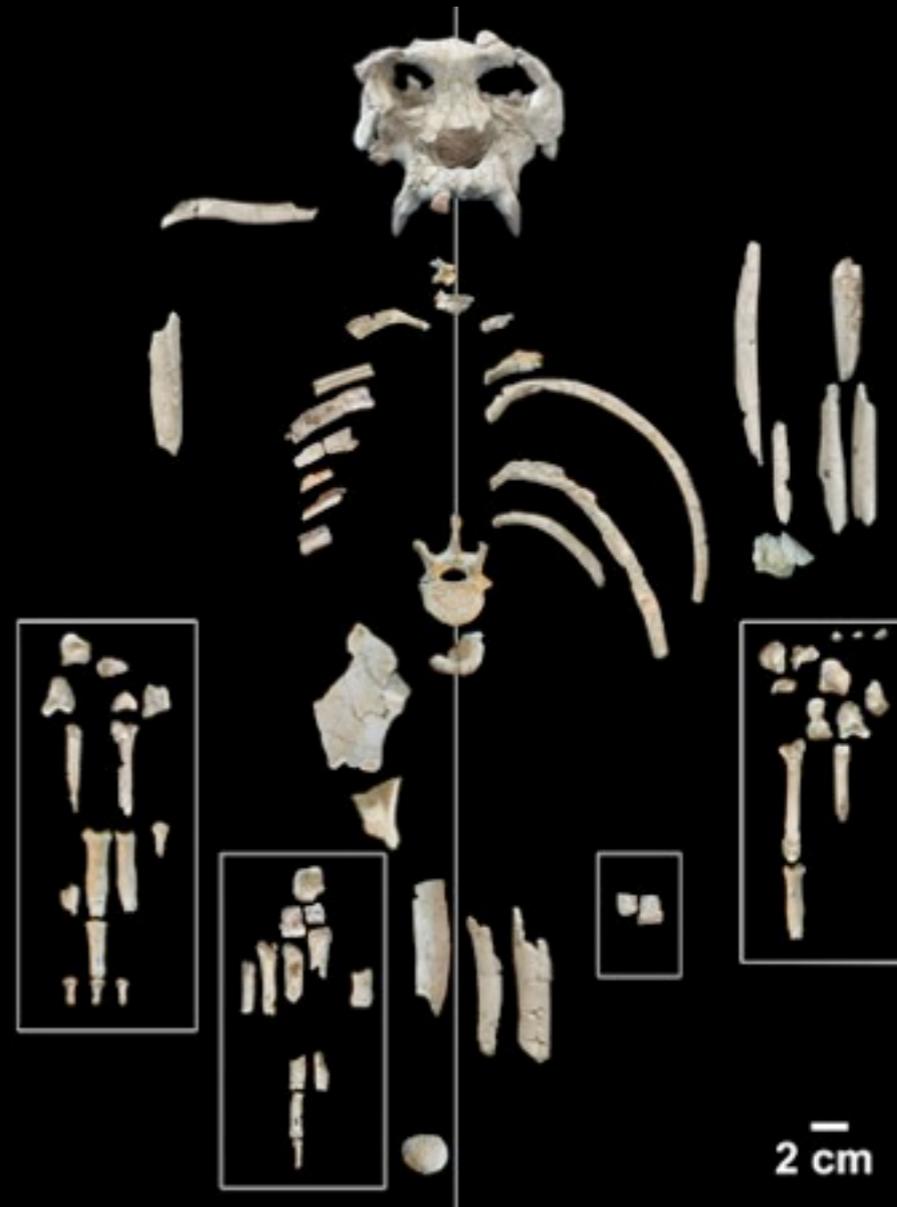
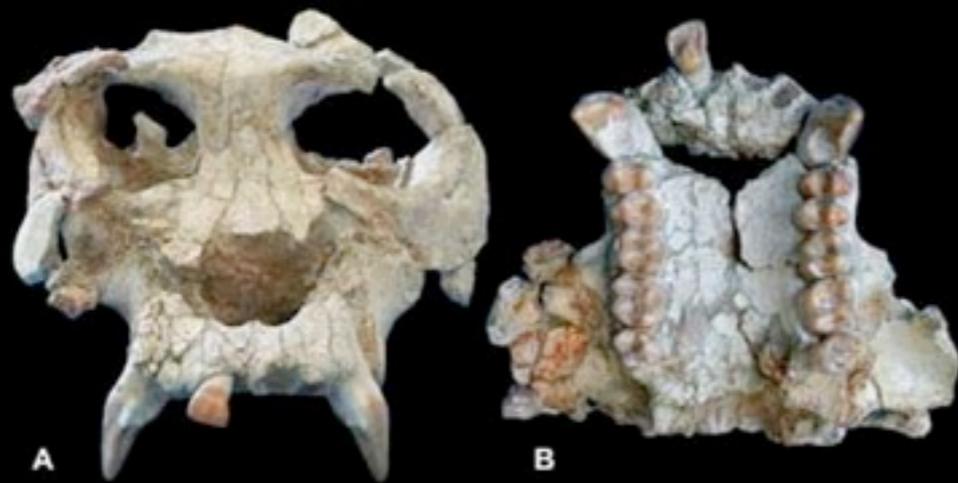
Oreopithecus Hartwig 2002

The cranium, while damaged and distorted in this image, has strong nuchal and sagittal crests which meet, smooth gracile orbital rims, a short snout, and a tubular ectotympanic.

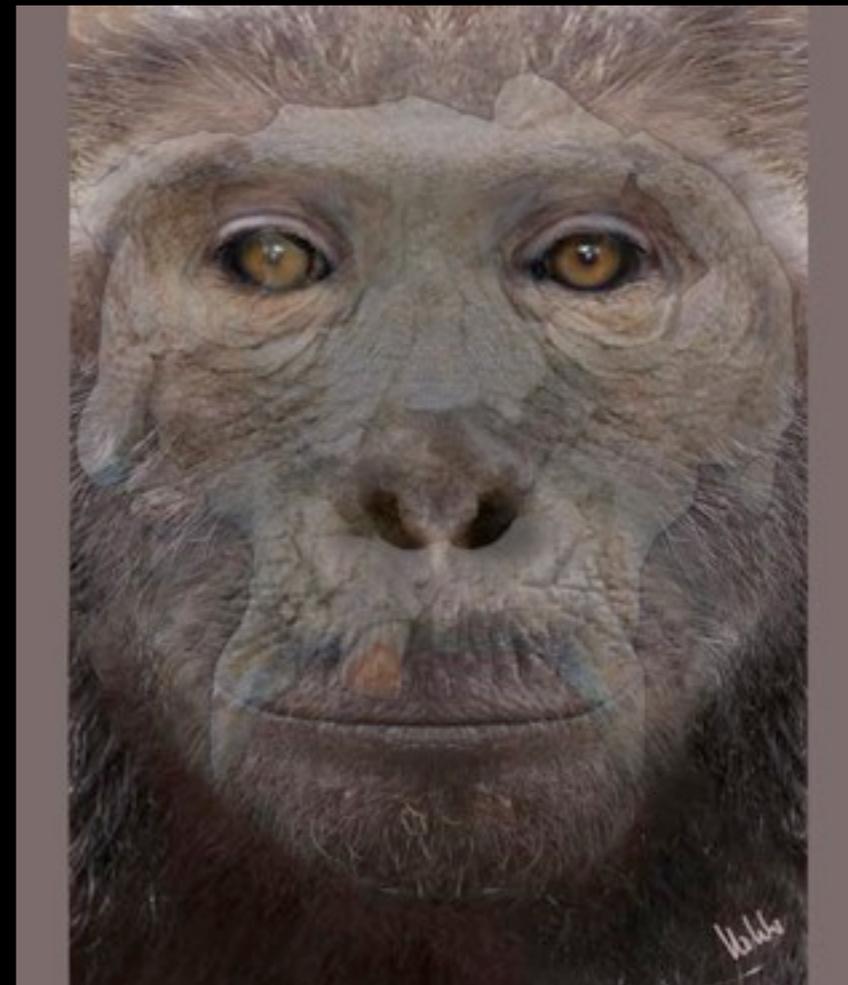
The brain size is small compared to the other great apes, and is suggested to be a result of secondary reduction that is often associated with specialized forms of folivory.



Pierolapithecus



Reconstruction of Pierolapithecus

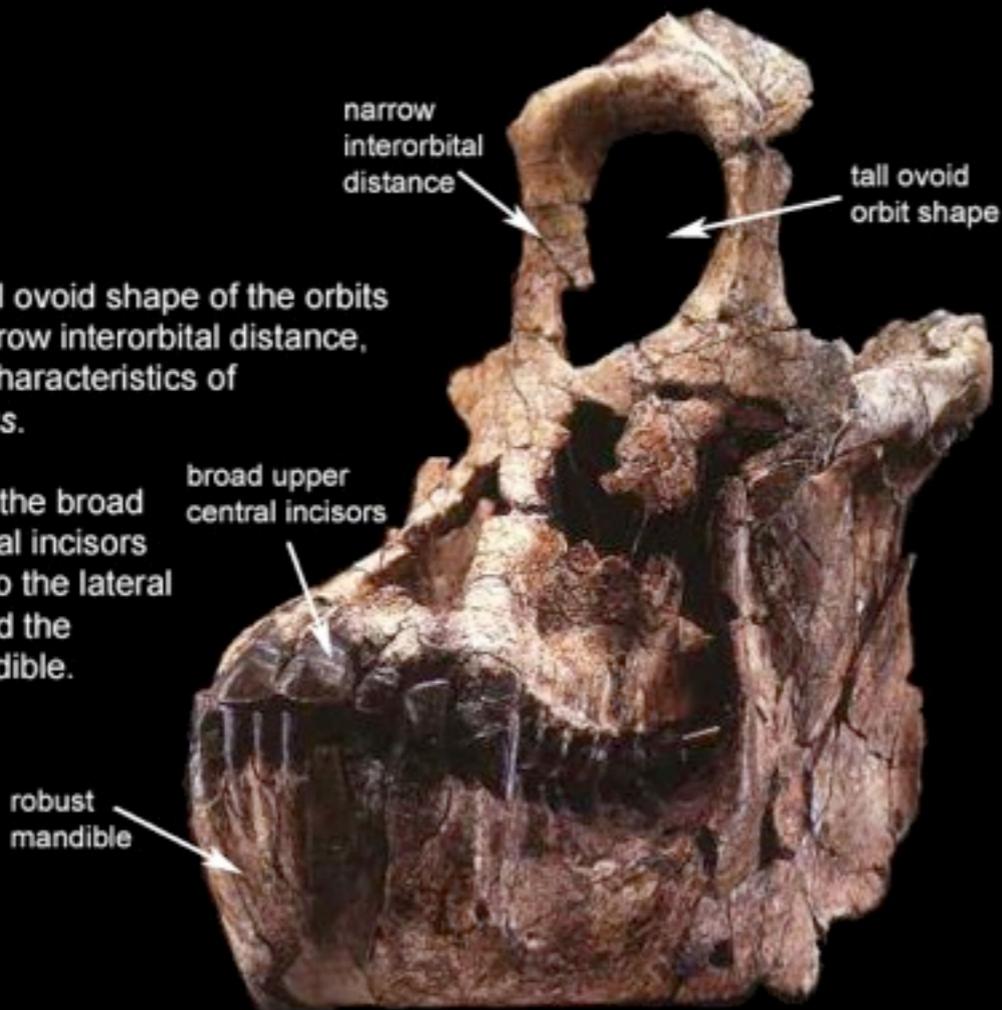


Sivapithecus

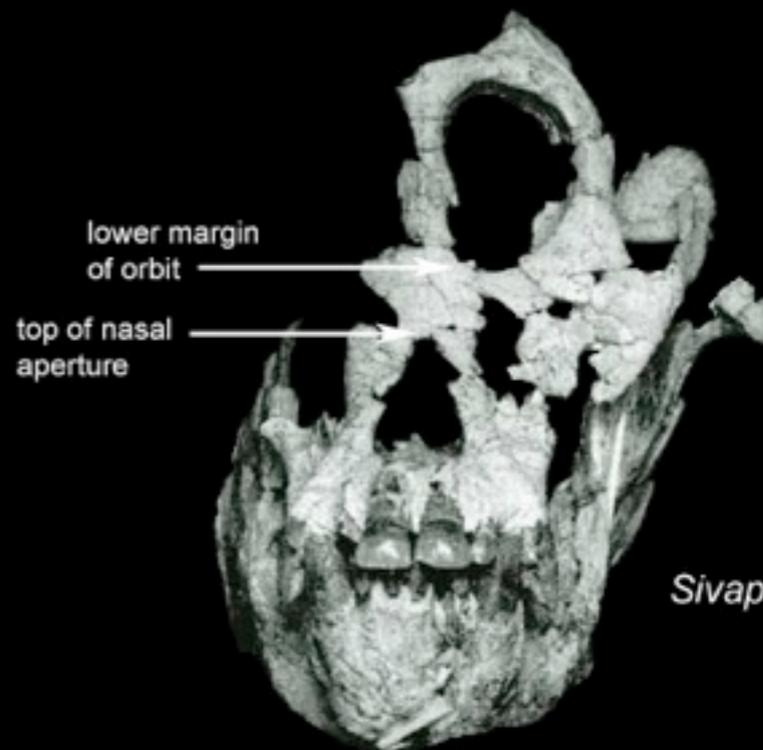
<http://www.modernhumanorigins.com/sivapithecus.html>

Note the tall ovoid shape of the orbits and the narrow interorbital distance, which are characteristics of *Sivapithecus*.

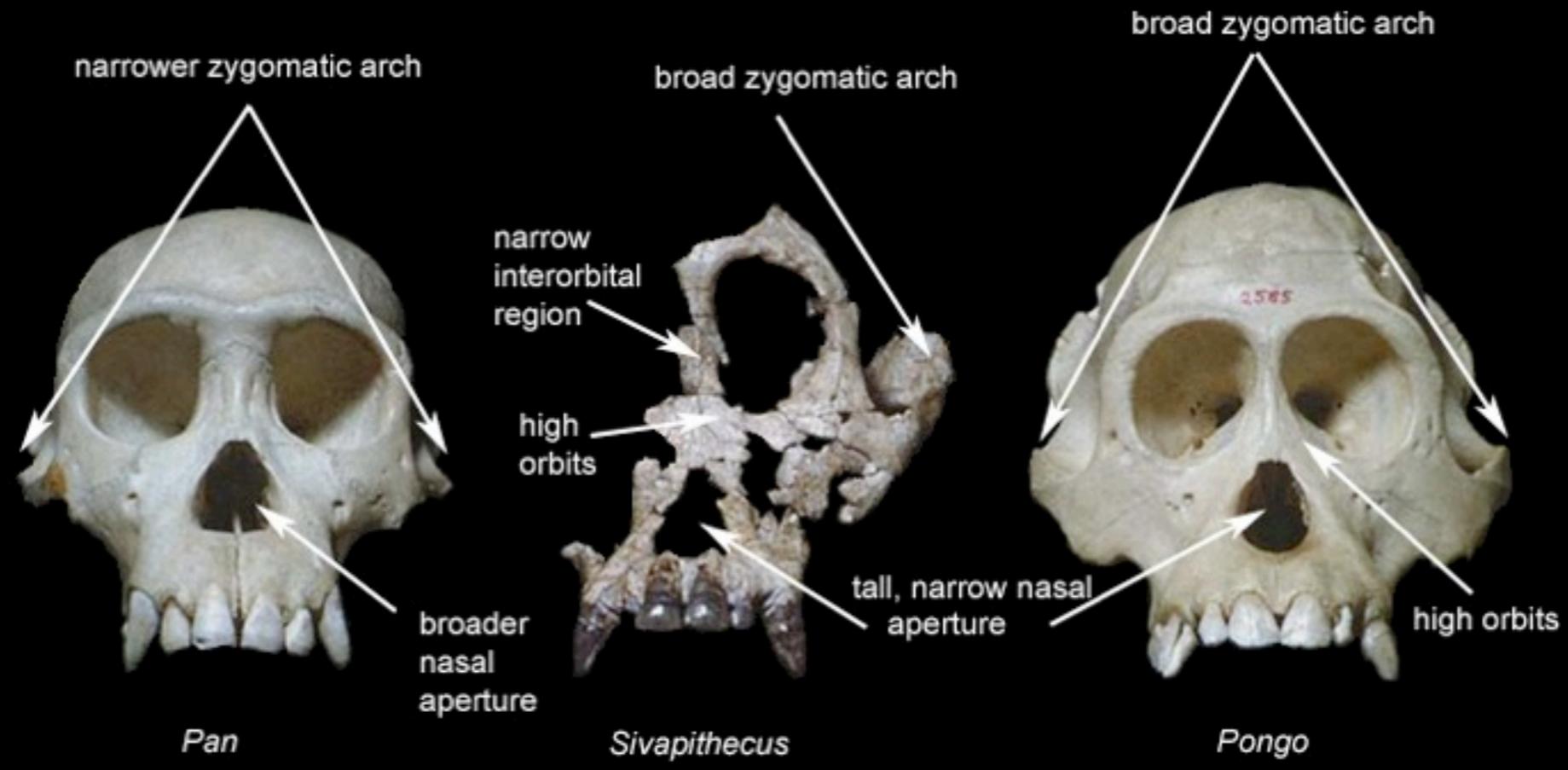
Also notice the broad upper central incisors compared to the lateral incisors, and the robust mandible.



Notice how high the lower margin of the orbits are from top of the nasal aperture, which is a trait *Sivapithecus* shares with *Pongo*.

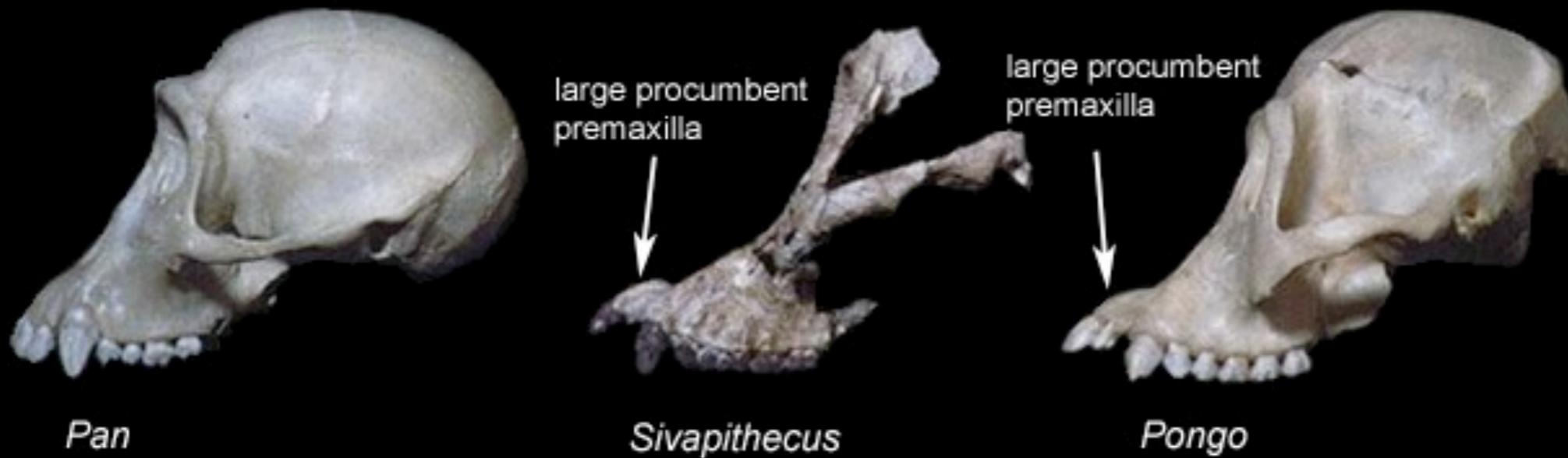


Sivapithecus sivalensis
Hartwig 2002



Whitehead et al. 2005

Sivapithecus and *Pongo* are similar in their possession of narrow interorbital regions, broad zygomatic arches, tall narrow nasal apertures, and high orbits, compared to *Pan*.

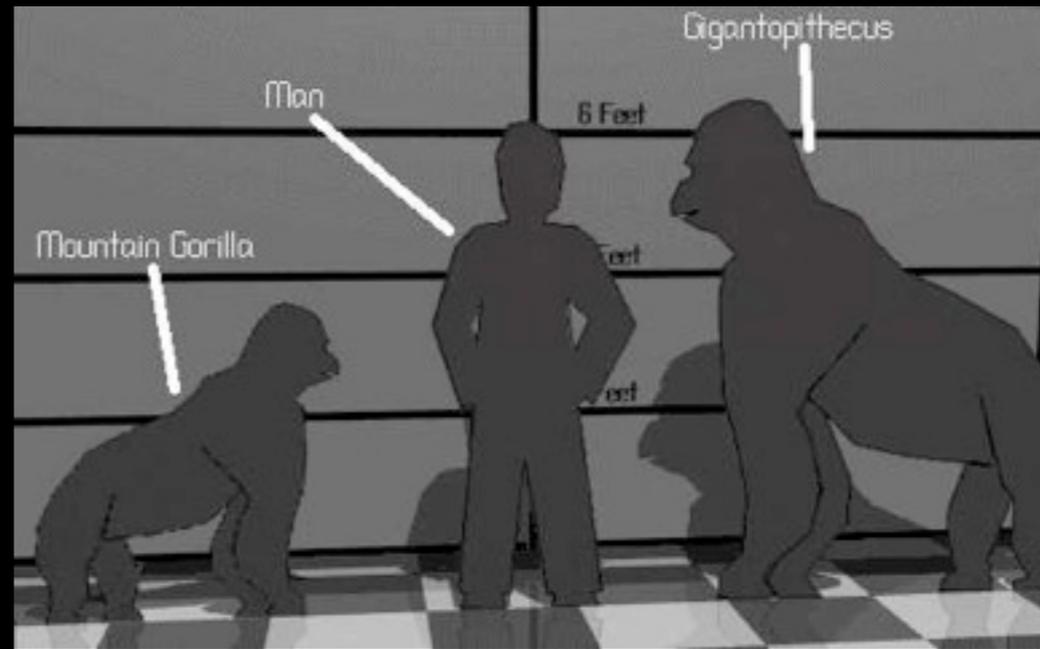


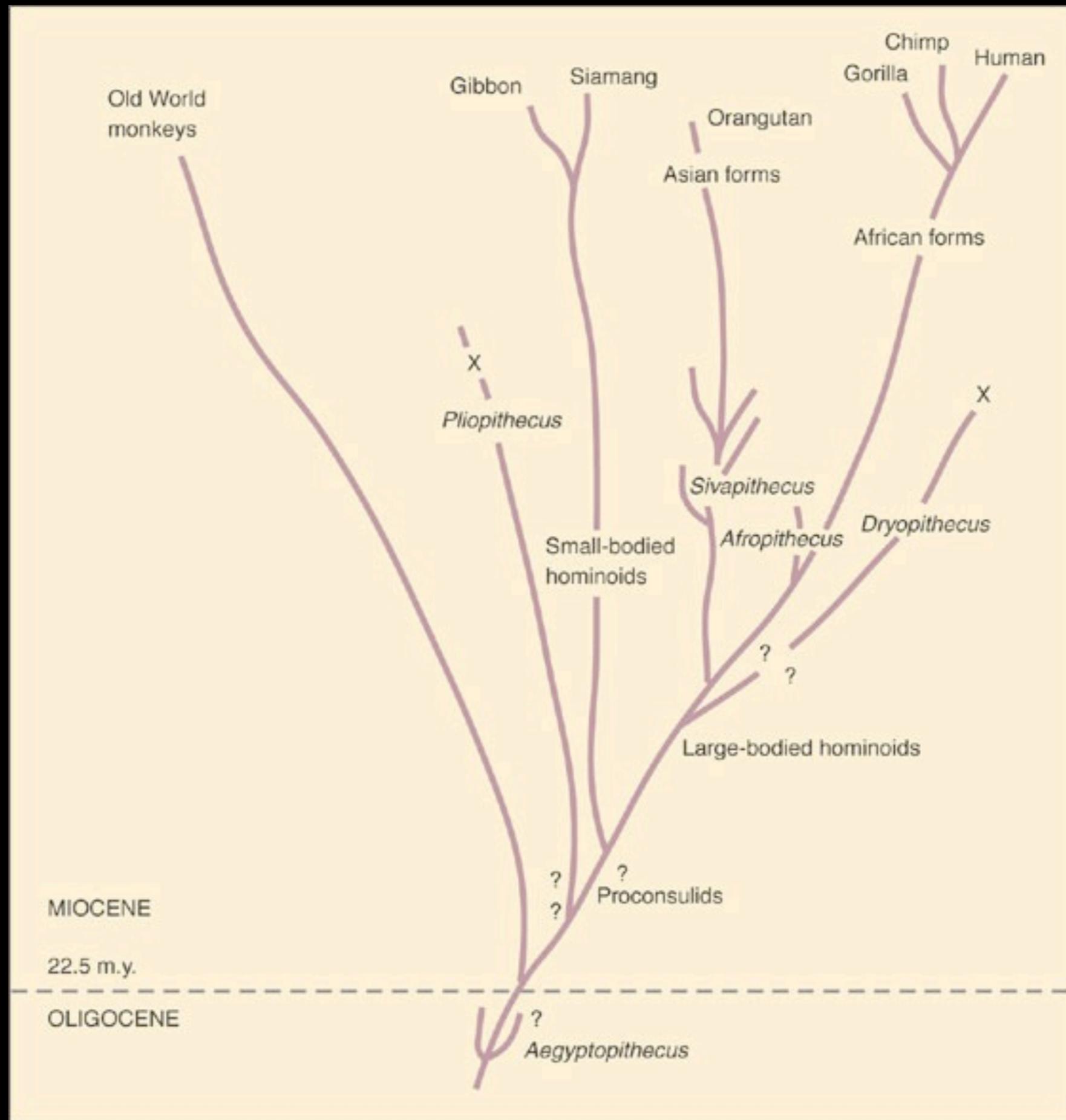
Whitehead et al. 2005

Notice how large and procumbent the premaxilla of *Sivapithecus* is compared to *Pan*, causing it to have a "dished" face. This is another derived trait *Sivapithecus* shares with *Pongo*.

Gigantopithecus







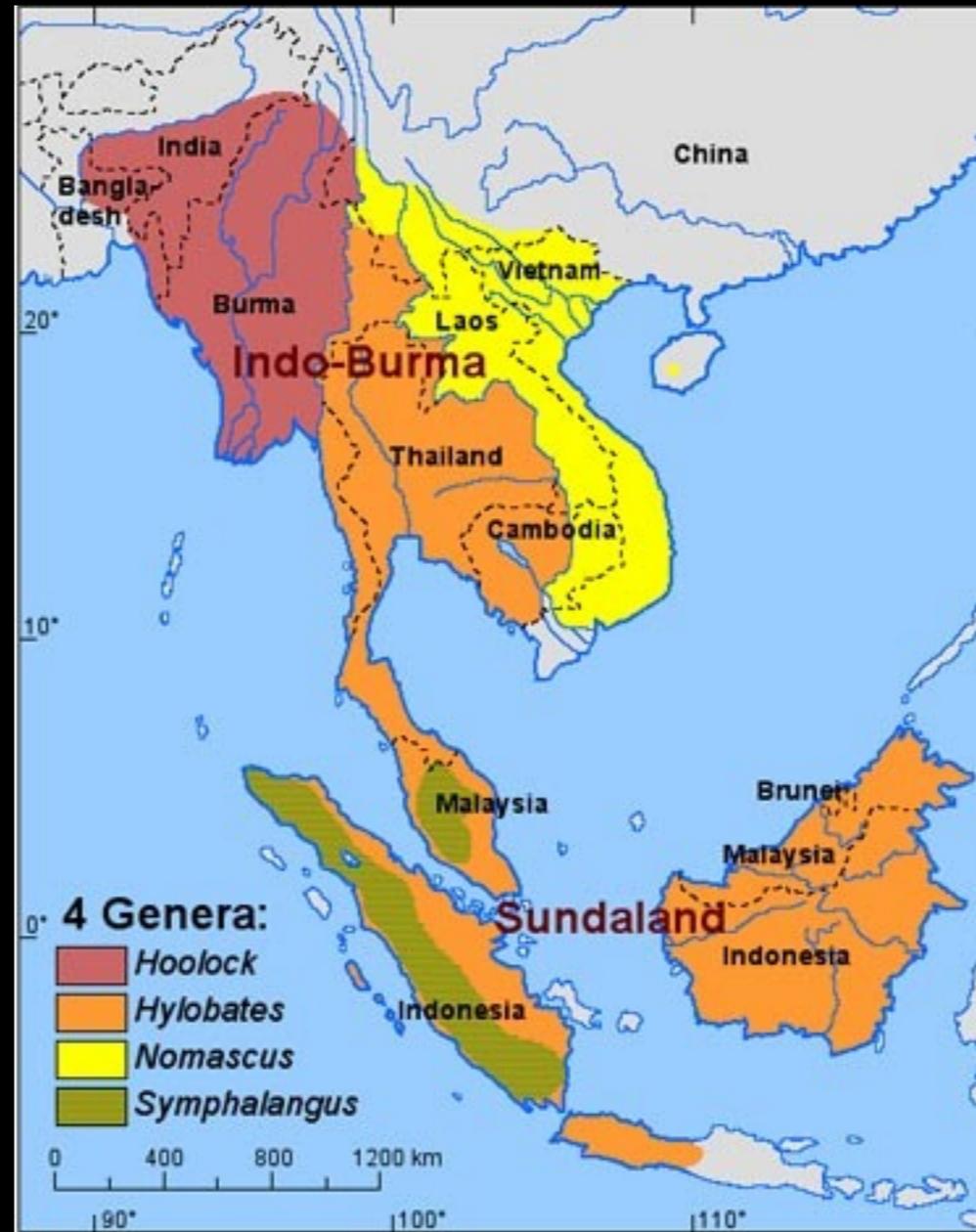
Superfamily: Hominoidea

- Gibbons, Gorillas, Orangutan, Chimpanzee, Human
- Greater encephalization, larger body, brachiation, social complexity, lack of tail

Family: Hylobatidae - Gibbons



Hylobatidae Distribution



Gibbon



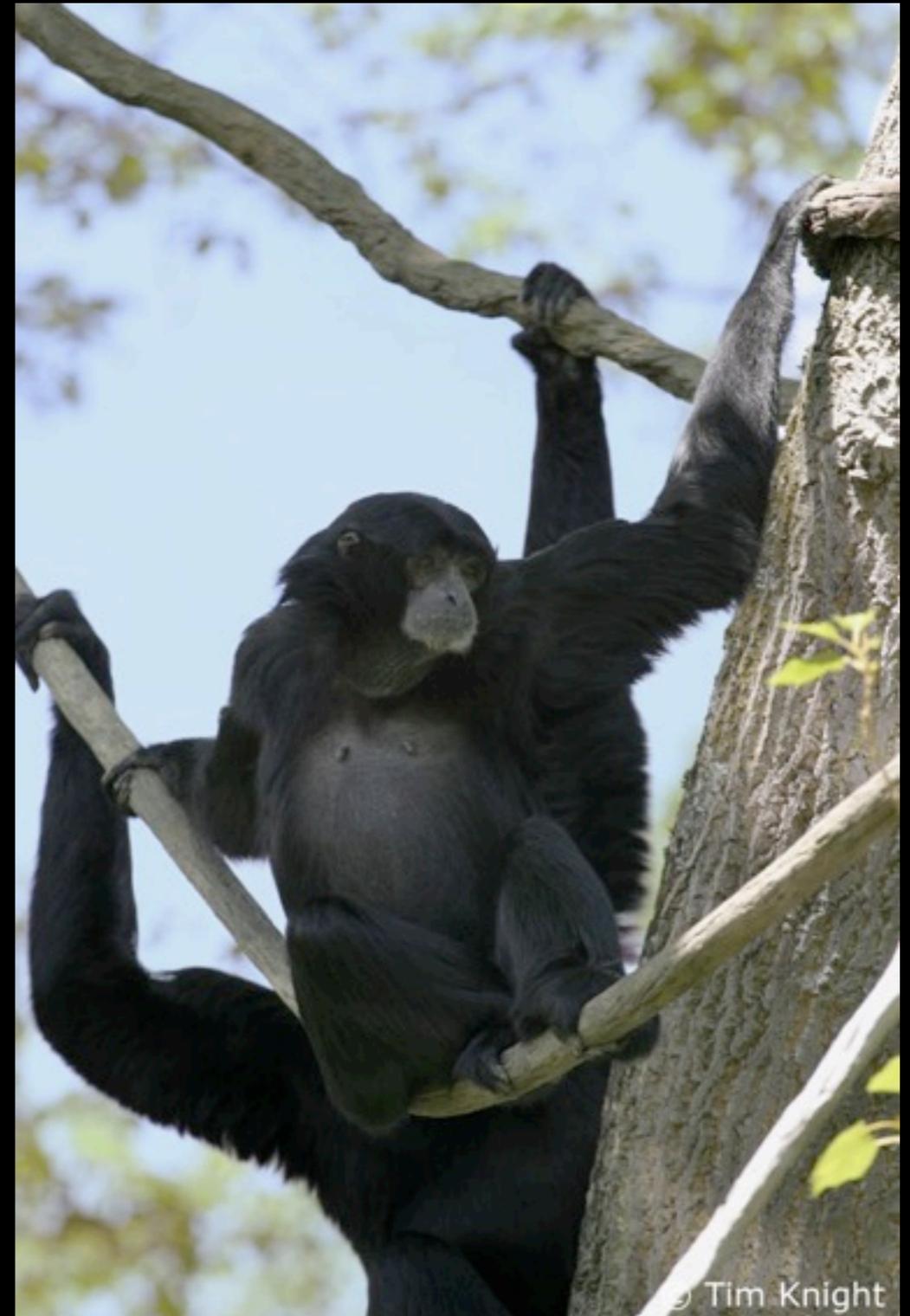
White handed gibbon



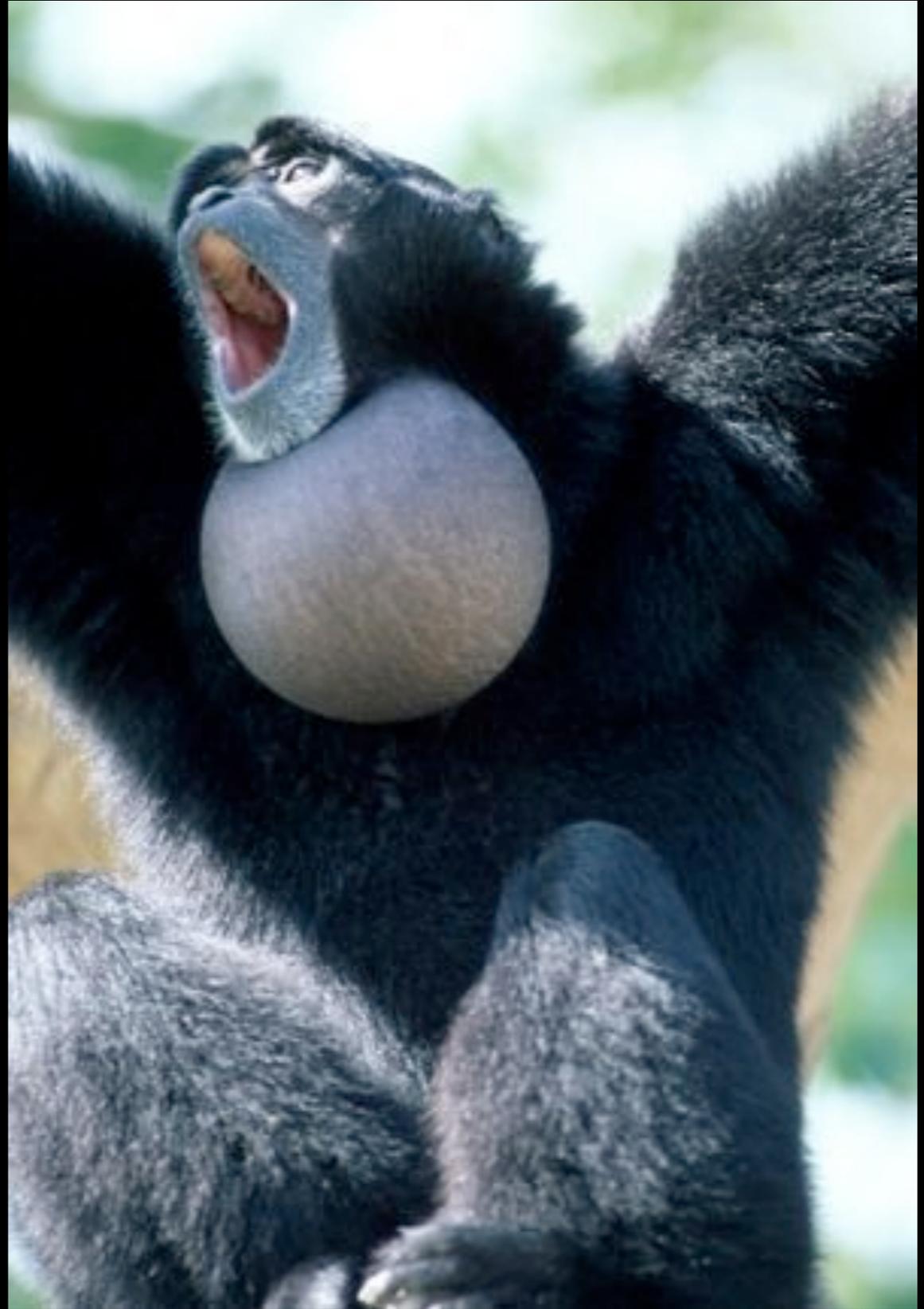
Gibbon



Siamang

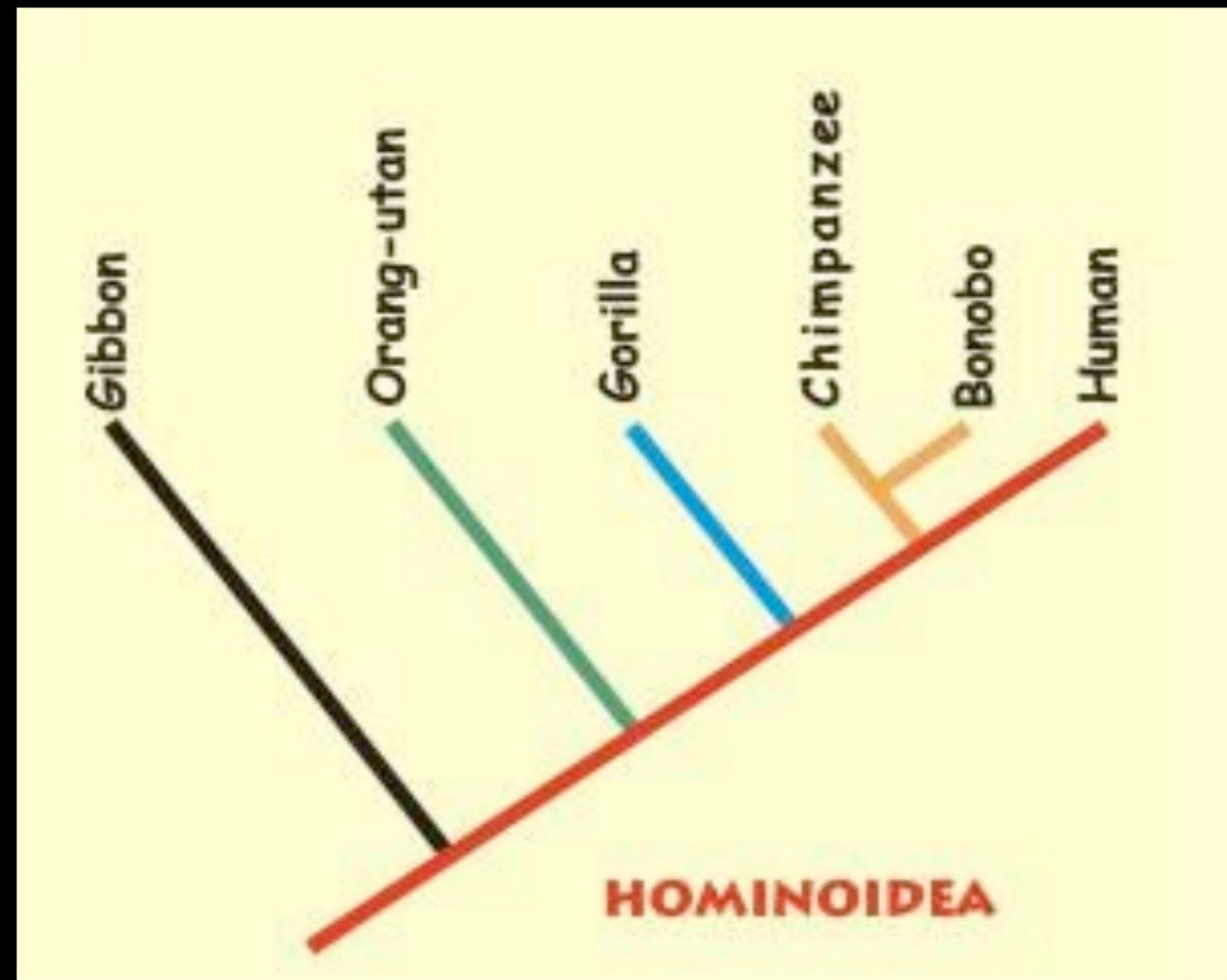


Siamang



The Great Apes

- Families: Pongidae and Hominidae
- Who goes in which?



Typical Taxonomy

- Pongidae: Orangutan, Gorilla, Chimp, Bonobo
- Hominidae: Humans
- DOES NOT MATCH UNDERSTANDING OF PHYLOGENY

Modern Taxonomy

- Pongidae = Orangutans
- Hominidae = Gorillas, Chimpanzee, Bonobo, Human
 - Subfamily Gorillinae = gorillas
 - Subfamily Paninae = chimpanzee, bonobo
 - Subfamily Homininae = humans + ancestors

Orangutan



Orangutan Distribution





Orangutan

Orangutan



Orangutan



African Ape Distribution



Gorilla



Gorilla



Gorilla



Chimpanzee



Chimpanzee



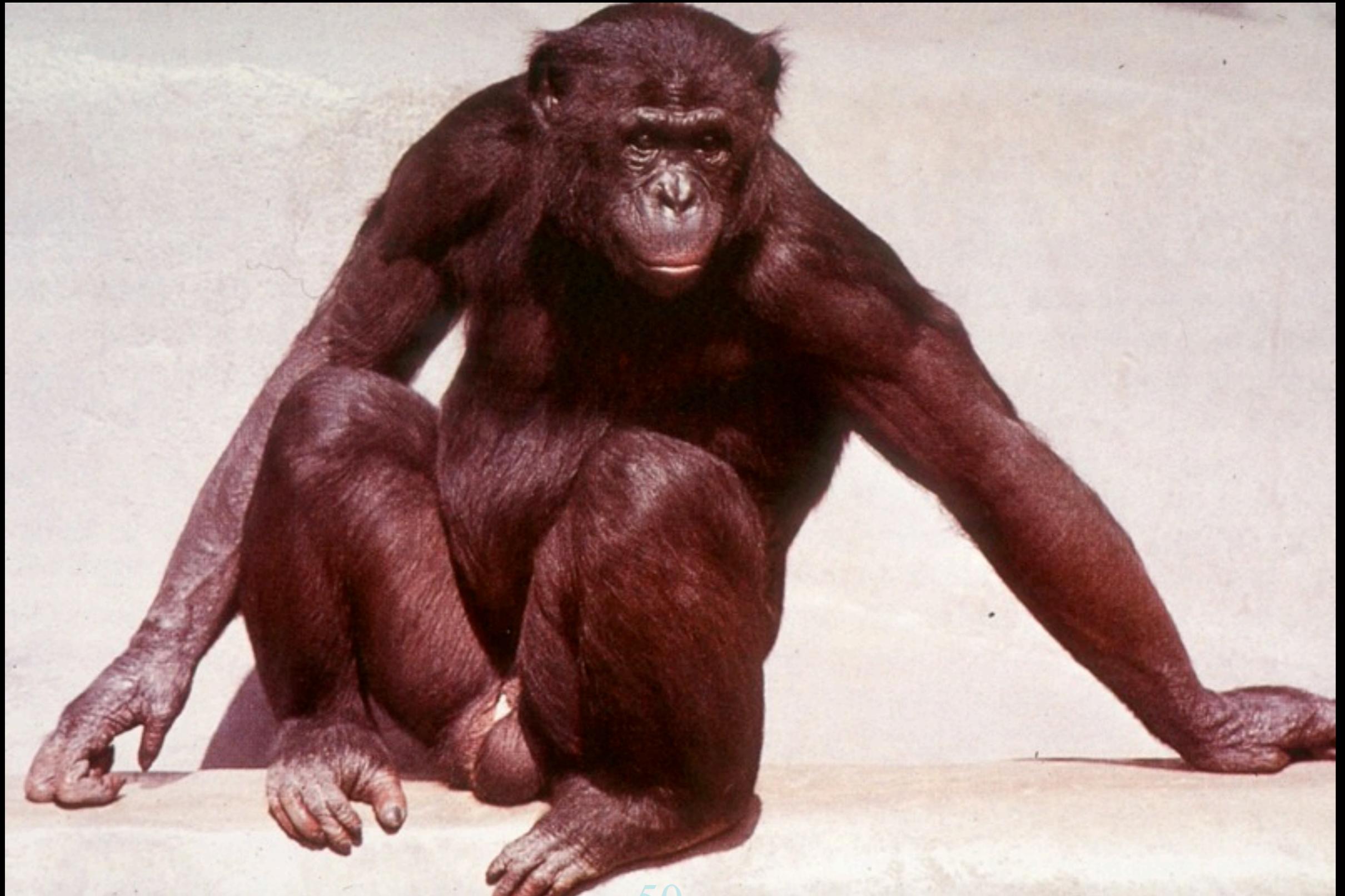
Chimpanzee



Chimp/Bonobo Tool Use



Bonobo



Bonobo



Bonobo



Photo Mark Kokke-2001

