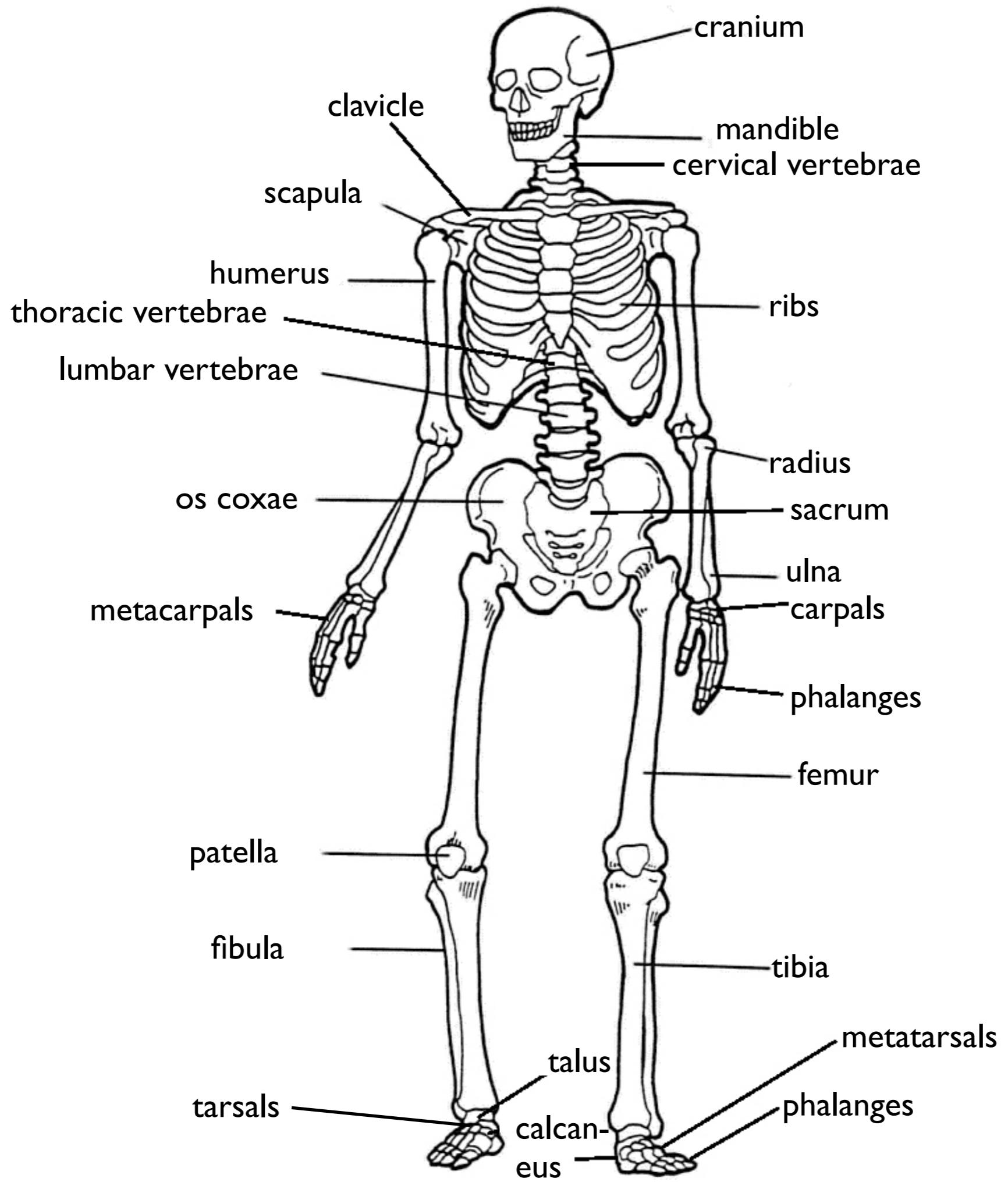
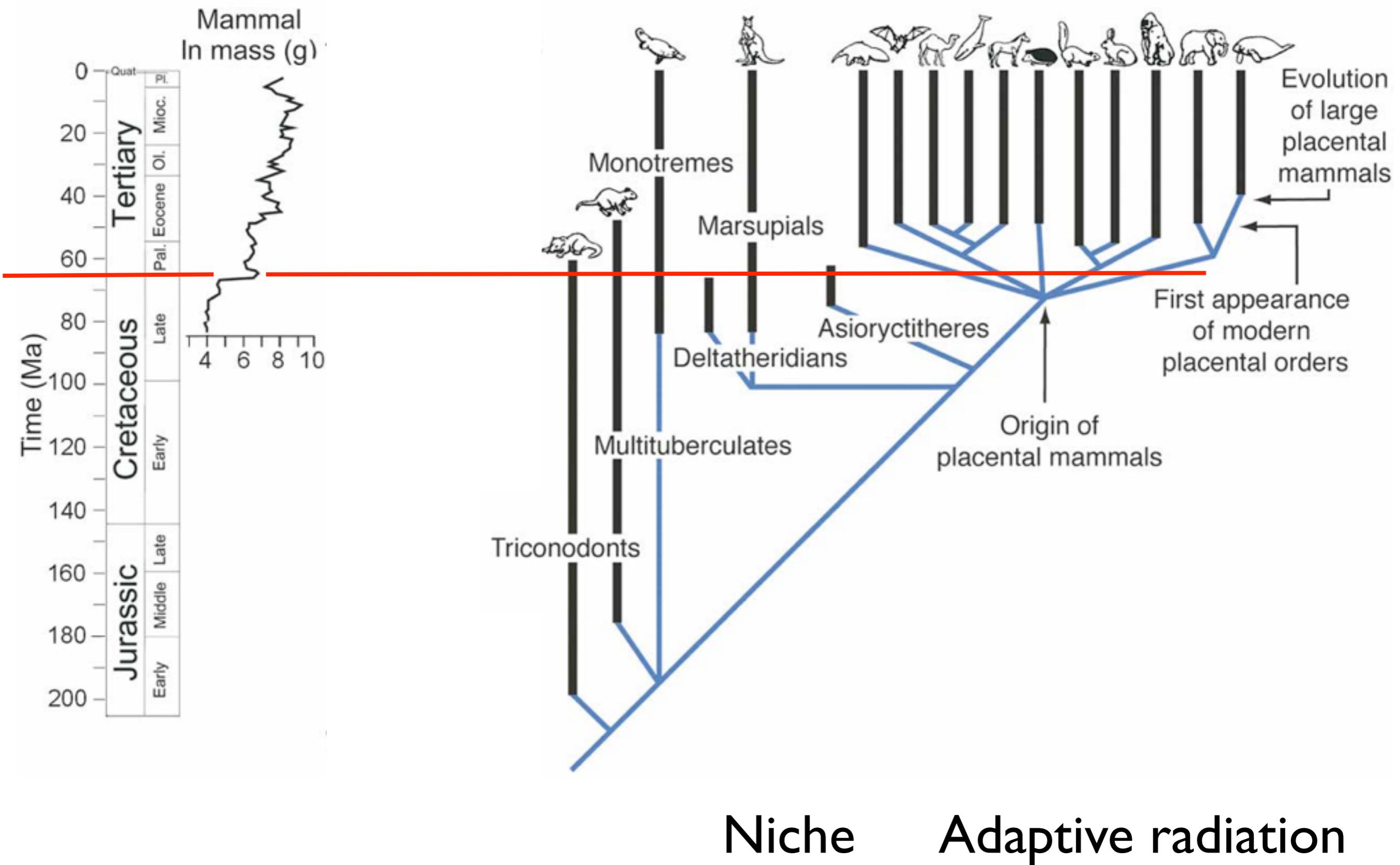


Anthropology 1100

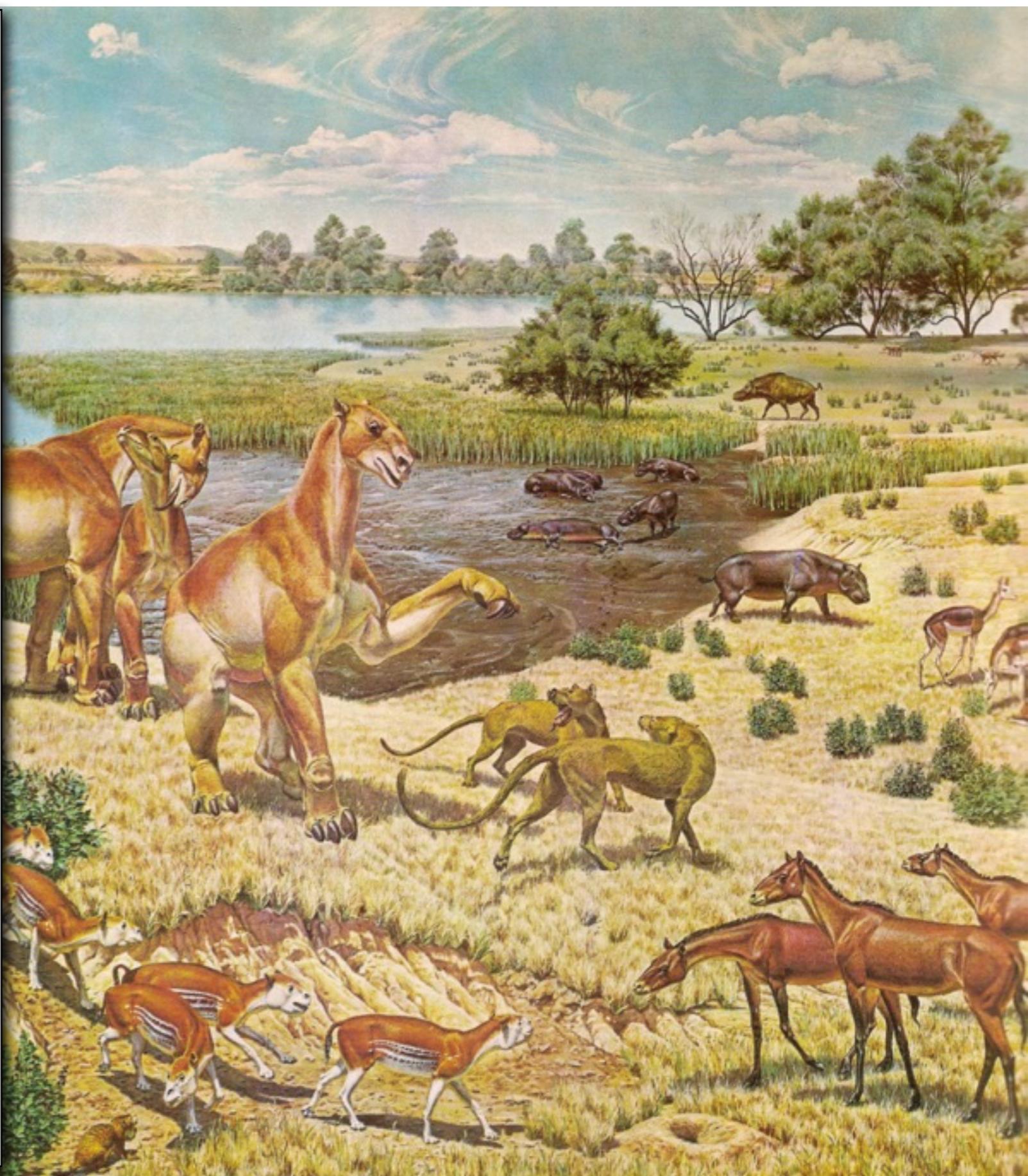
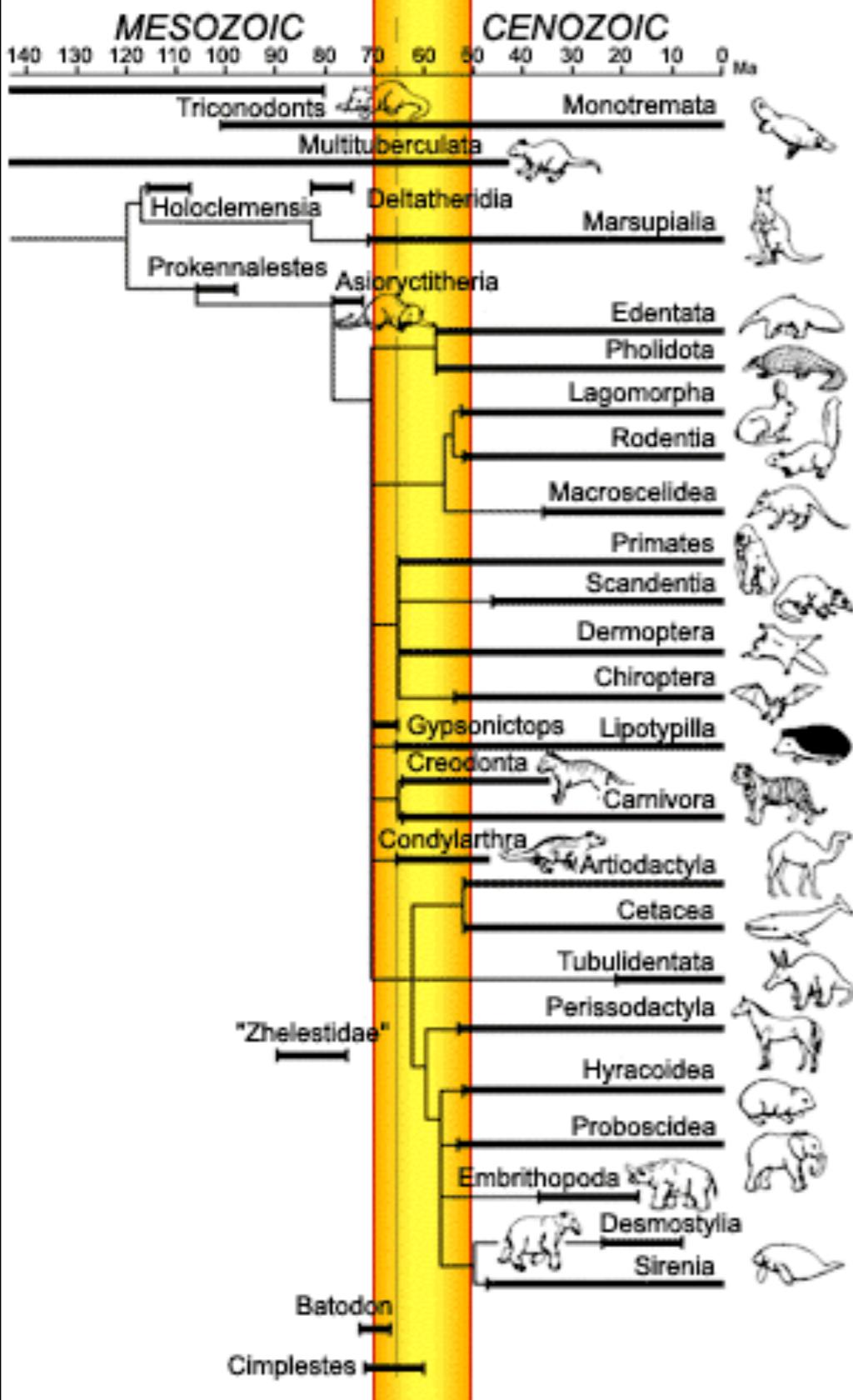
Introduction to Physical Anthropology







20 million years of rapid diversification

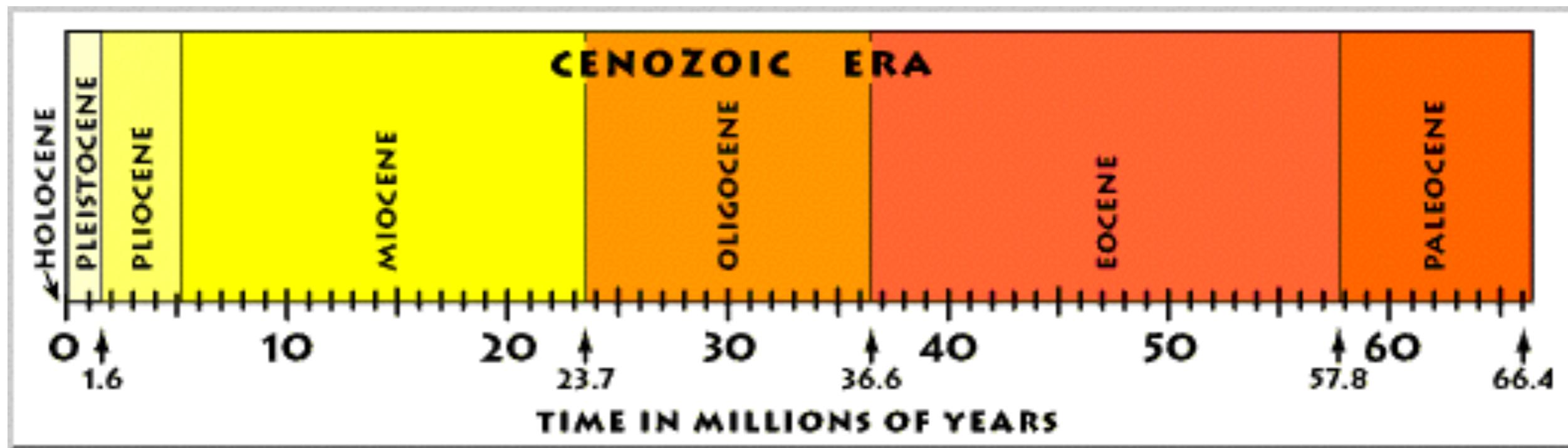




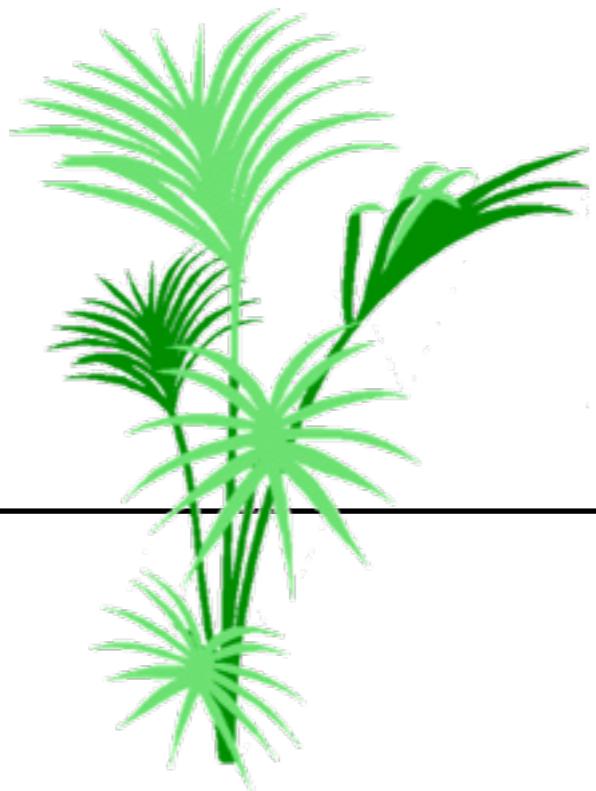
Earliest primates have roots in or before the big placental mammal adaptive radiation of 65 Ma



Earliest primate fossils from the Paleocene in Morocco



Animalia kingdom



Animalia

phylum Chordata

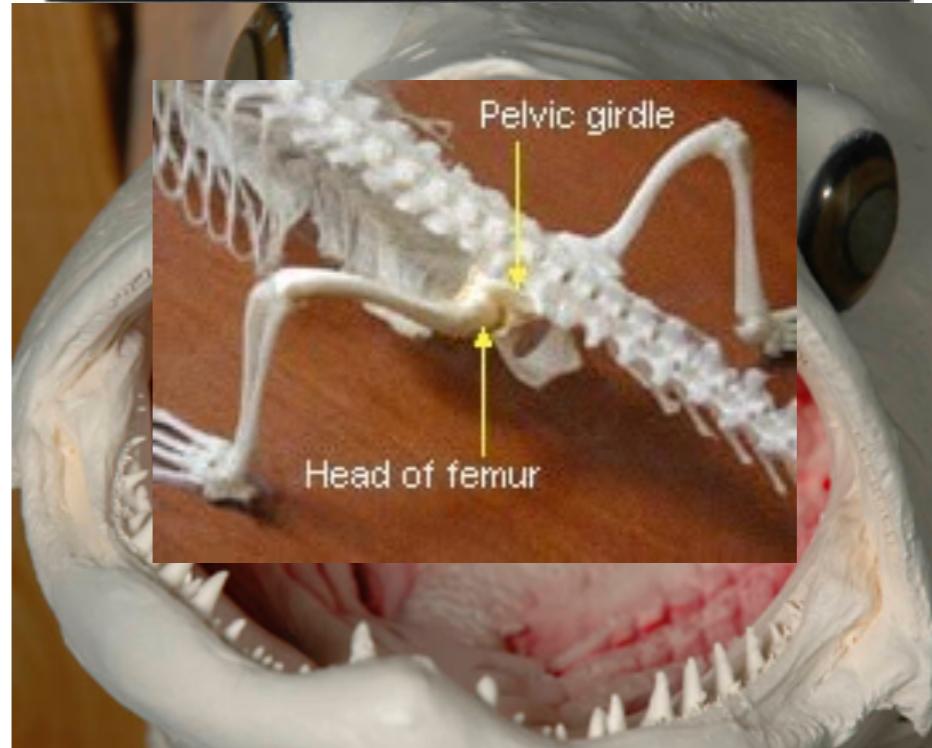
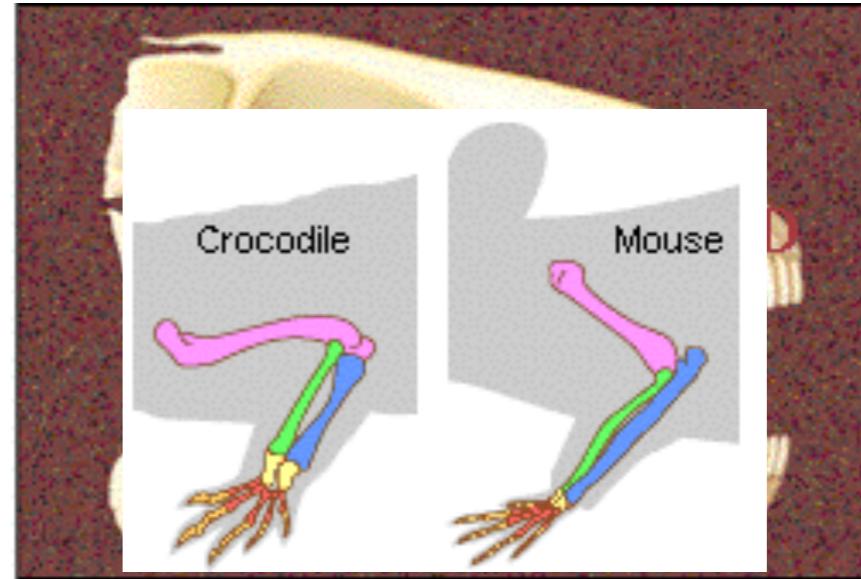


Animalia
Chordata
Mammalia class



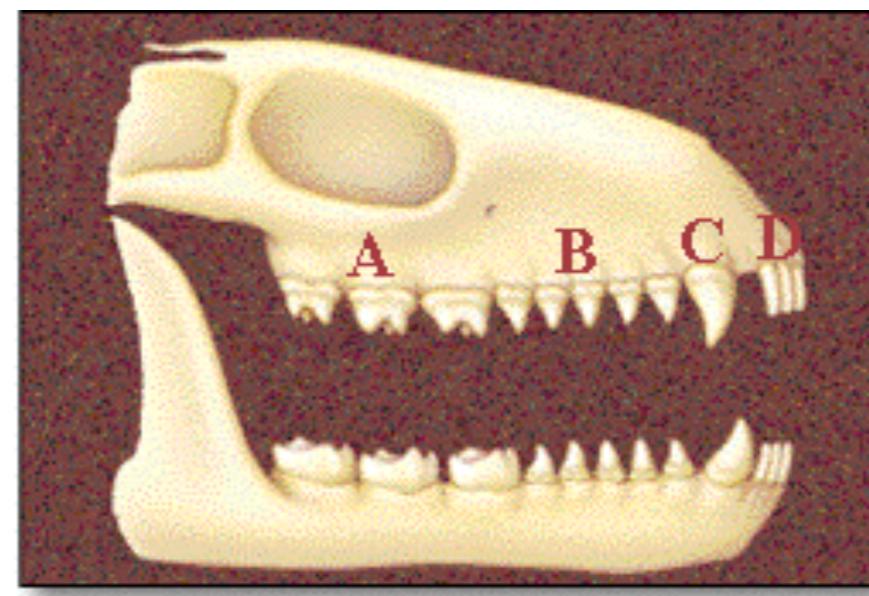
Mammal

- Mammal features
- Specialized teeth
- Thermoregulation



Mammal teeth

- Incisors
- Canines
- Premolars



Dental formula

Animalia
Chordata
Mammalia
Primates order



Animalia
Chordata
Mammalia
Primates
Suborder **Anthropoidea**
**Monkeys
and apes!**



Animalia
Chordata
Mammalia
Primates
Anthropoidea
Family **Hominidae**

Apes!



Animalia
Chordata
Mammalia
Primates
Anthropoidea
Hominidae
Tribe Hominini

Chimps and humans!



Animalia

Chordata

Mammalia

Primates

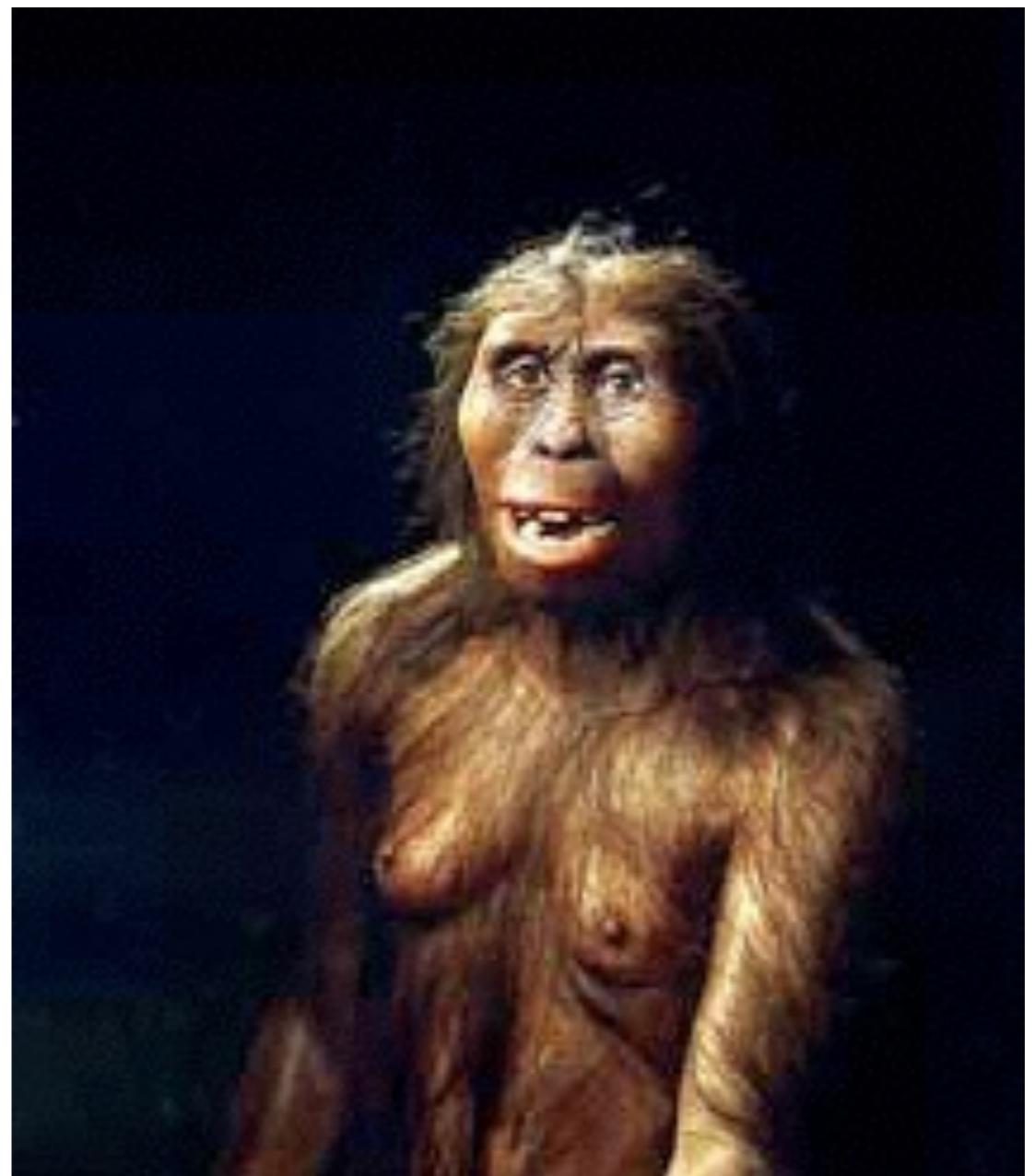
Anthropoidea

Hominidae

Homininae

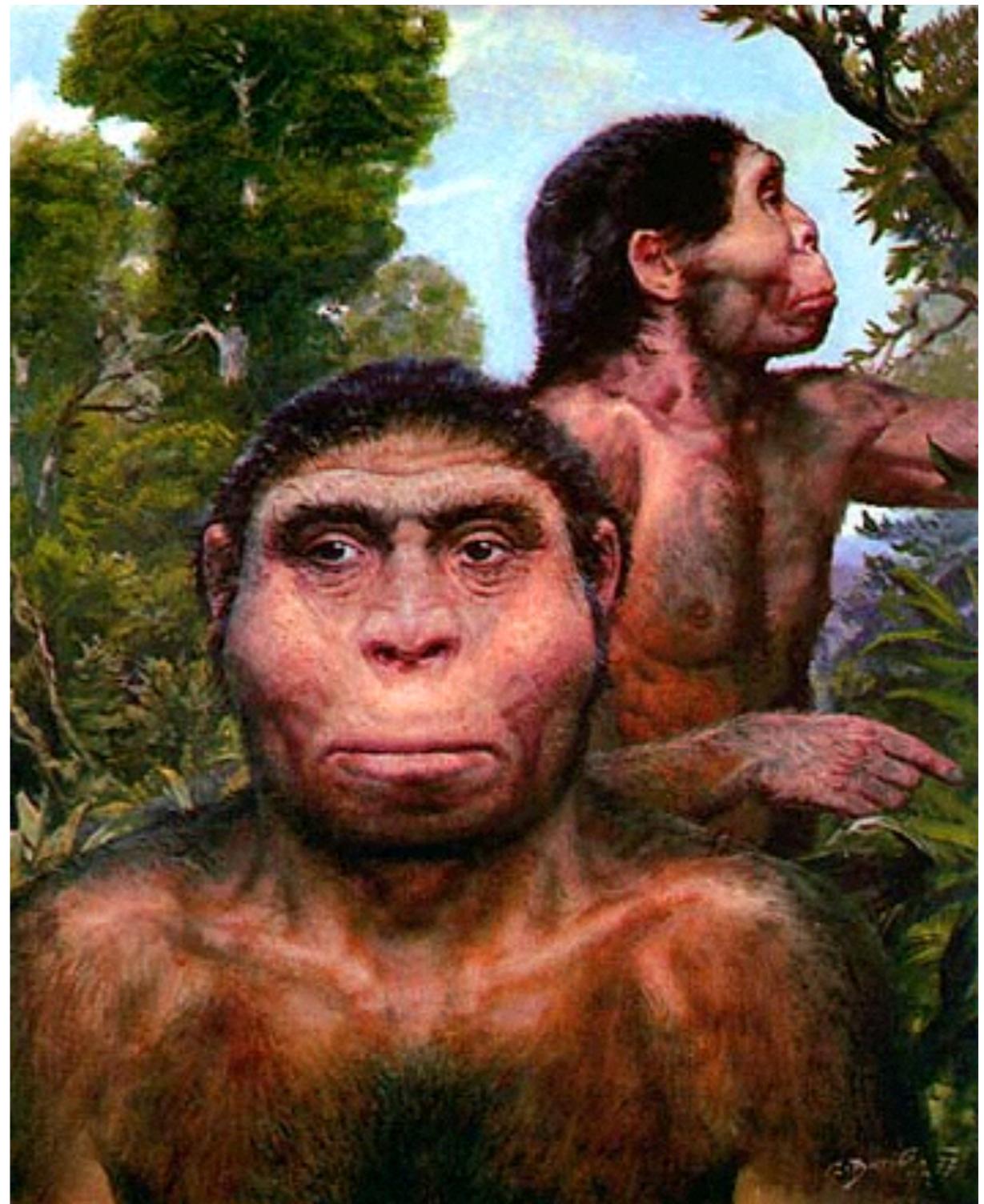
Subtribe Hominina

Human ancestors!

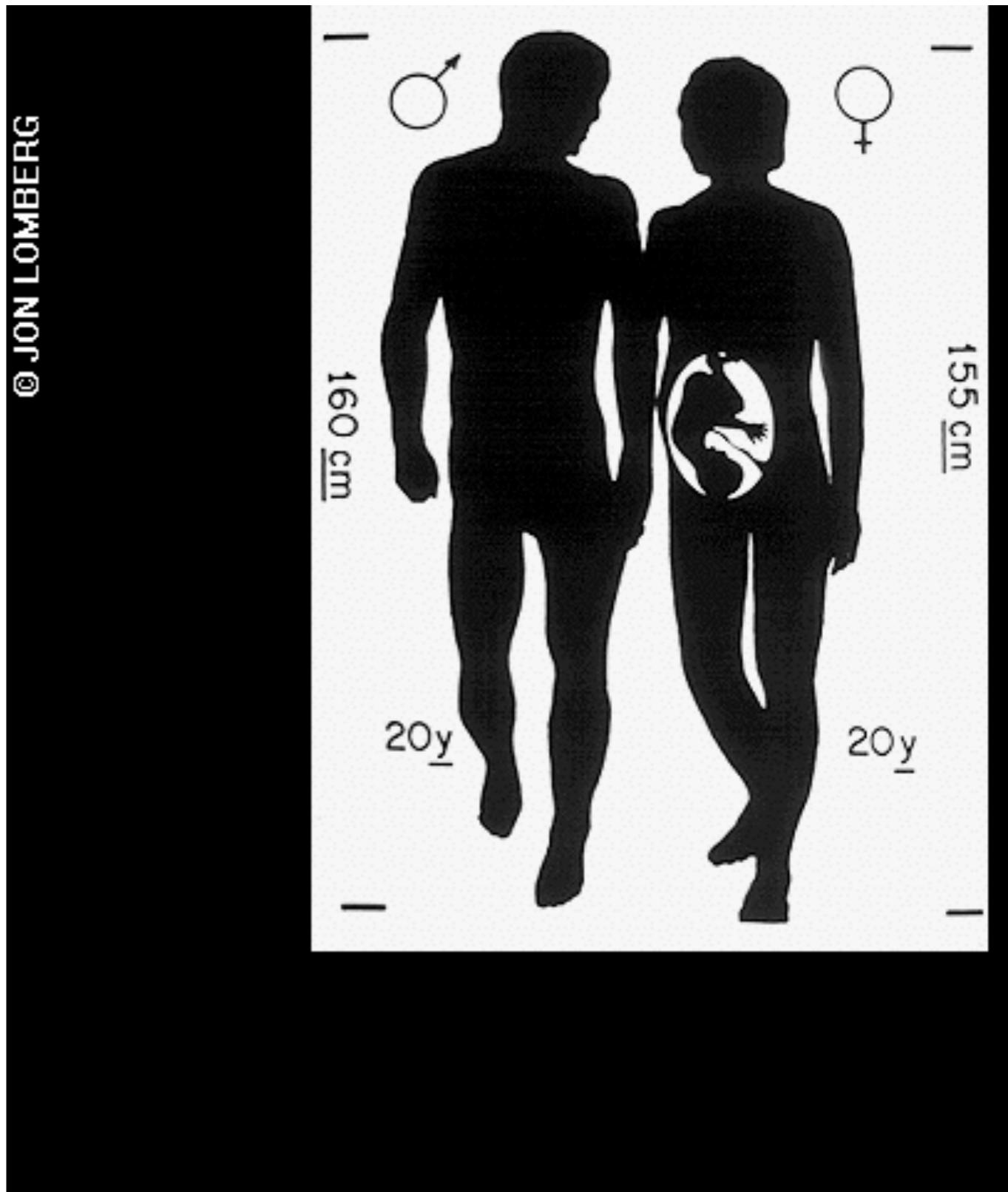


Anamalia
Chordata
Mammalia
Primates
Anthropoidea
Hominidae
Hominini
Hominina
Homo

Our genus!



Animalia
Chordata
Mammalia
Primates
Anthropoidea
Hominidae
Homininae
Hominini
Homo sapiens

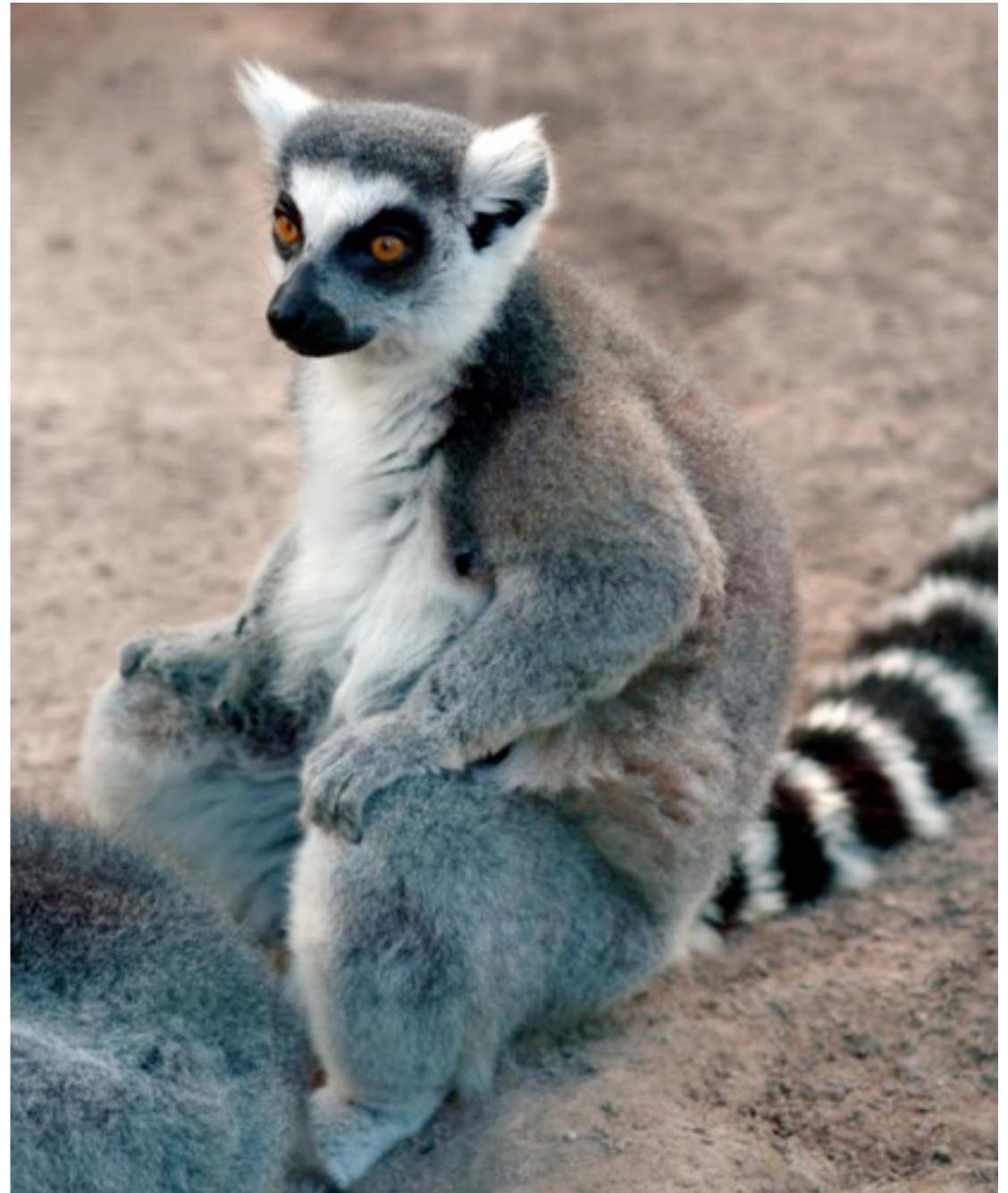


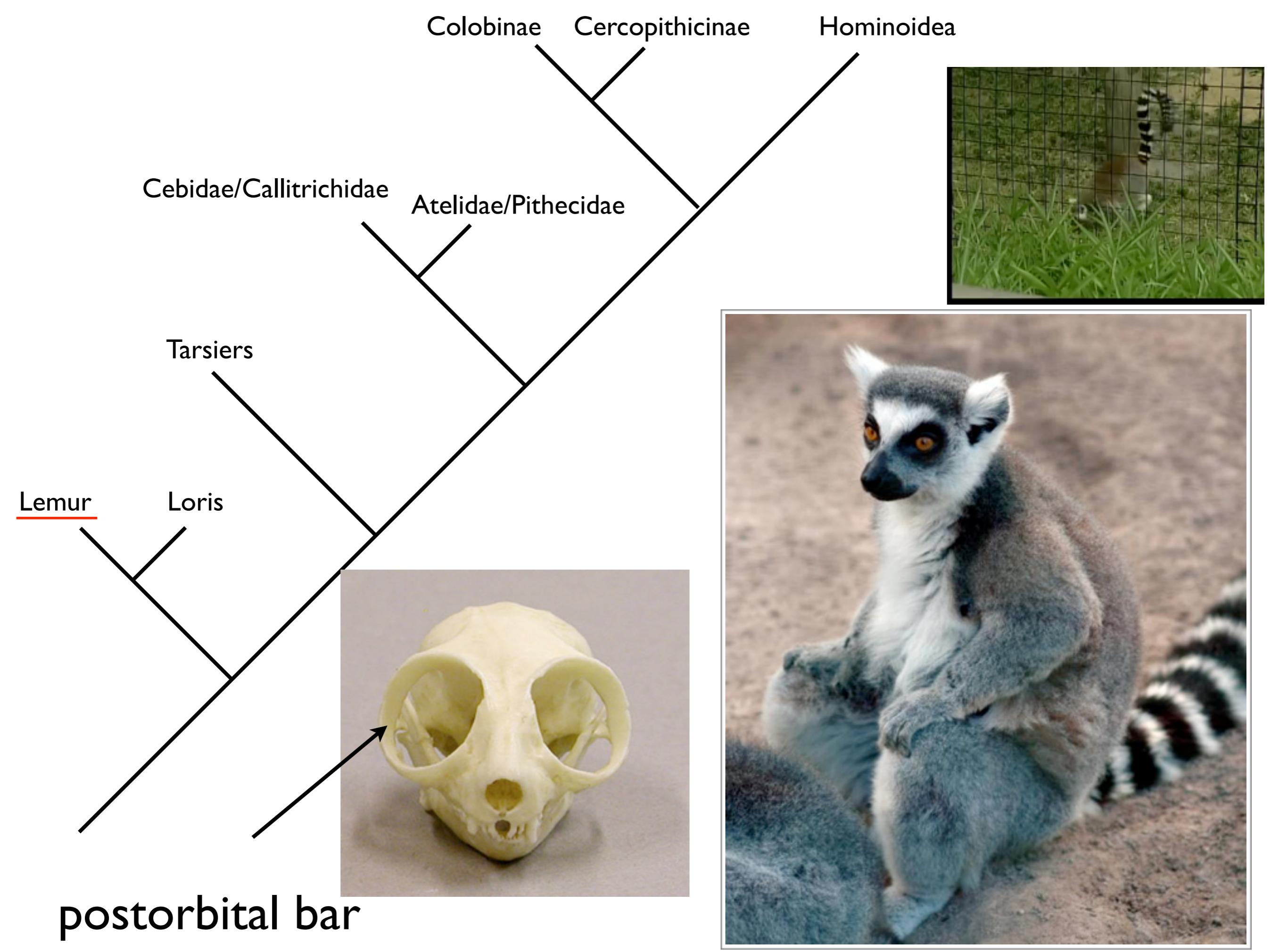
Strepsirhini

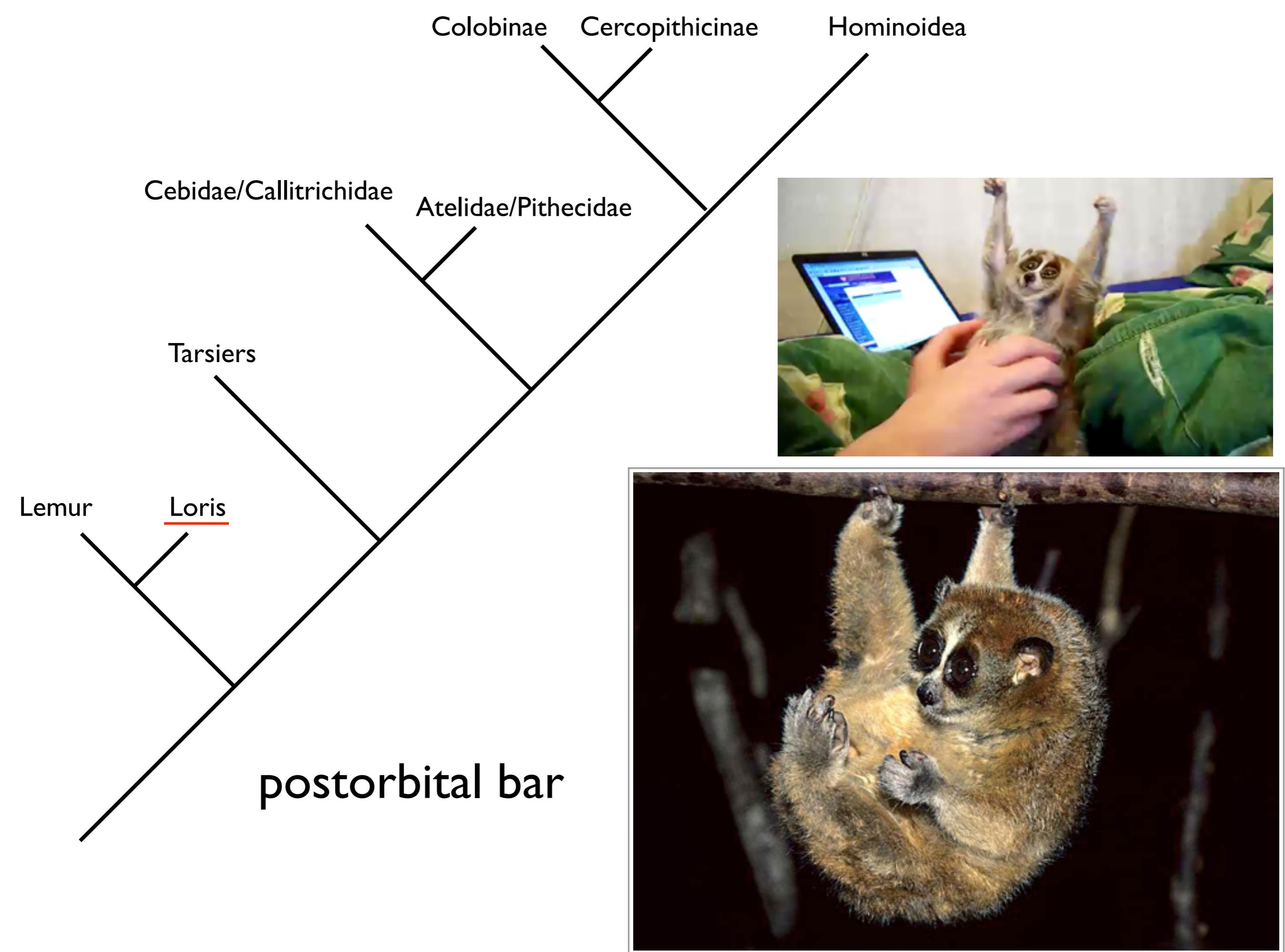
- Lemuriformes

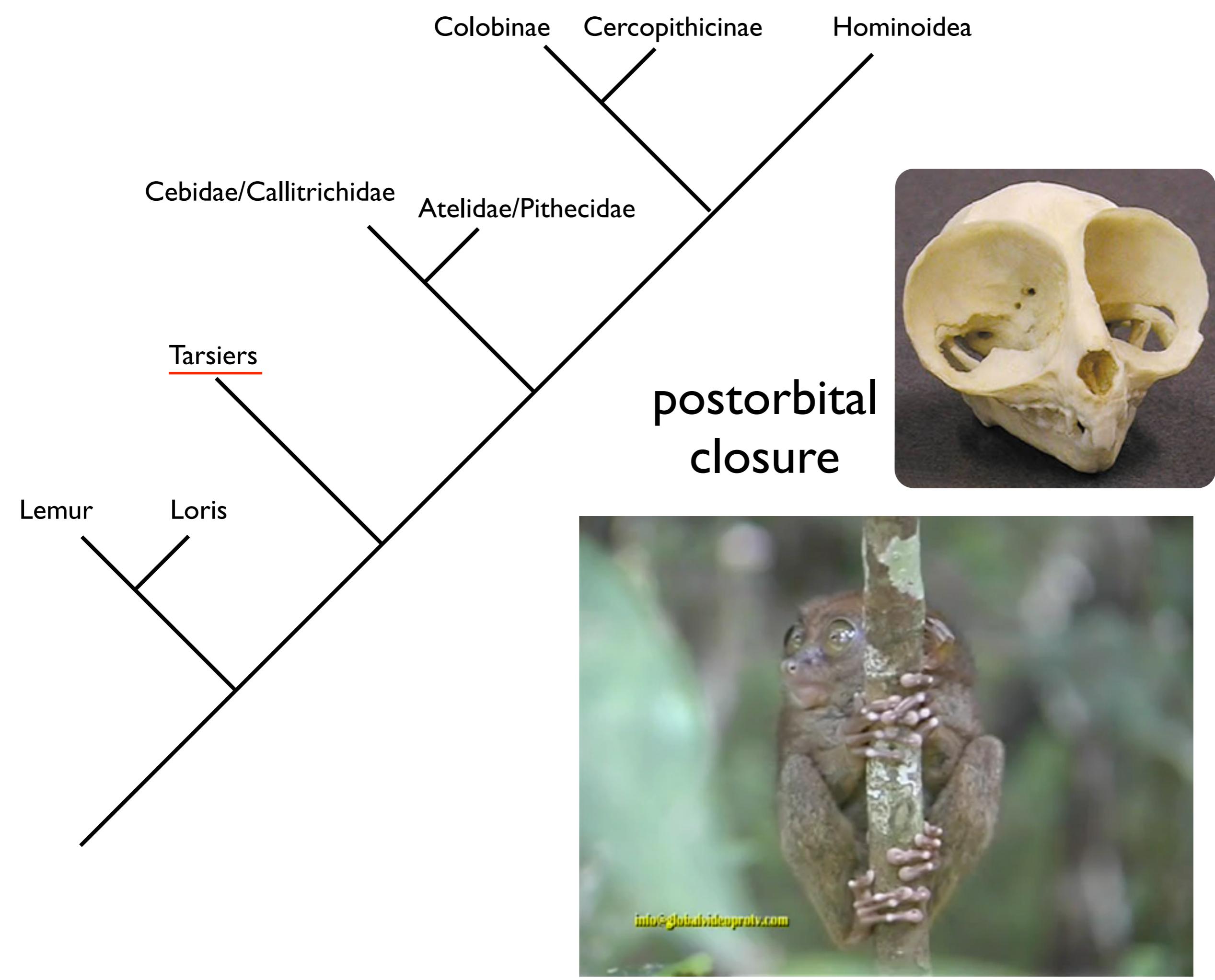
Africa & Asia:
nocturnal

Madagascar:
diurnal



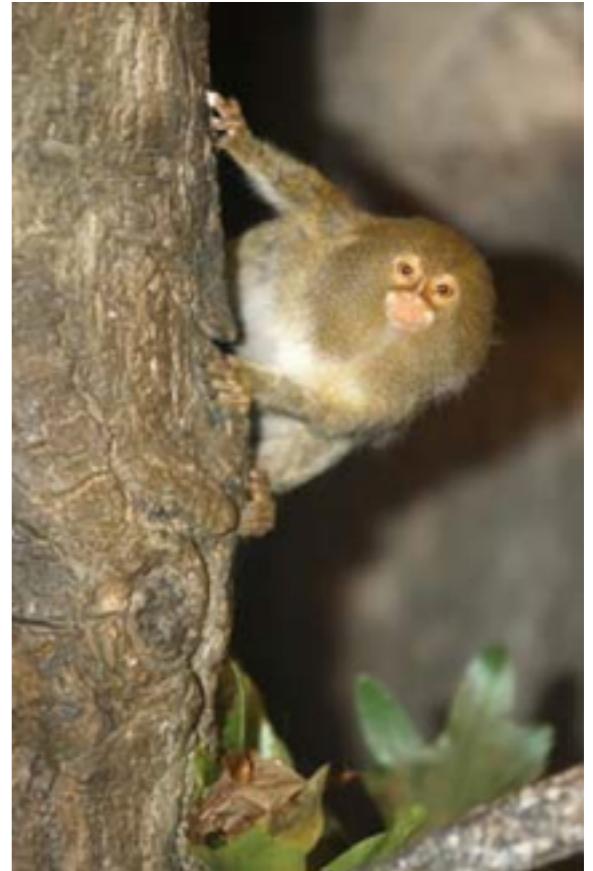
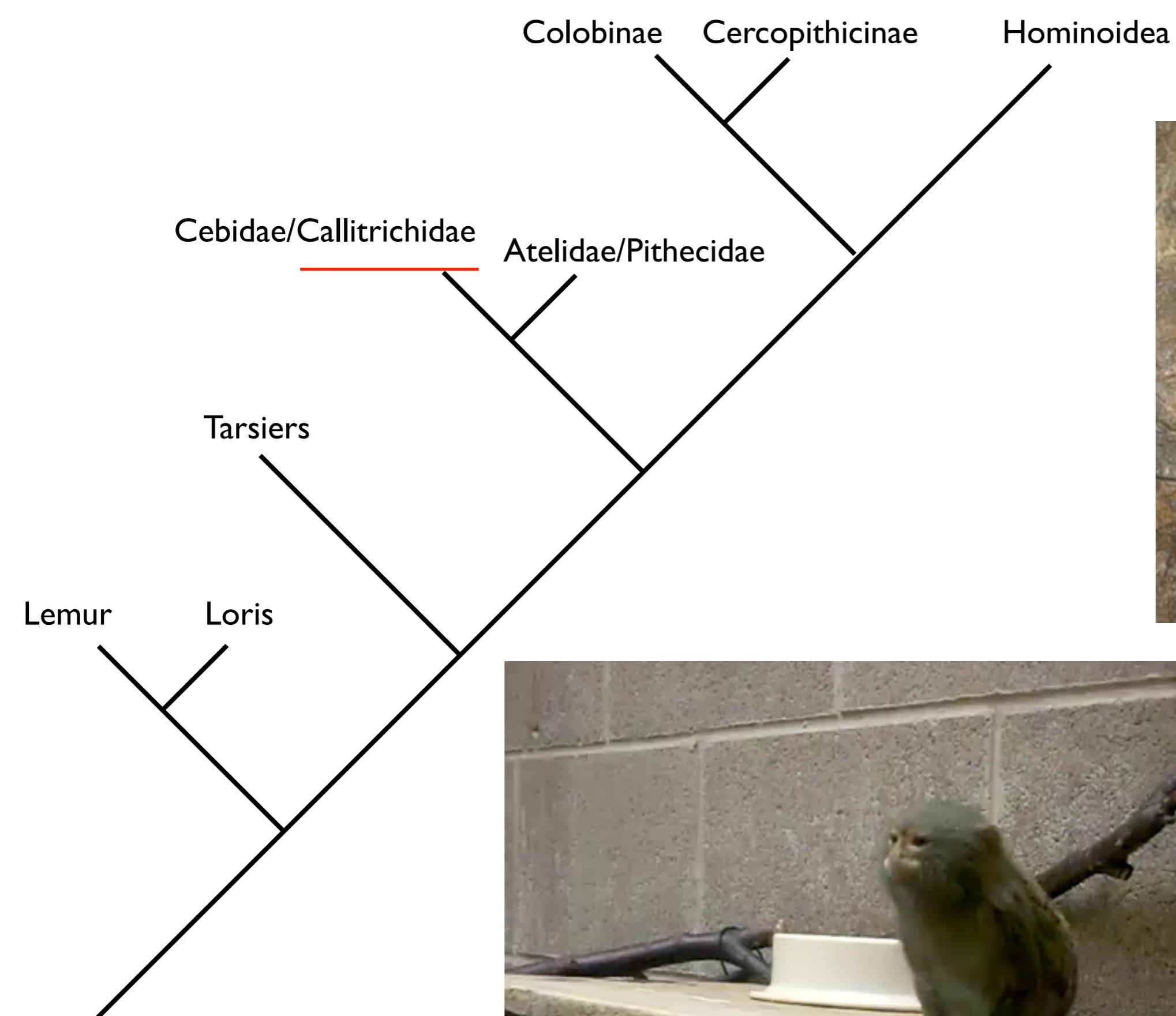


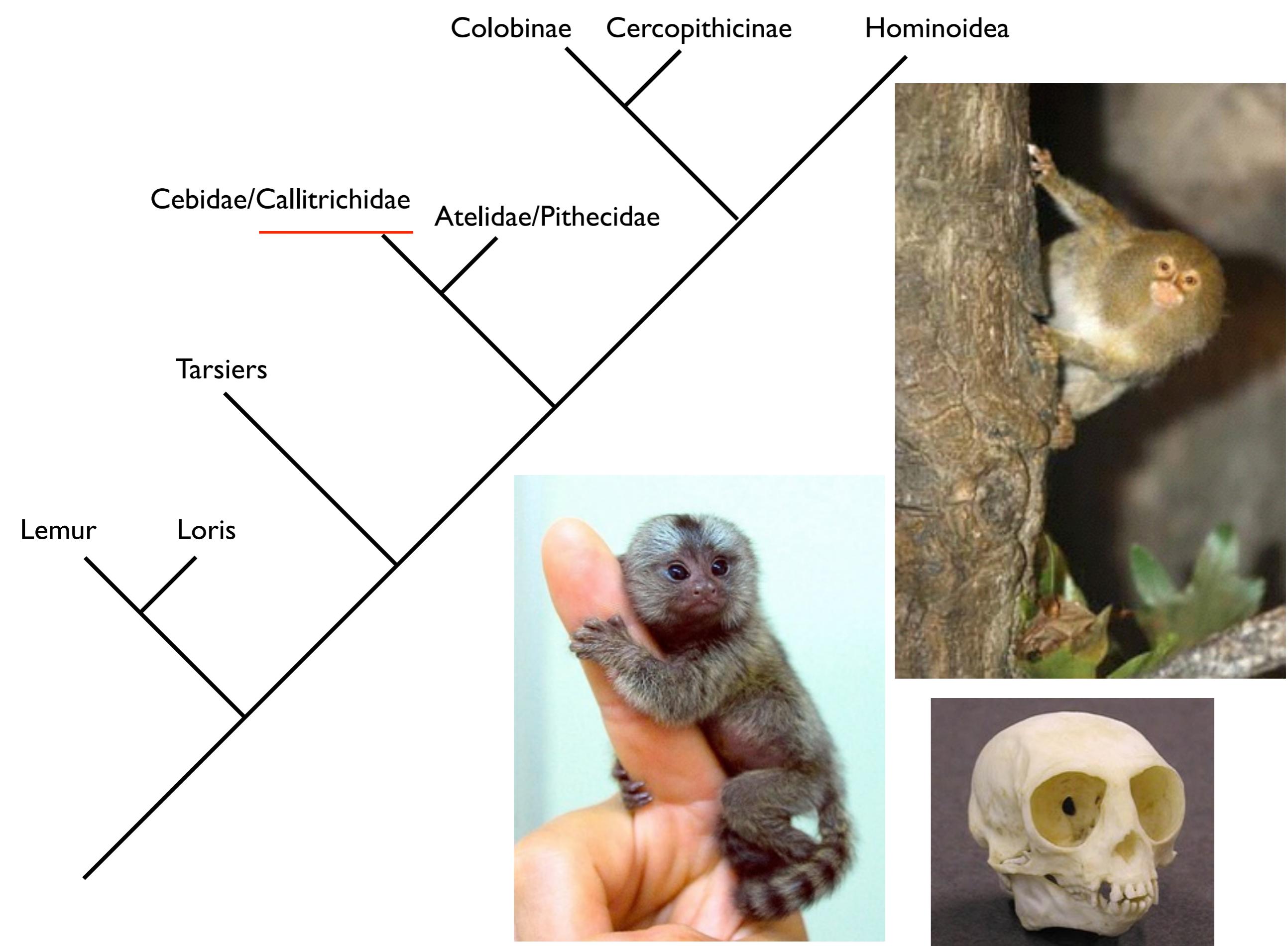


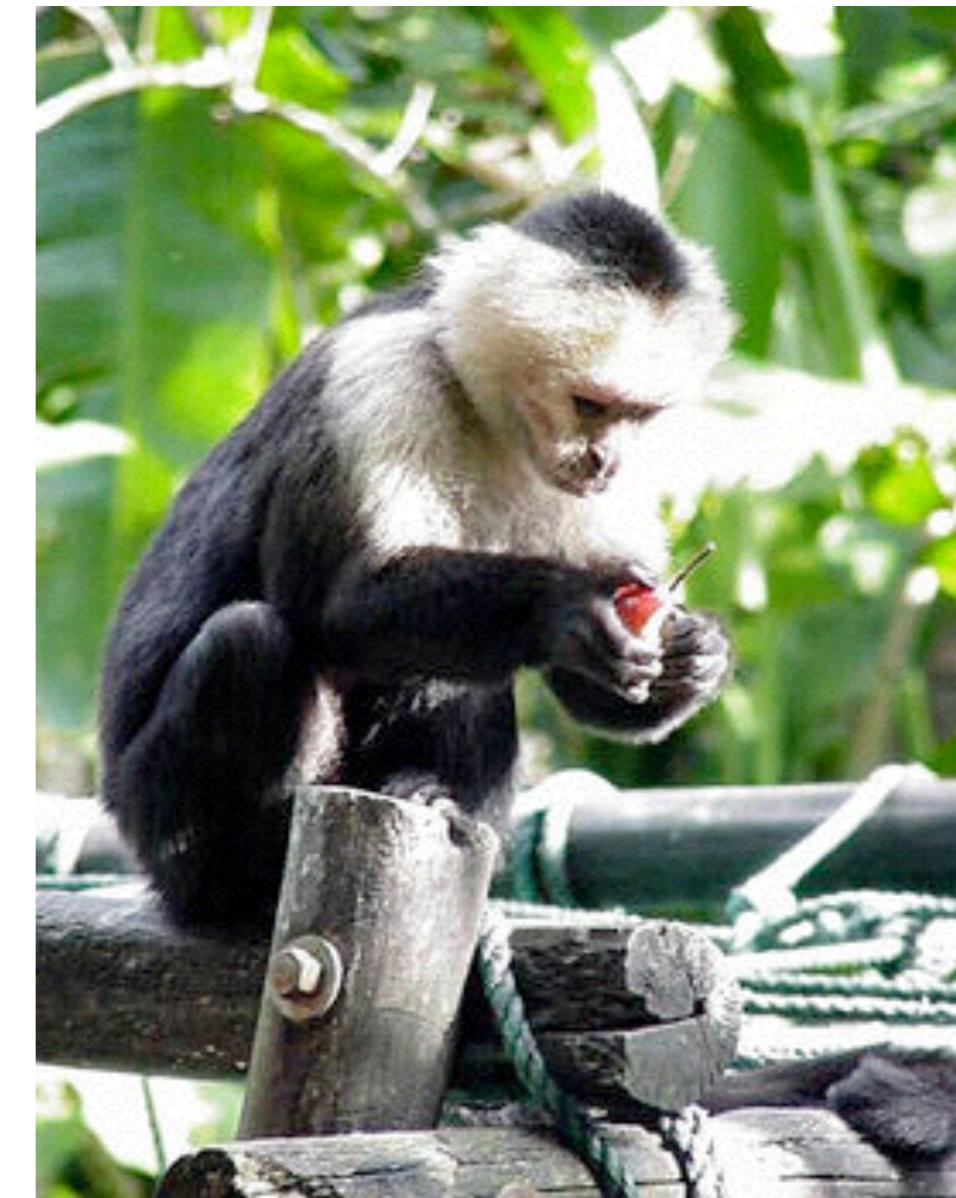
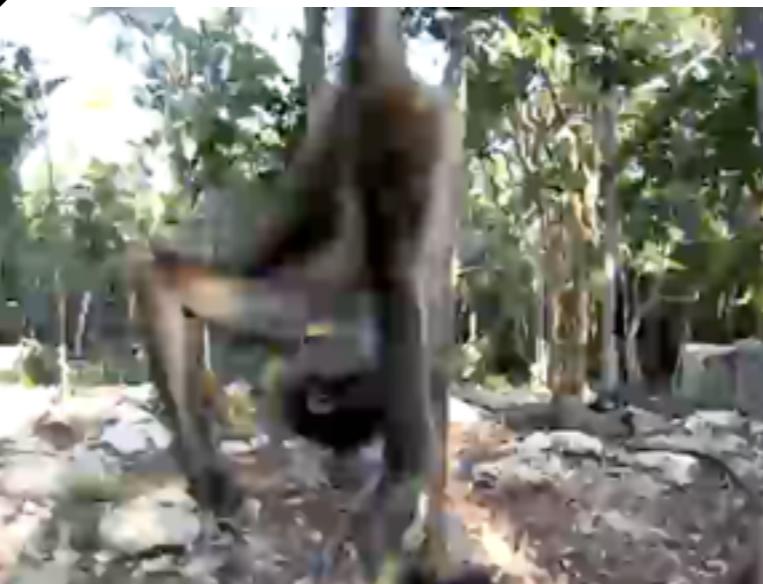
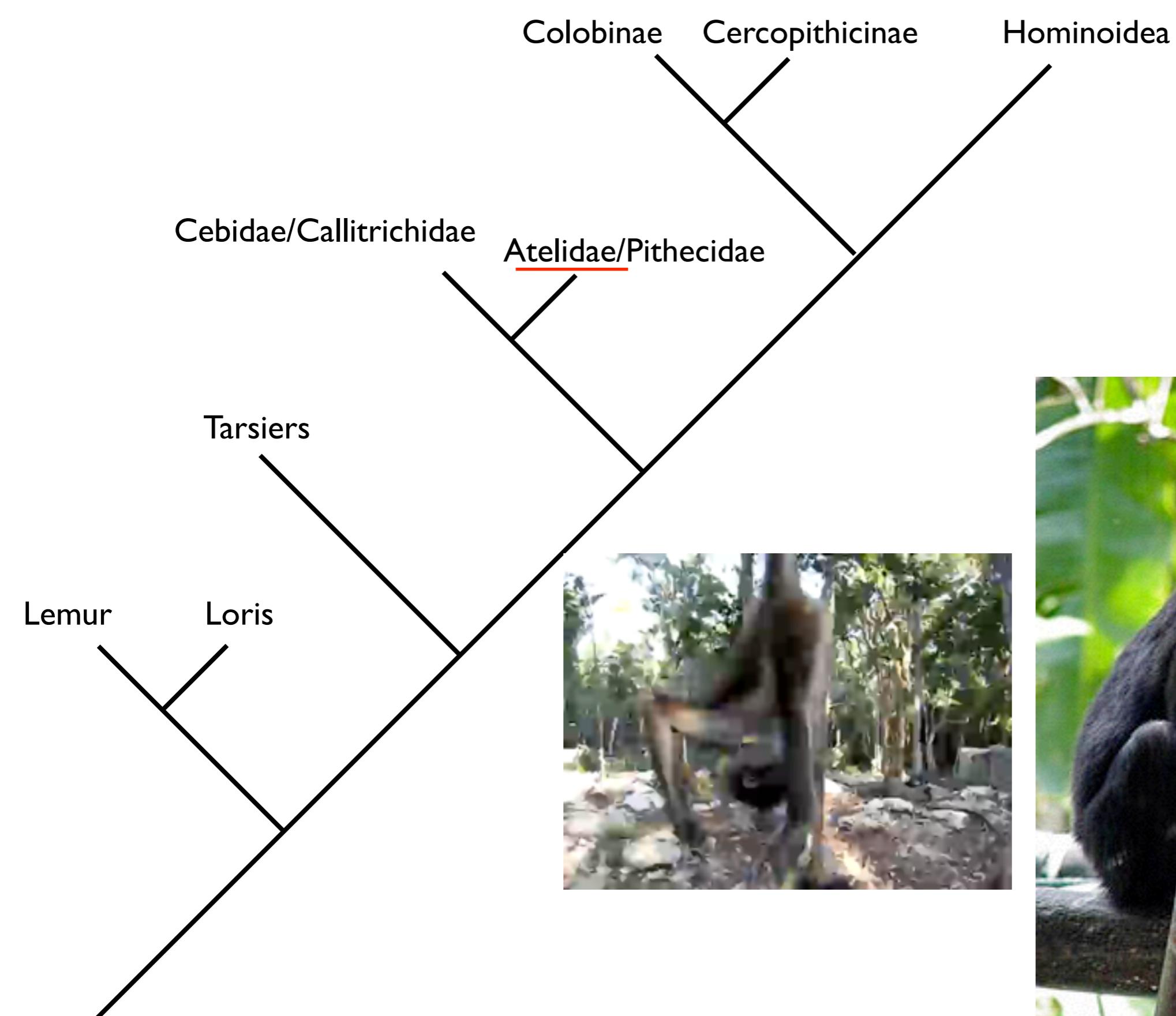


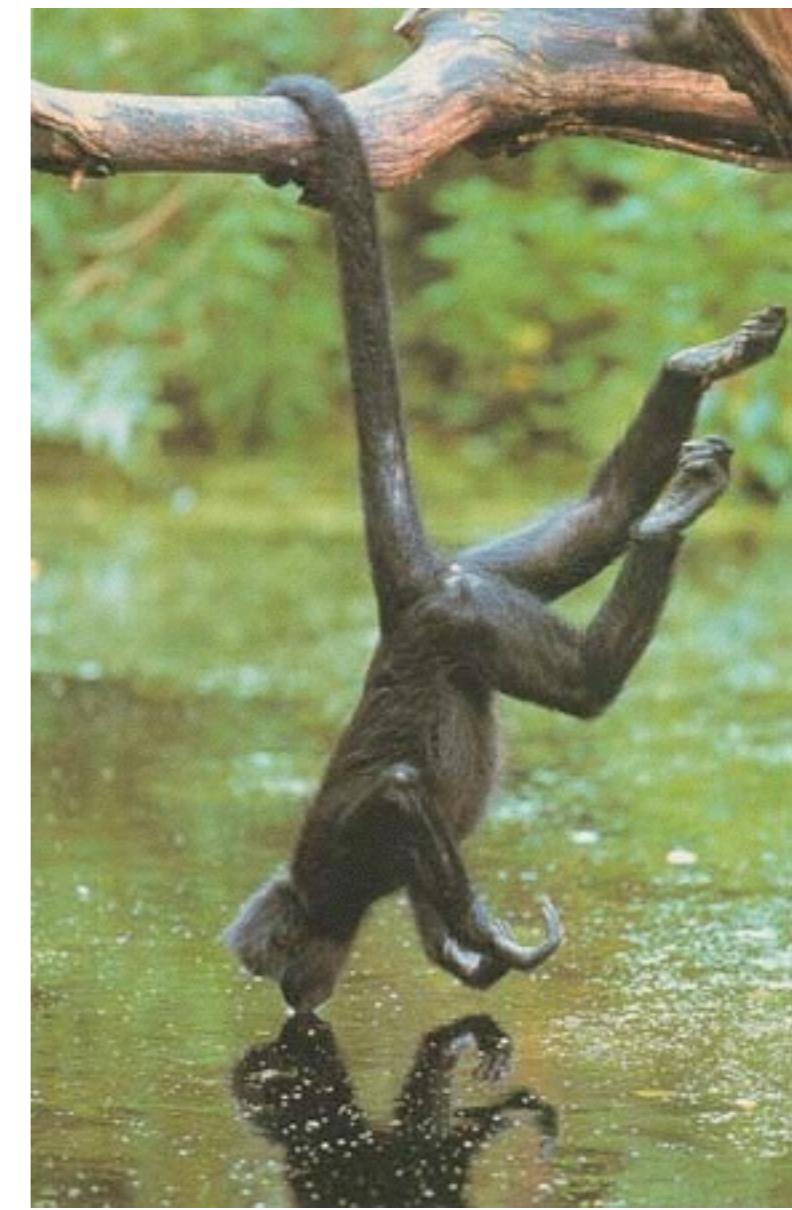
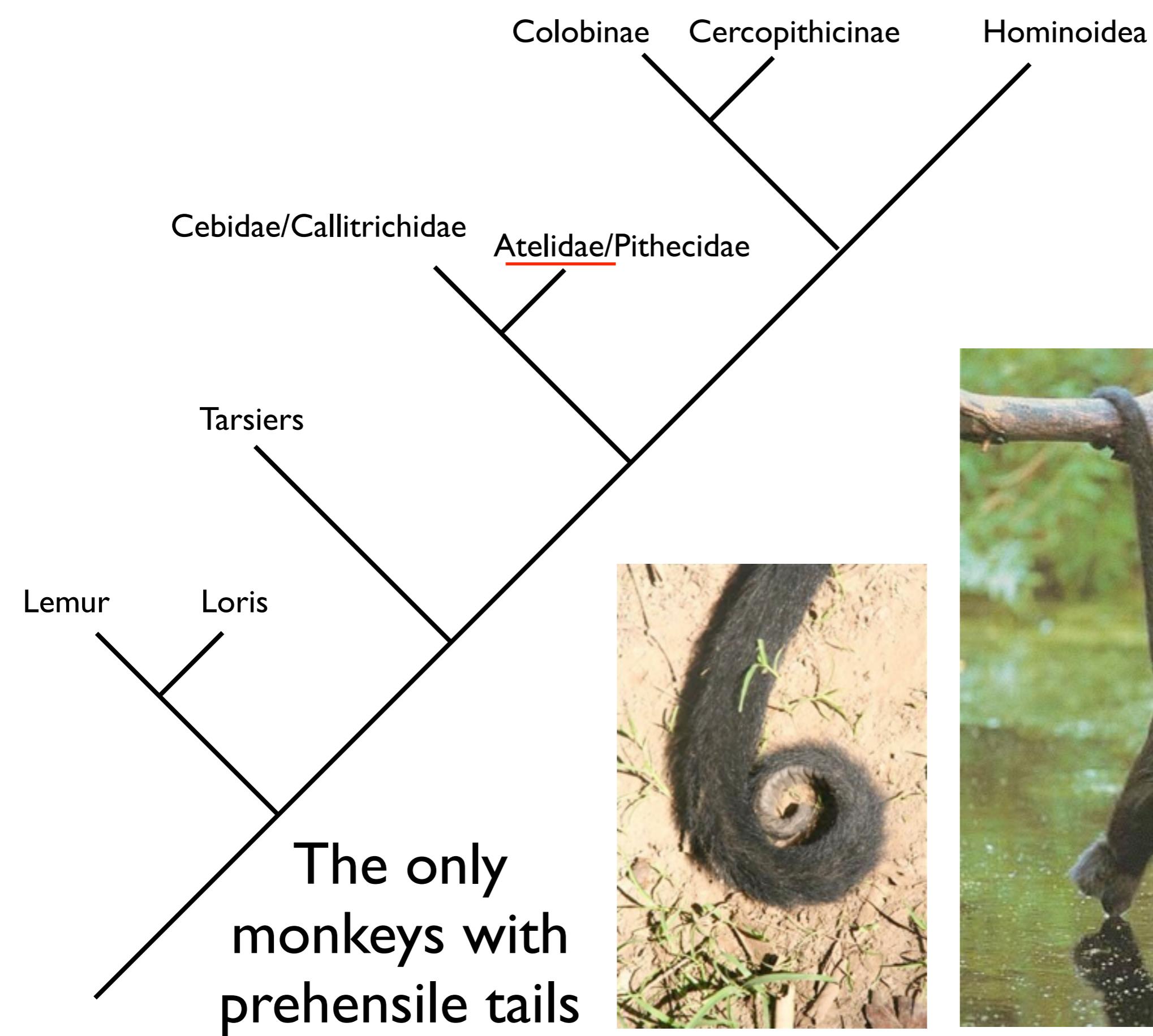
Platyrrhines (New World Monkeys)

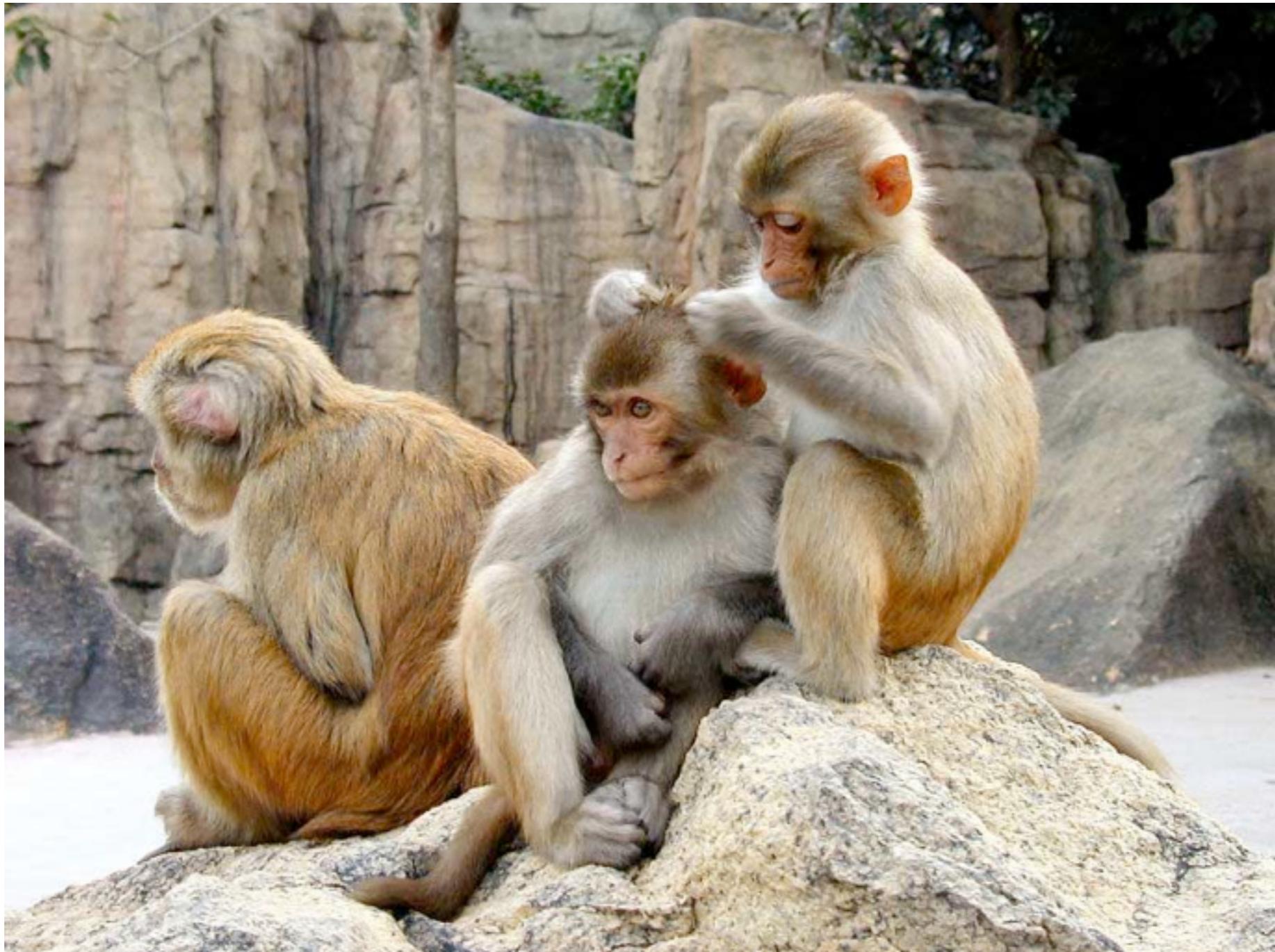




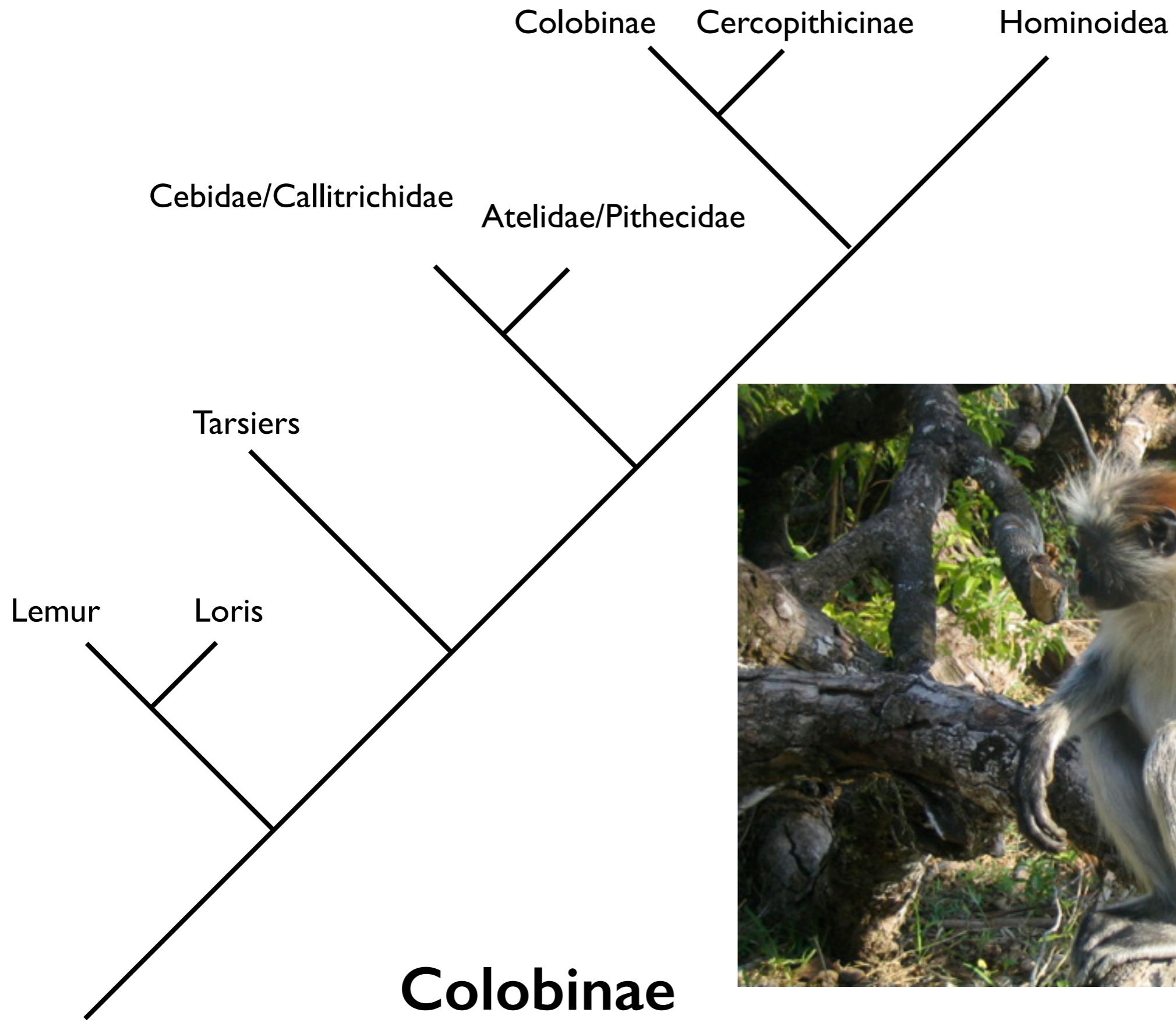


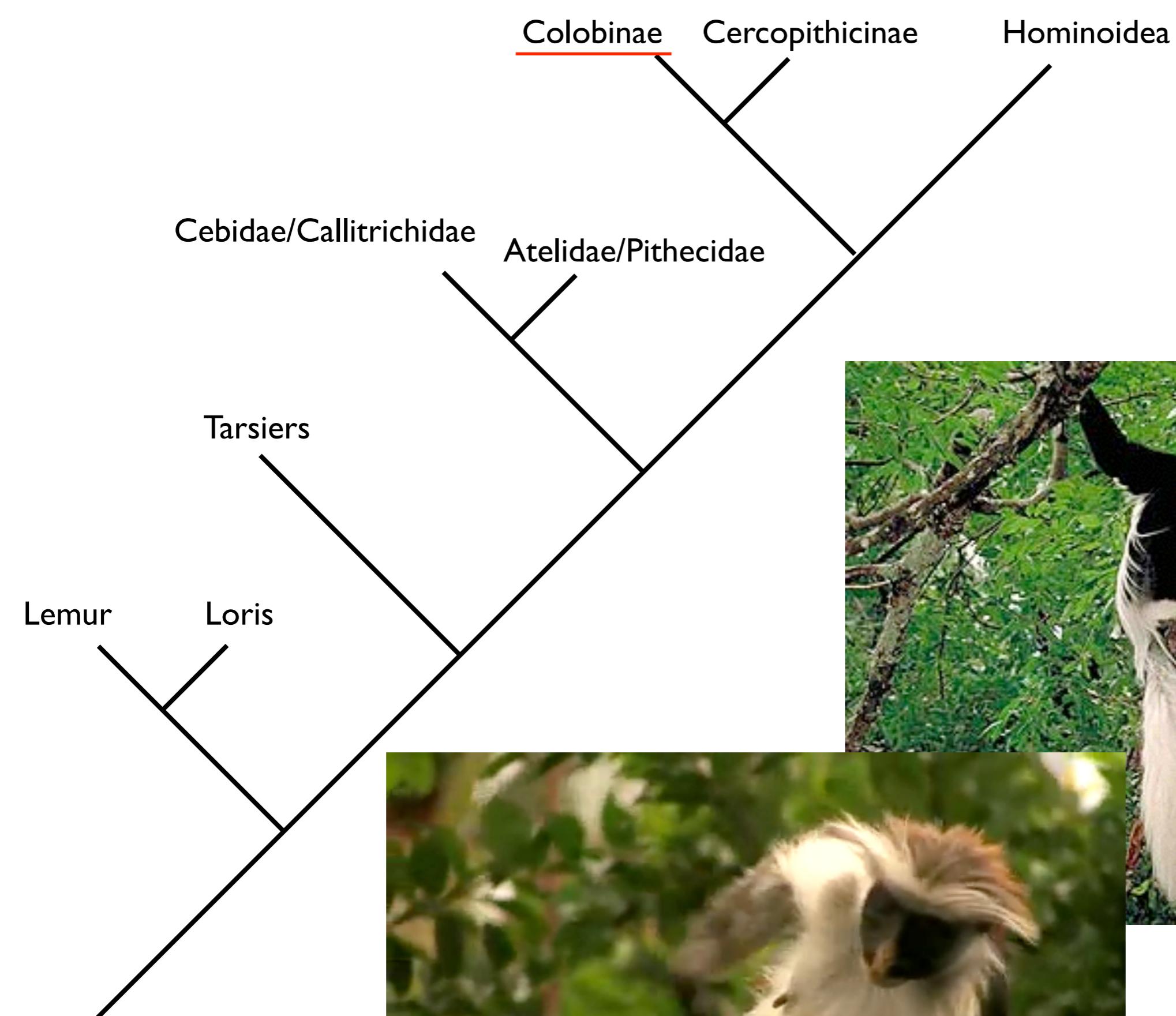


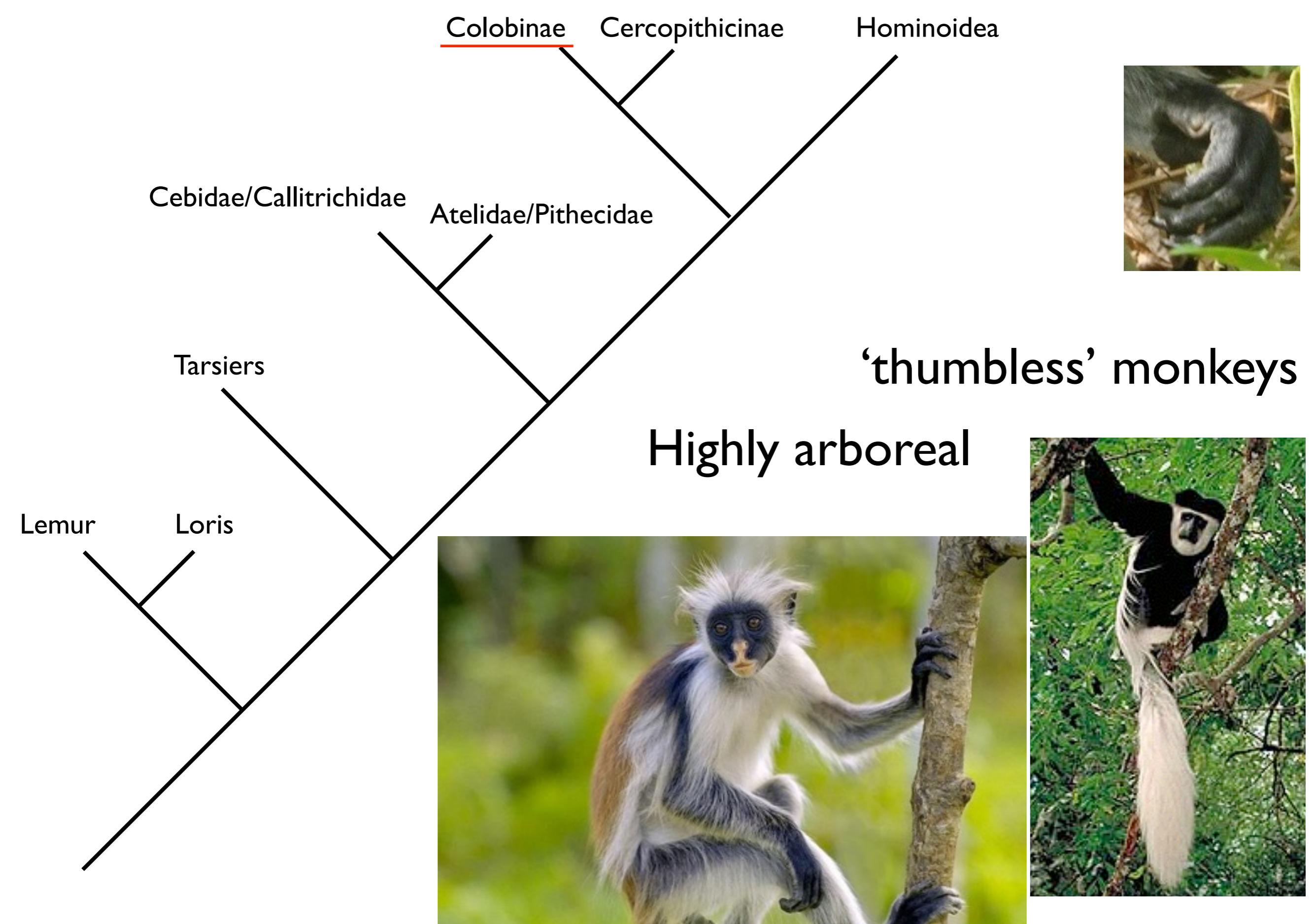


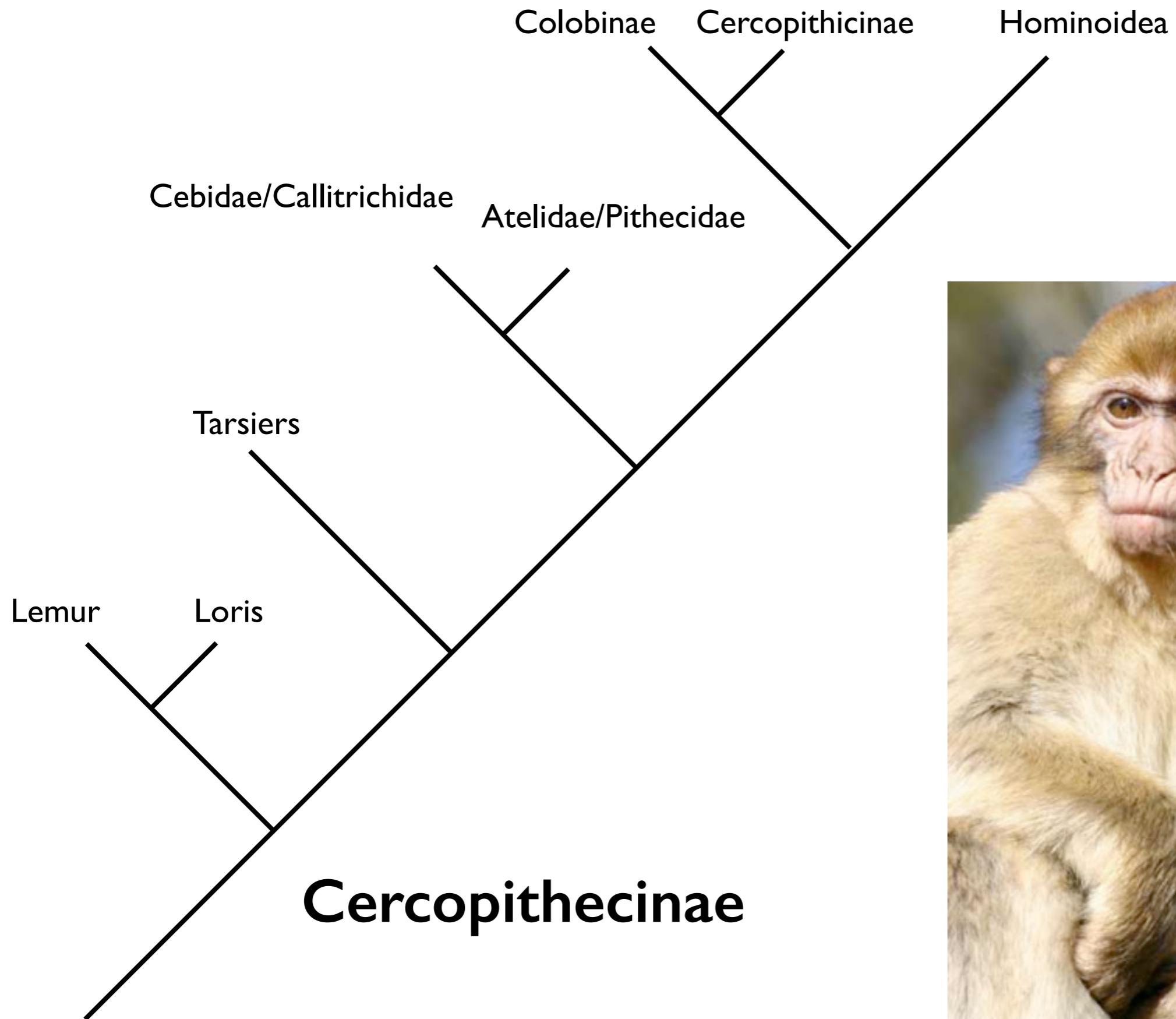


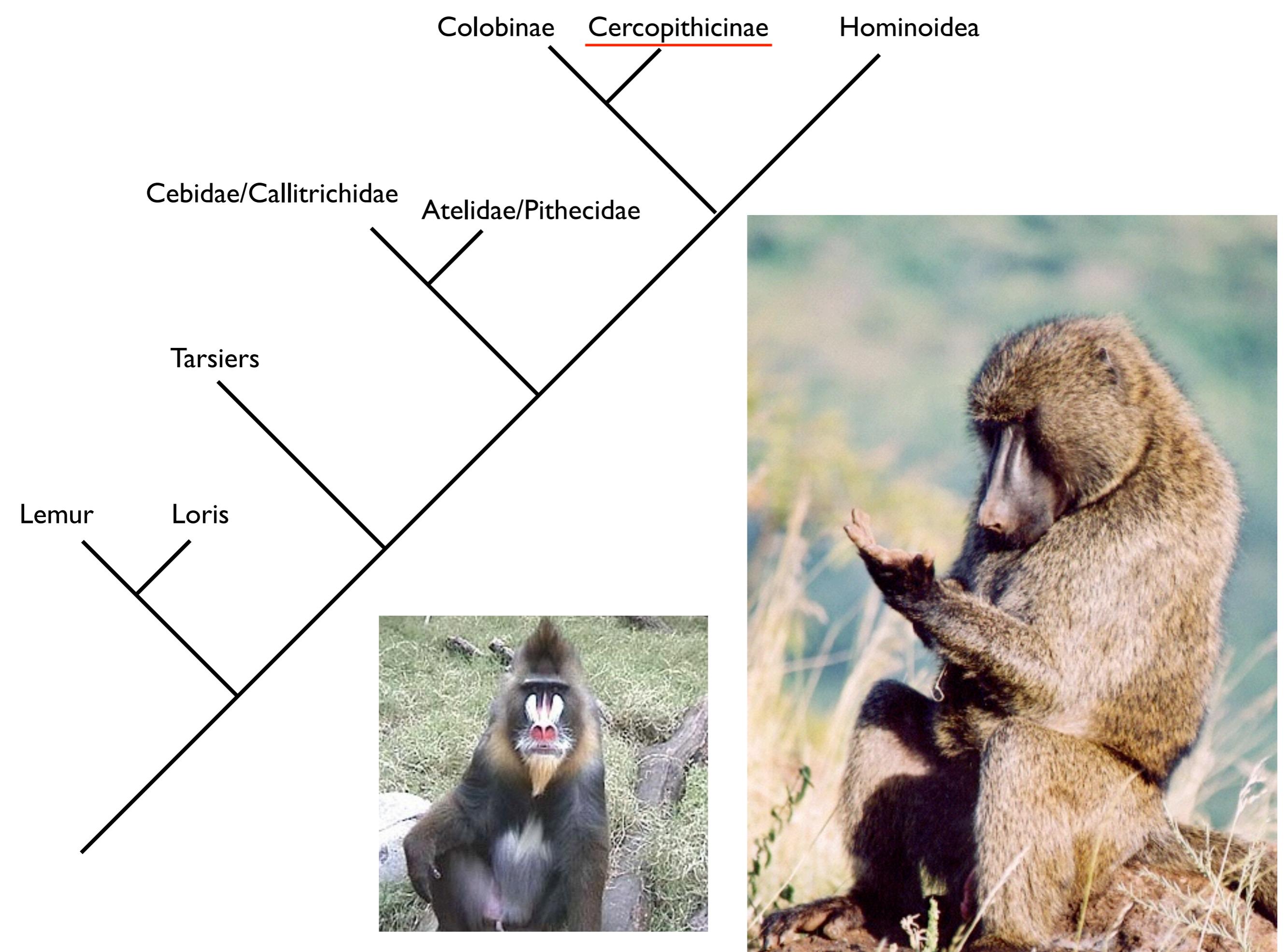
Catarrhines

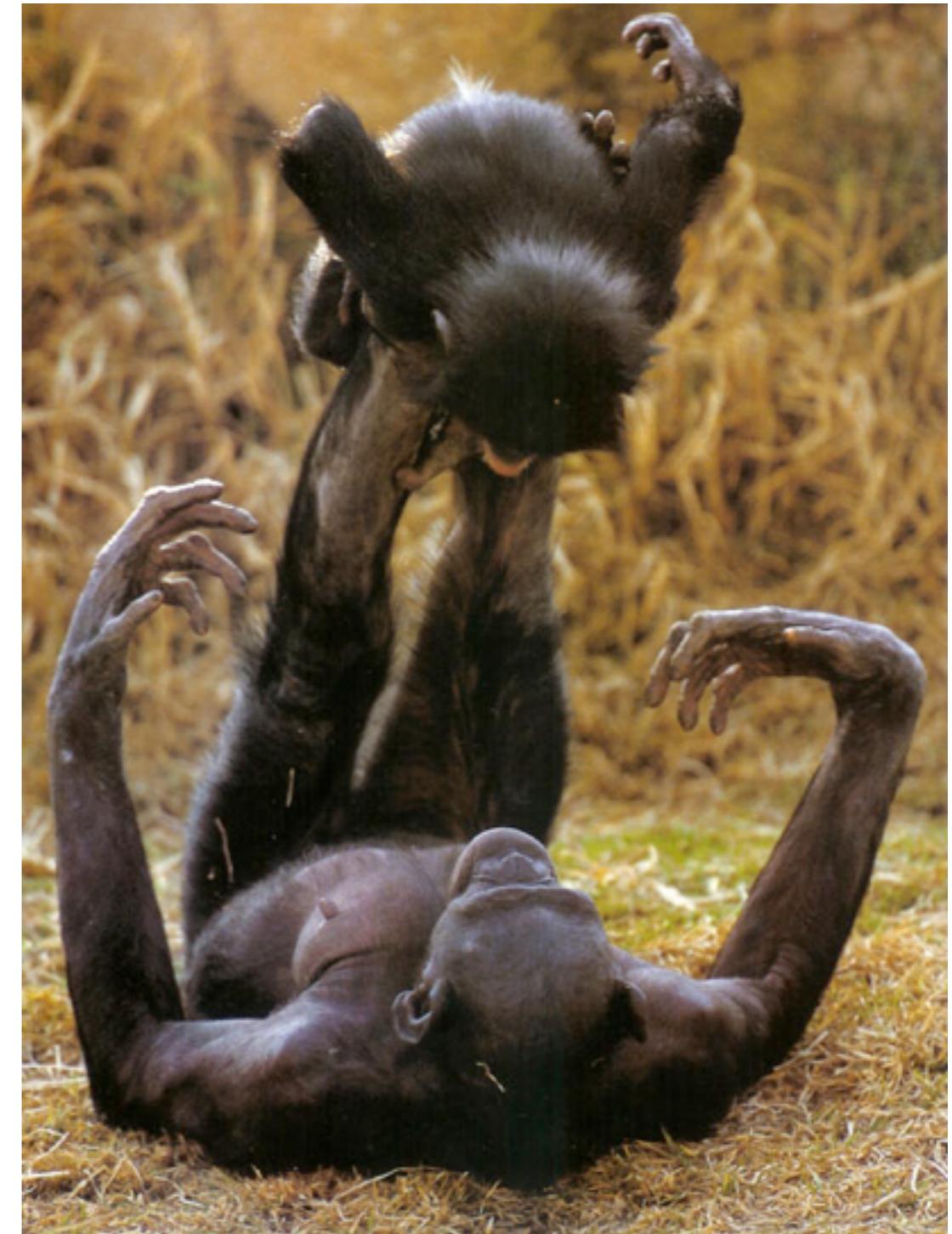
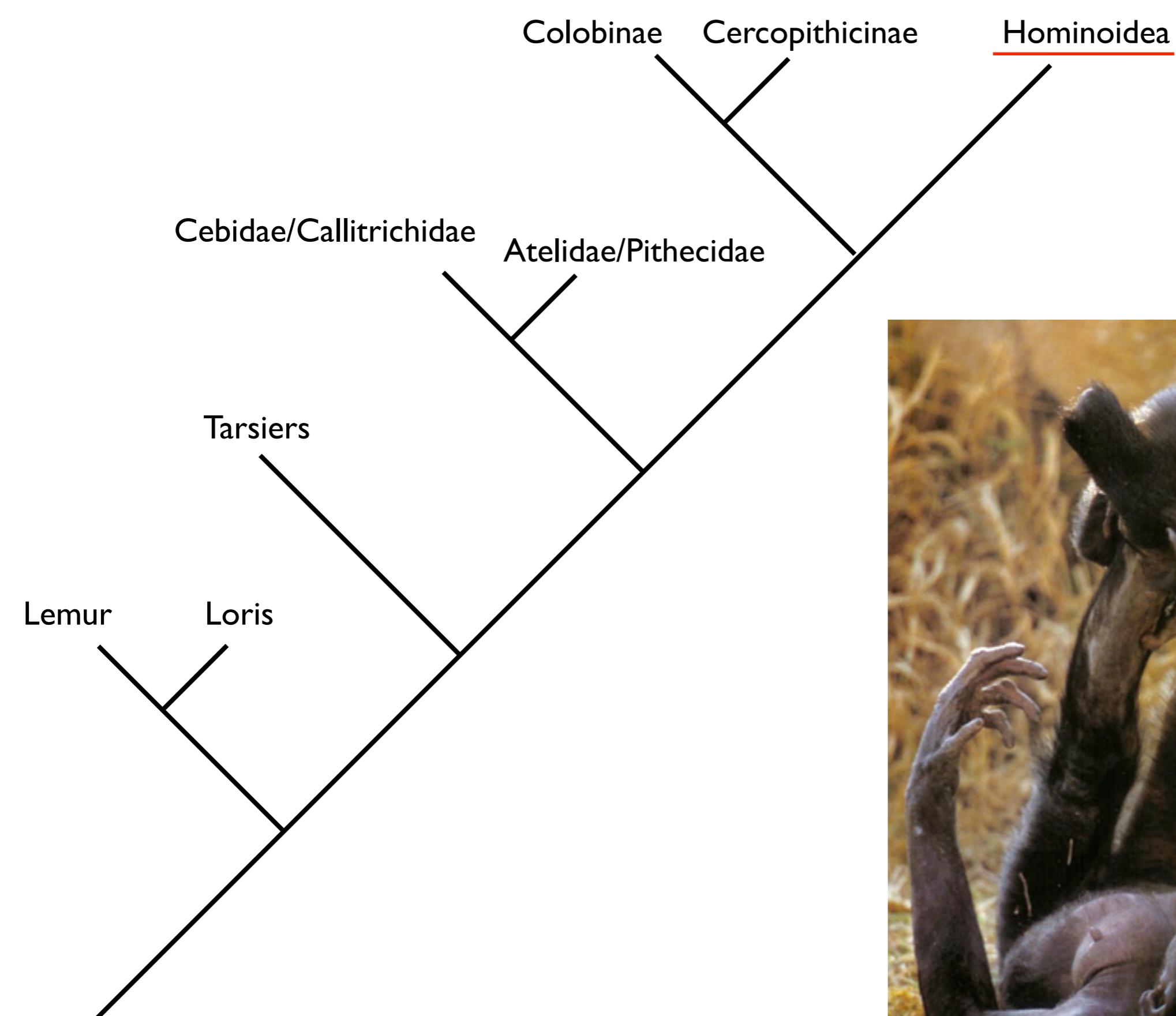




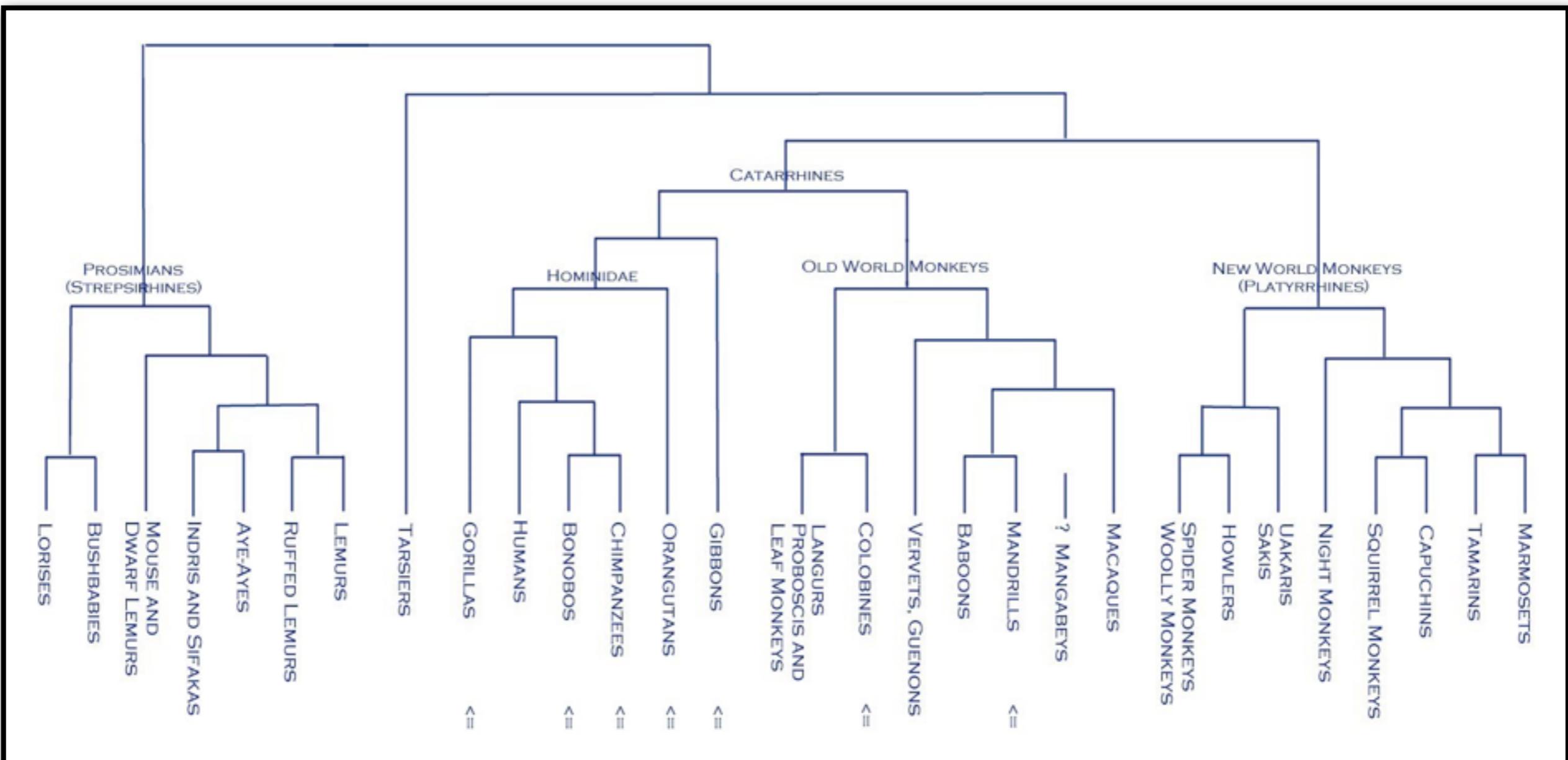


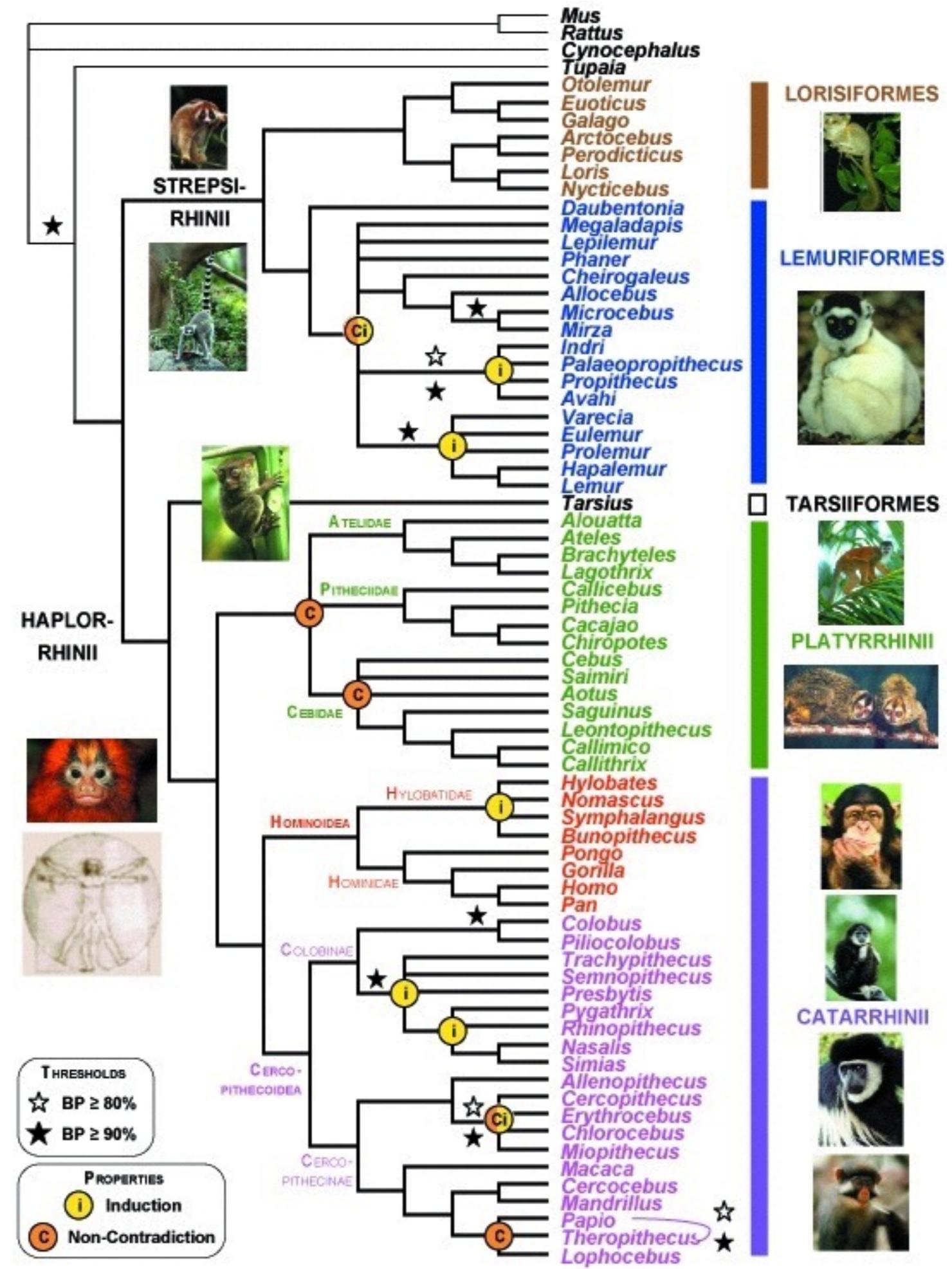


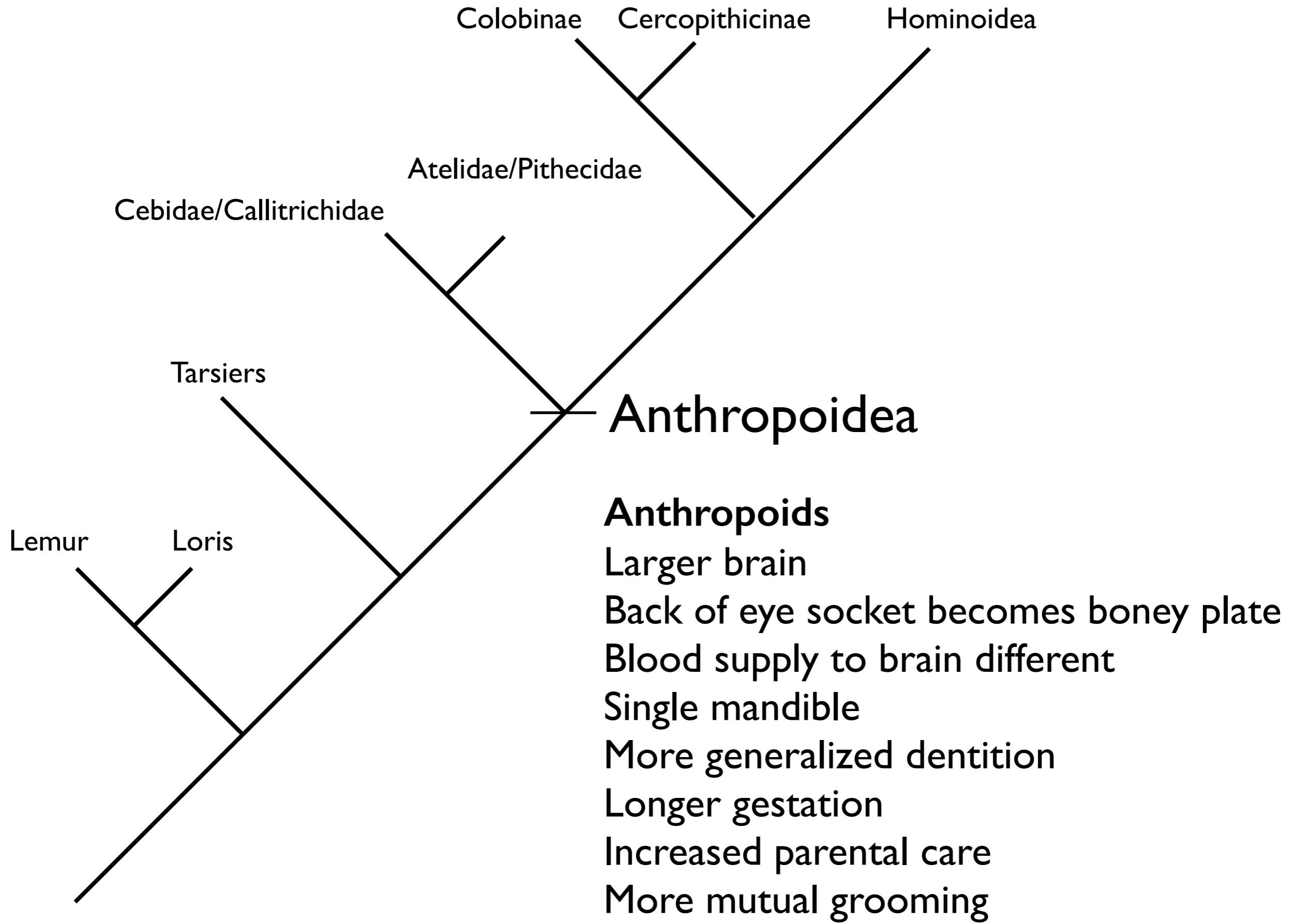


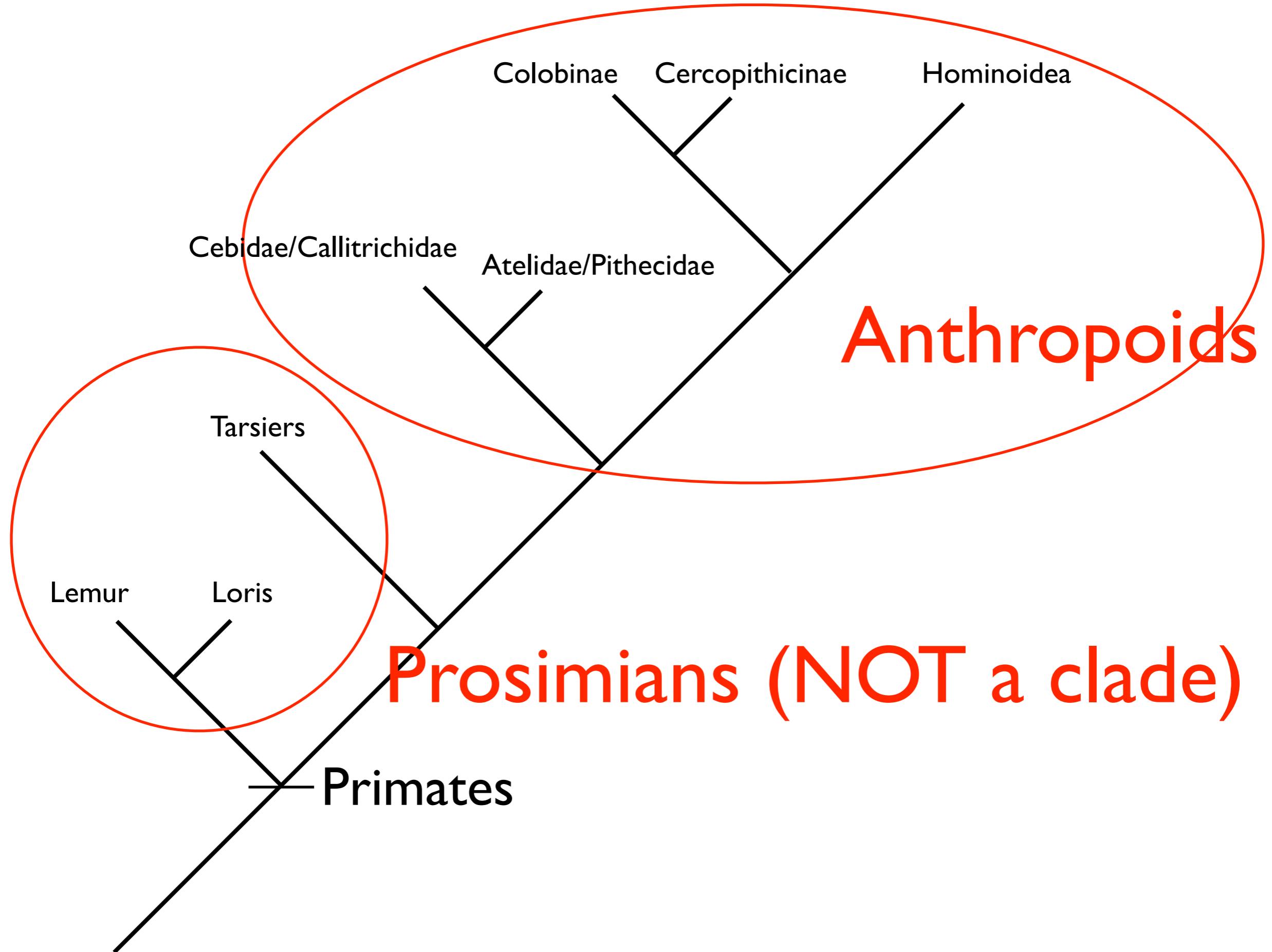


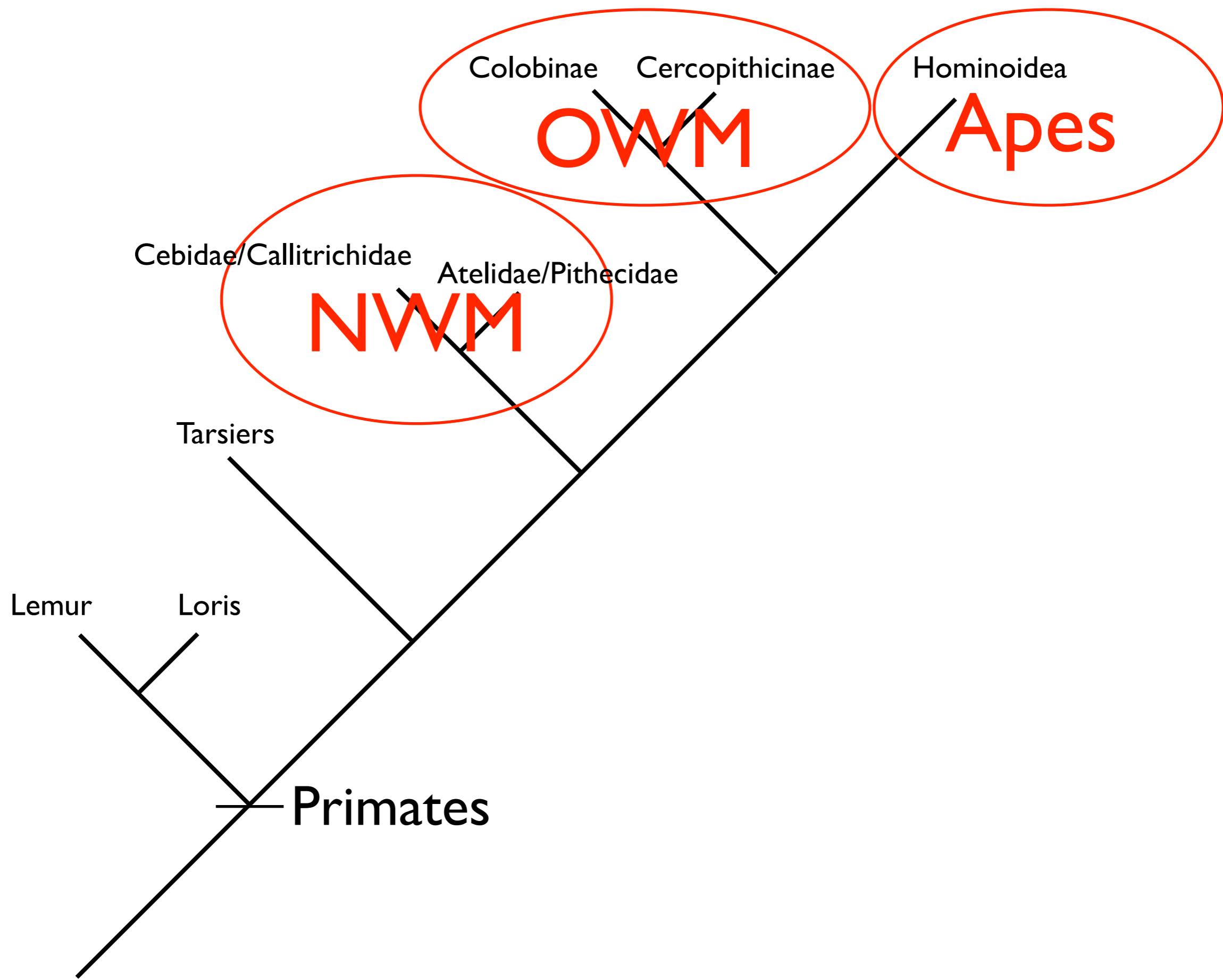
Systematics and Genetics

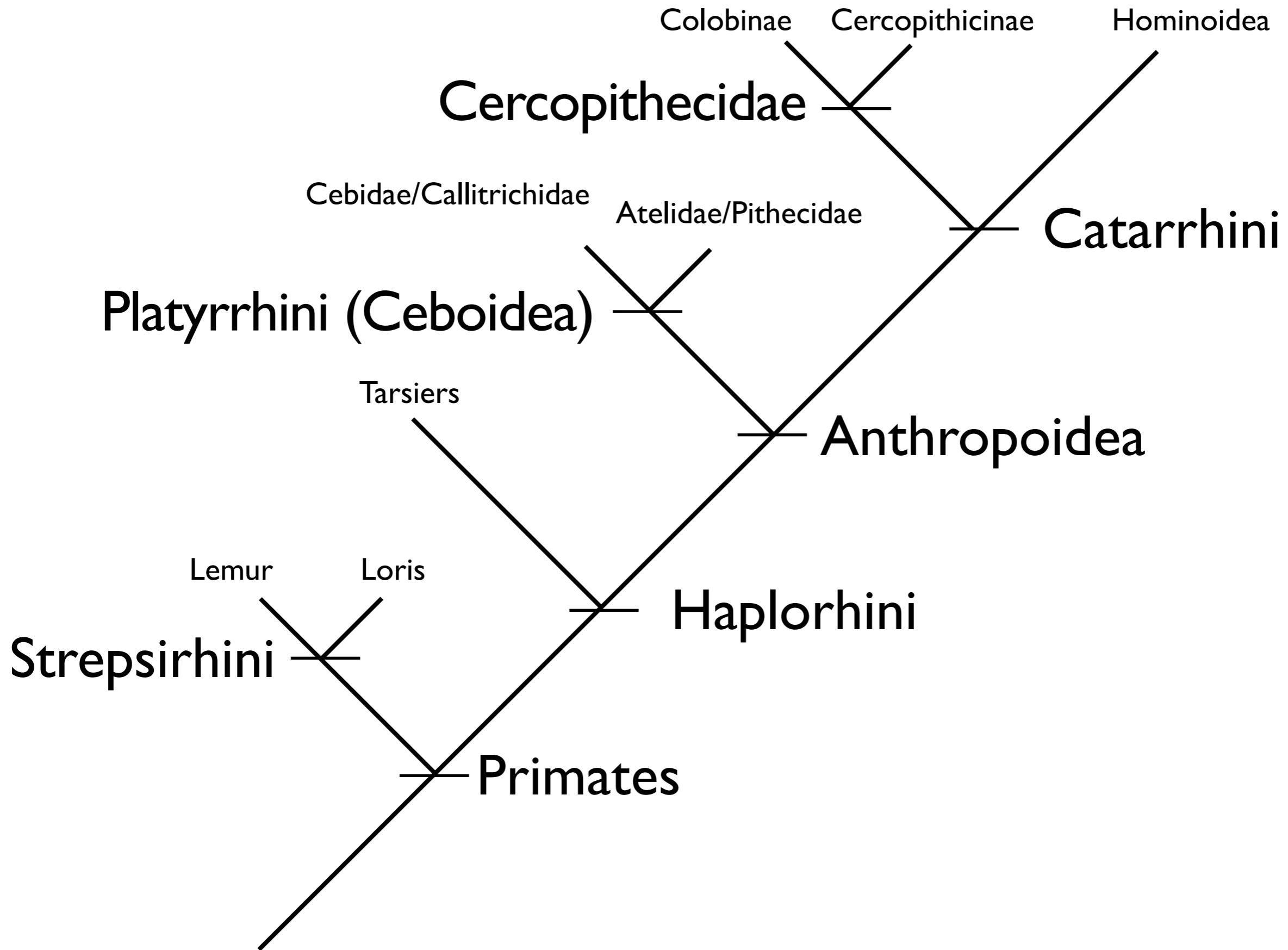


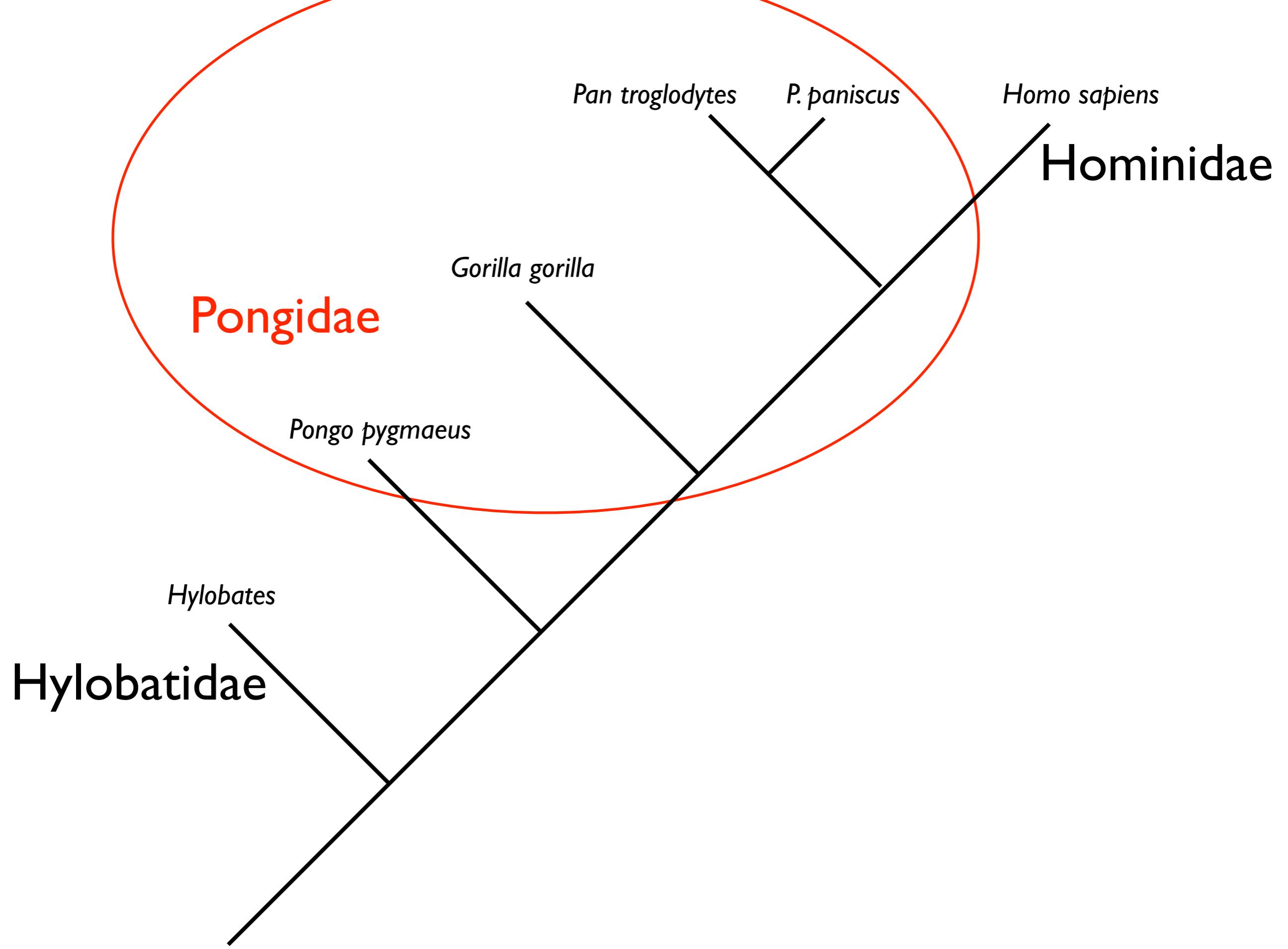


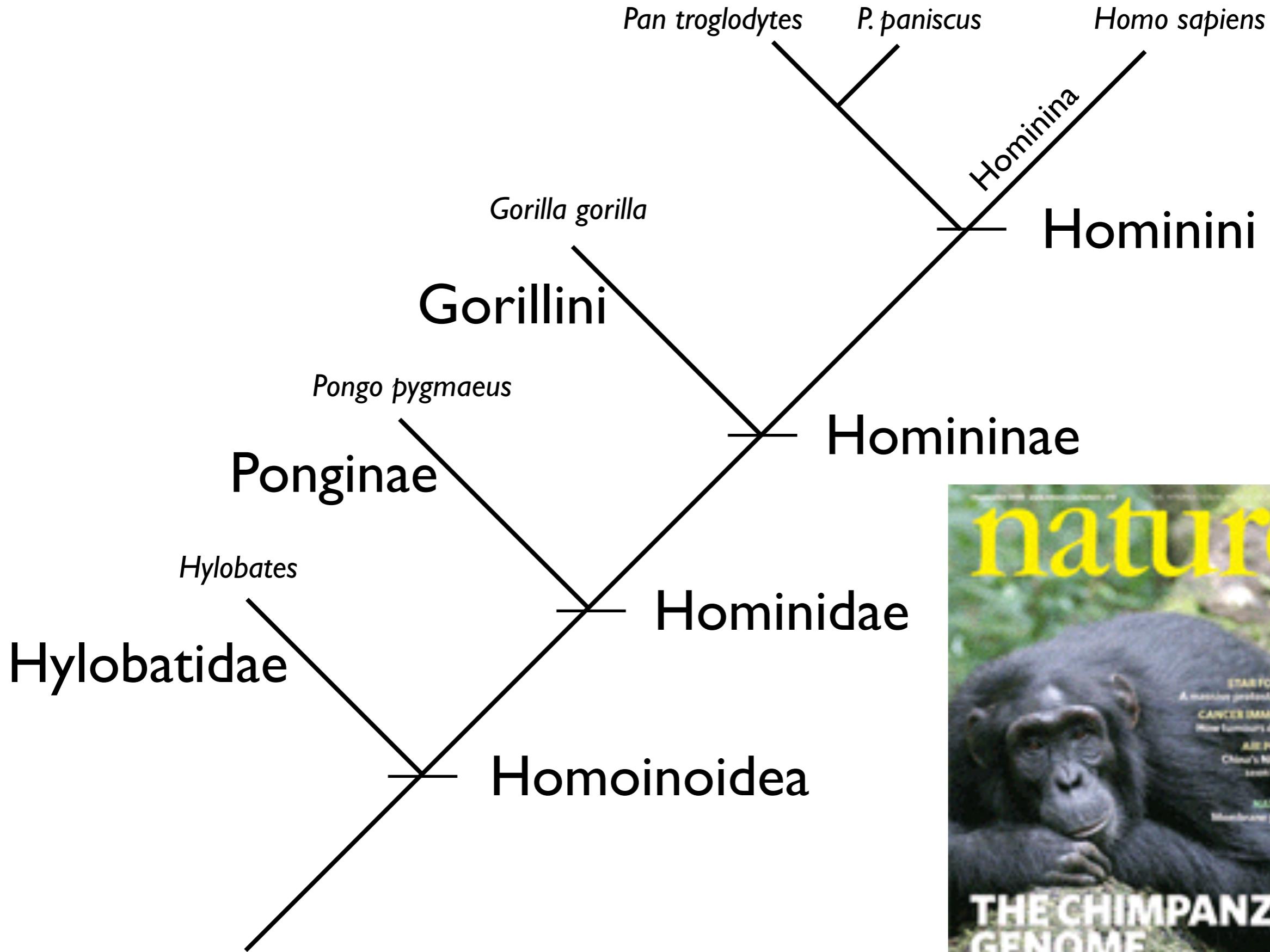


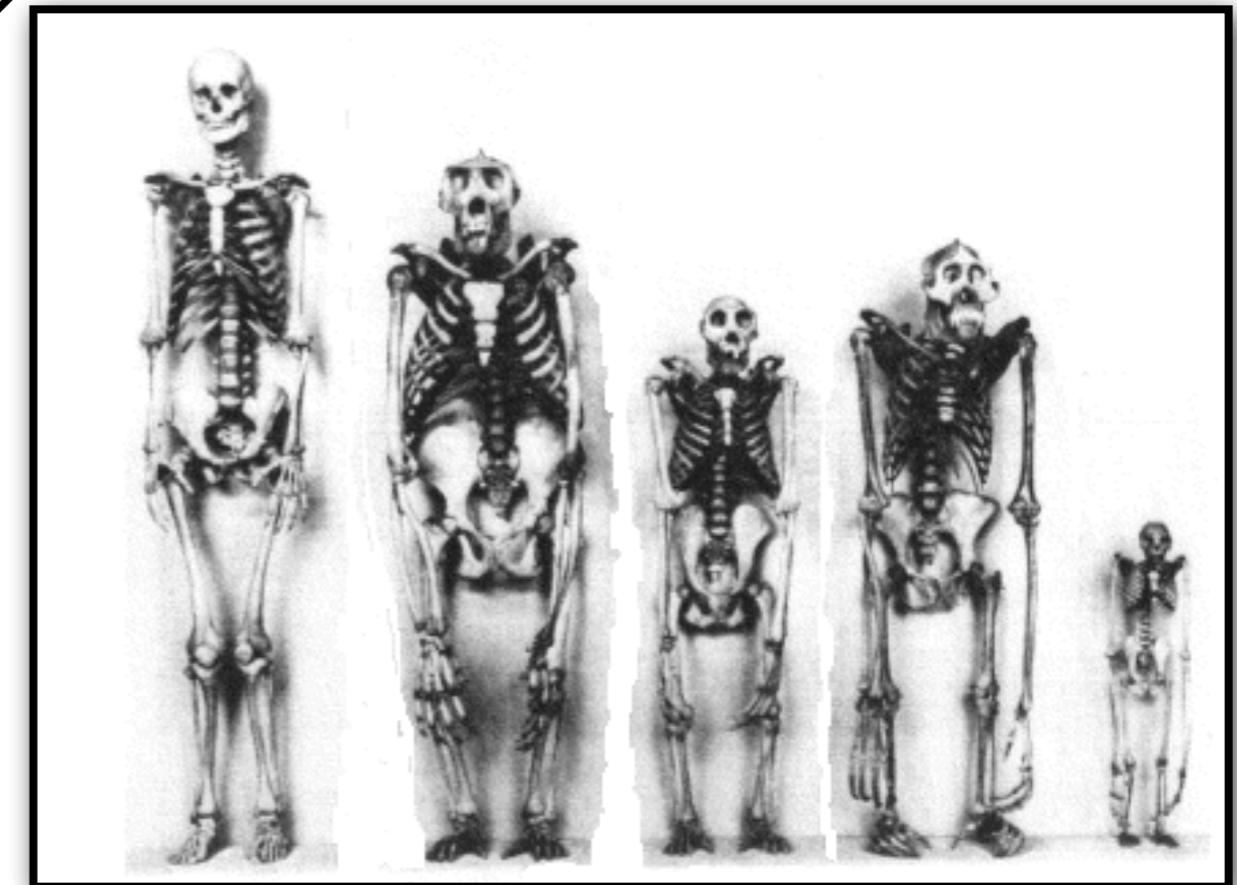
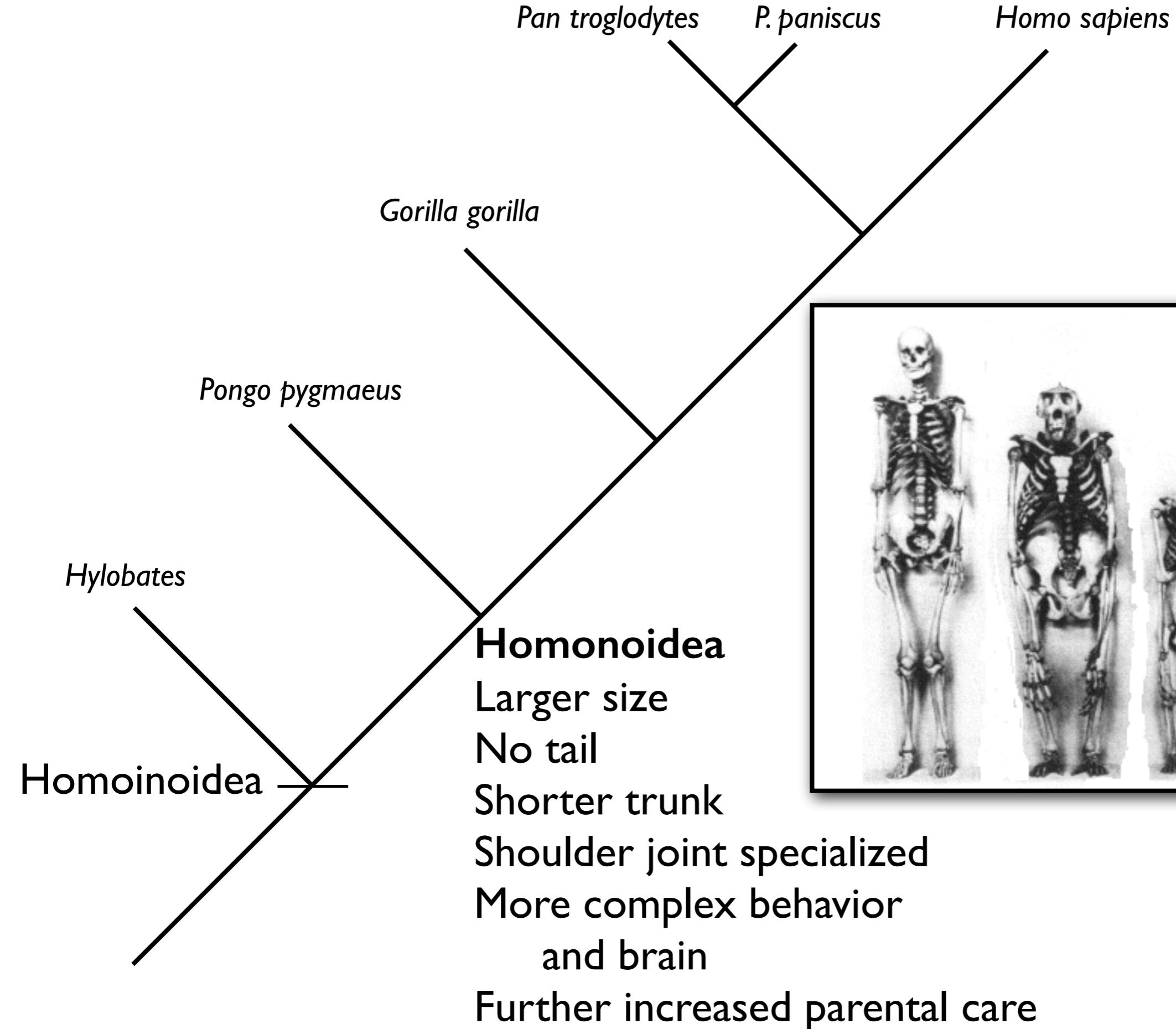














Gibbons

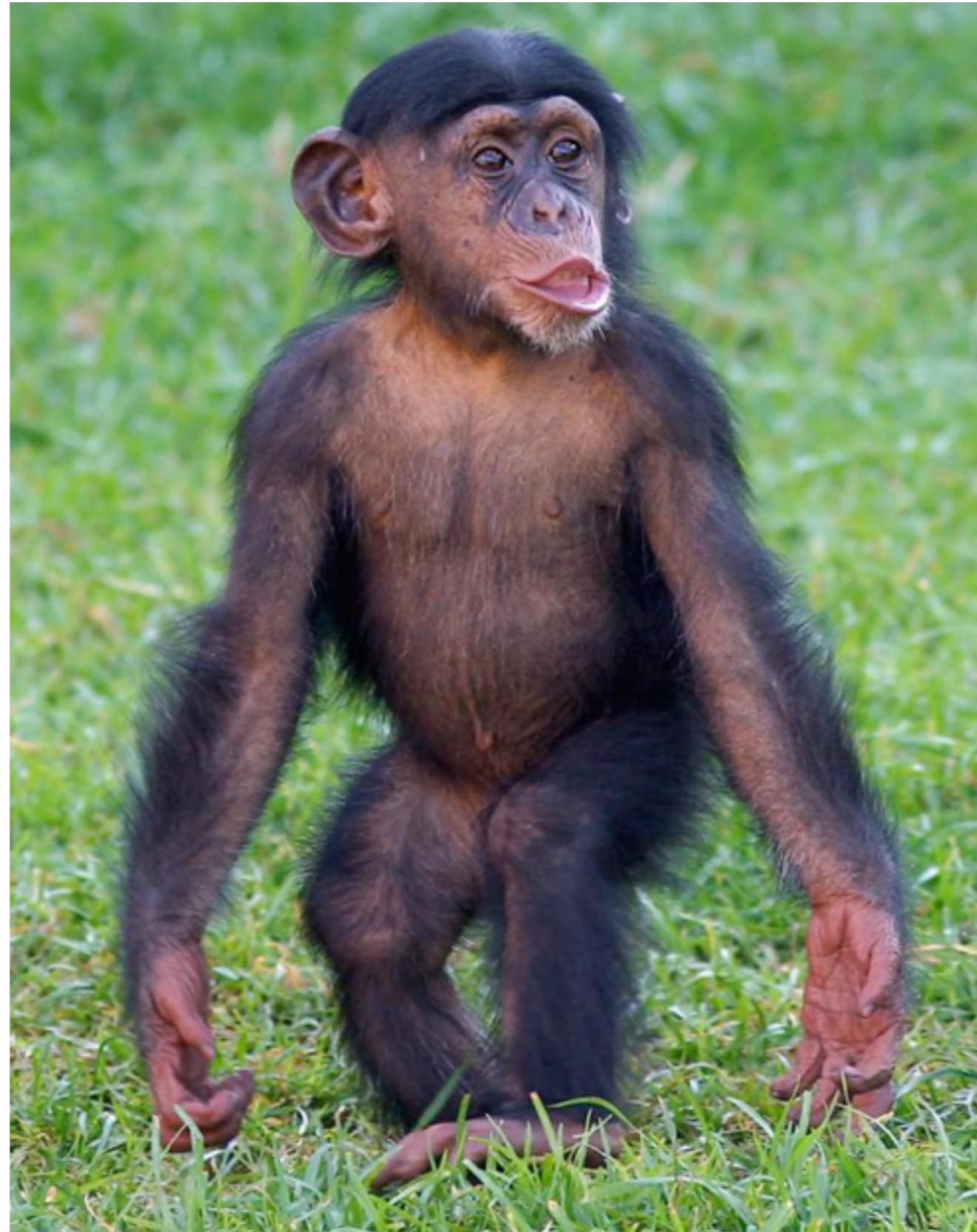


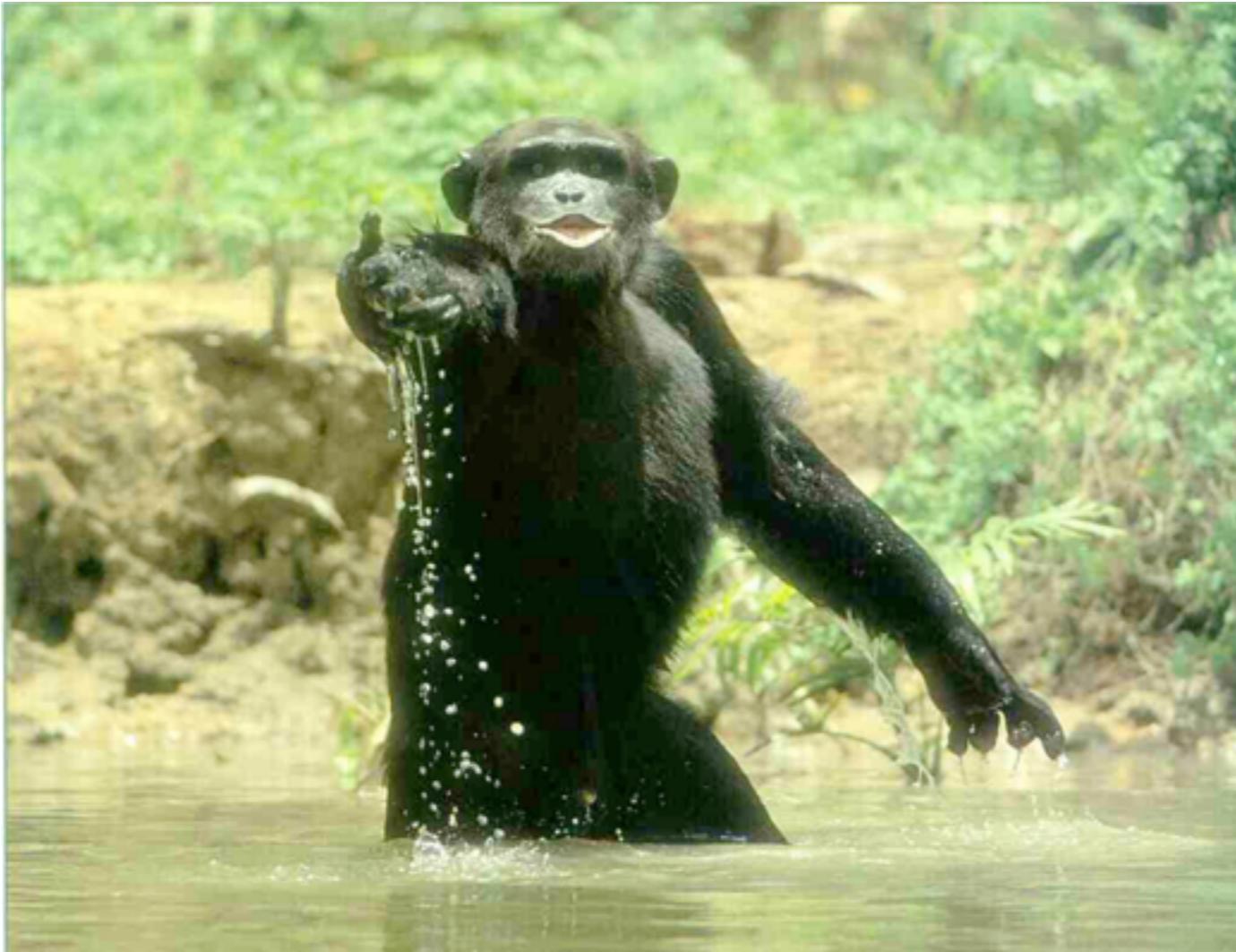
Orangutan



Gorilla

Pan troglodytes





Pan paniscus (bonobo)

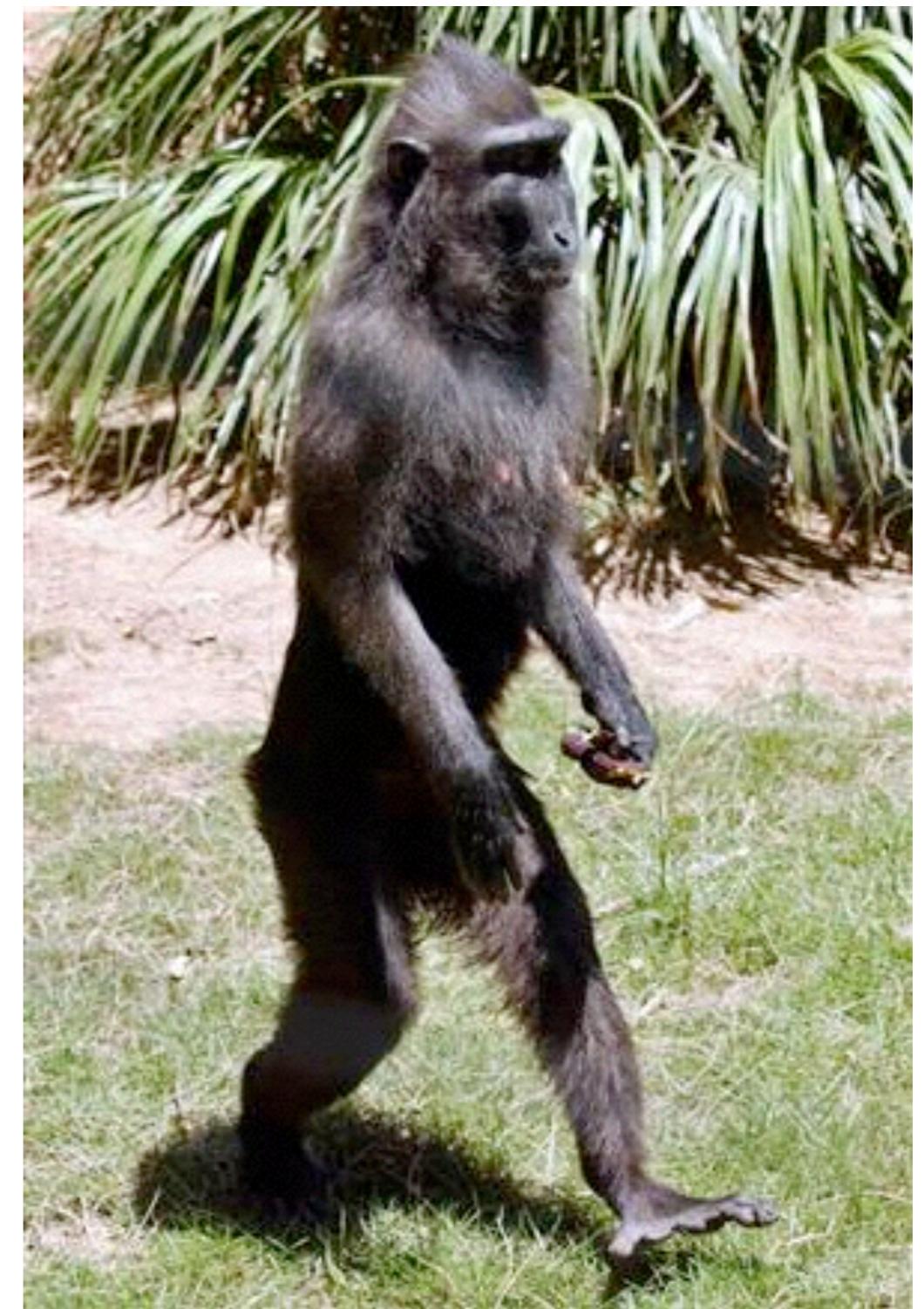
Homo sapiens





Erect posture

Flexible limb structure: Multiple locomotor possibilities





Five digits on hands and feet



Opposable thumb



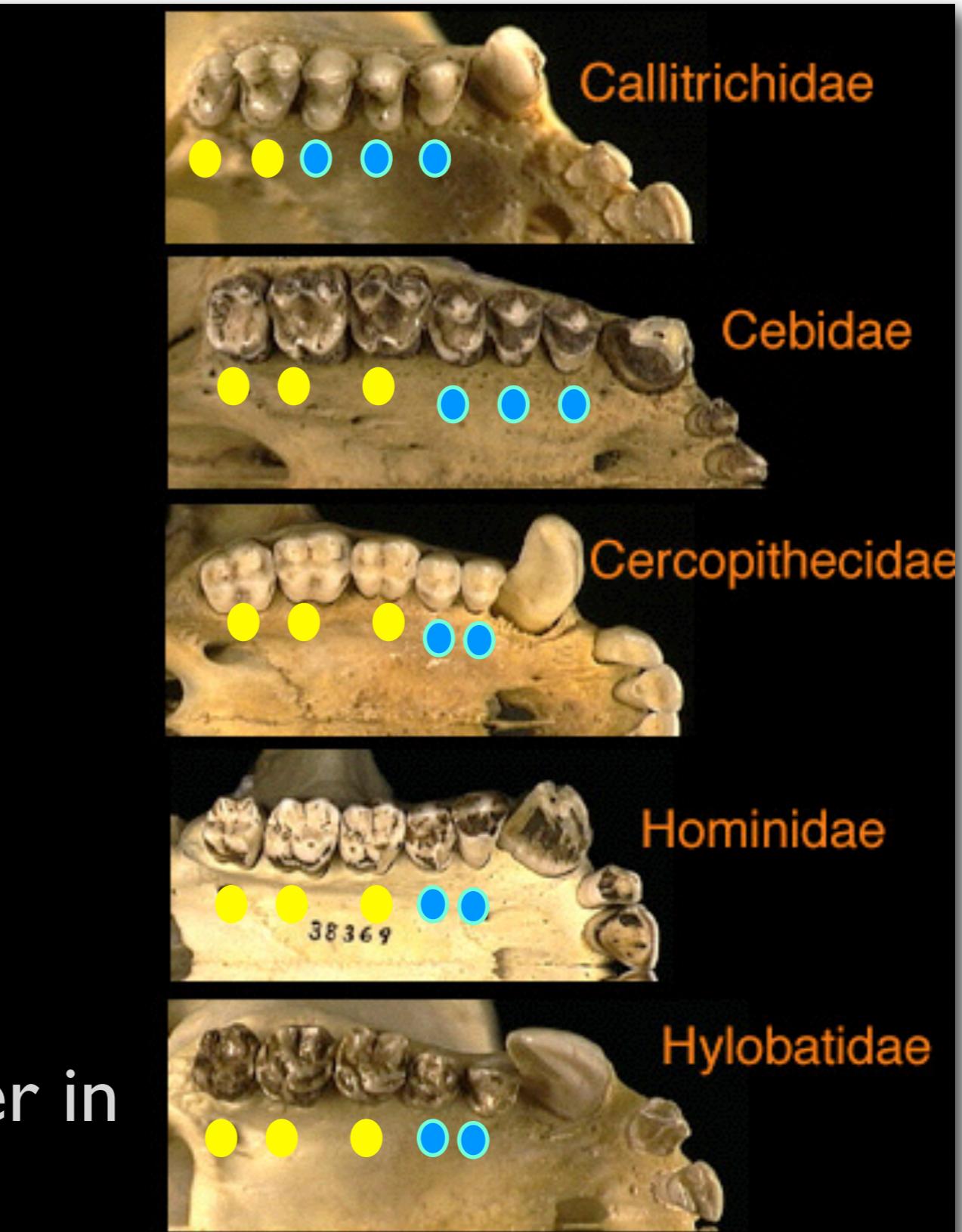
Nails, not claws



Tactile hands



Primate groups differ in
tooth number

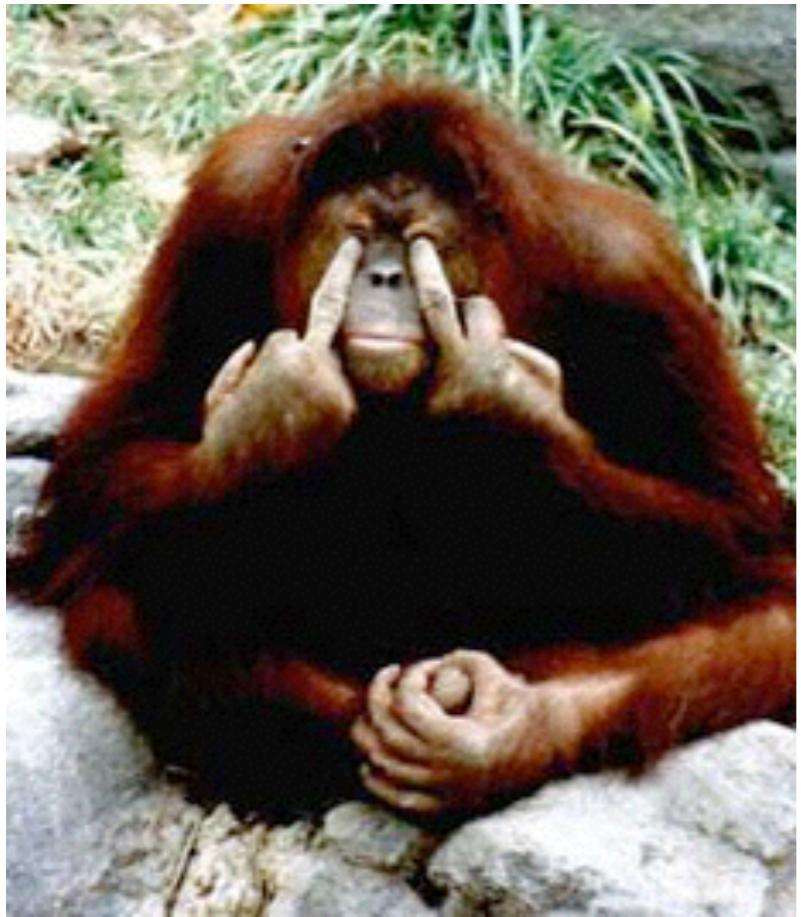




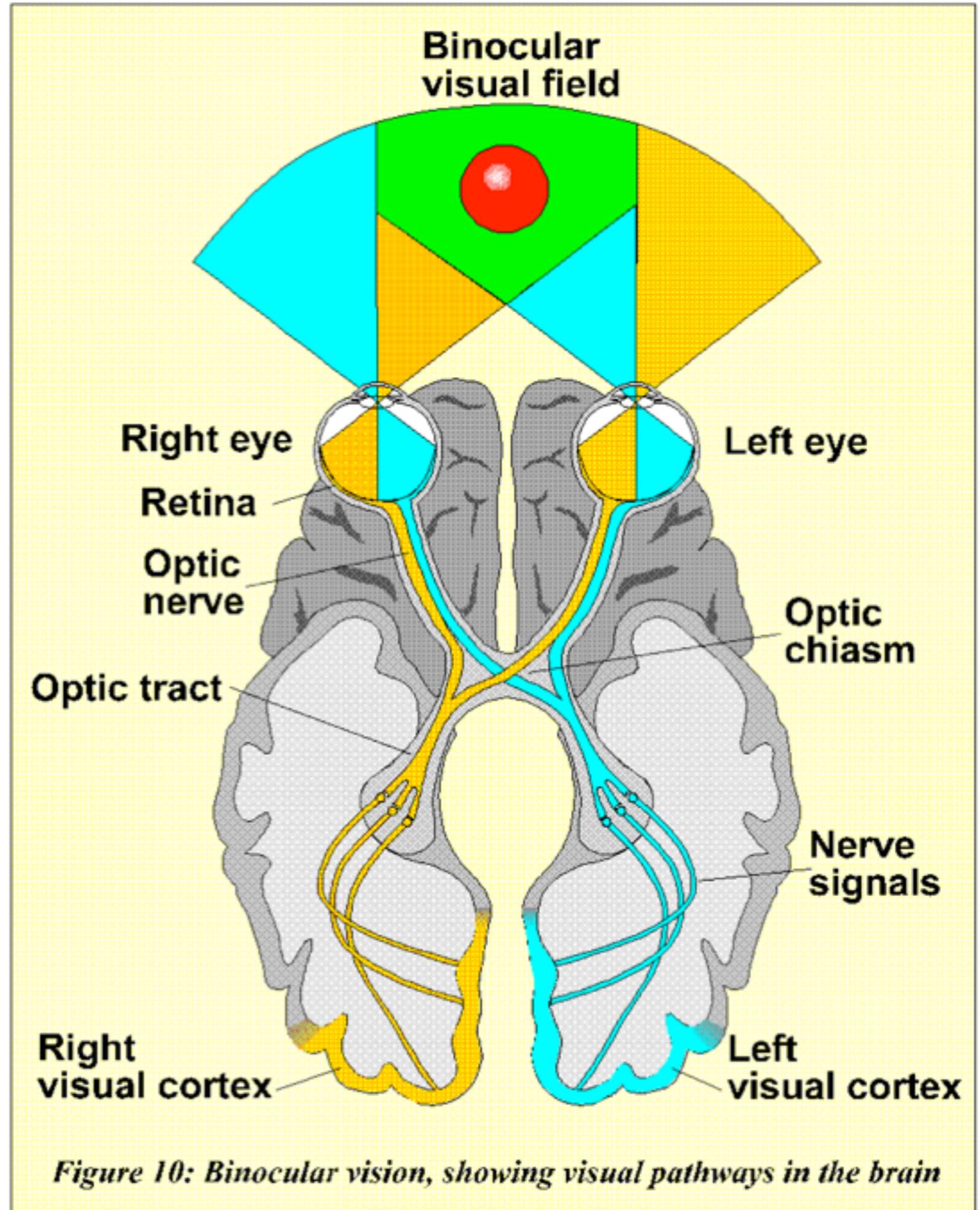


Color vision

(*some nocturnal primates see less color)

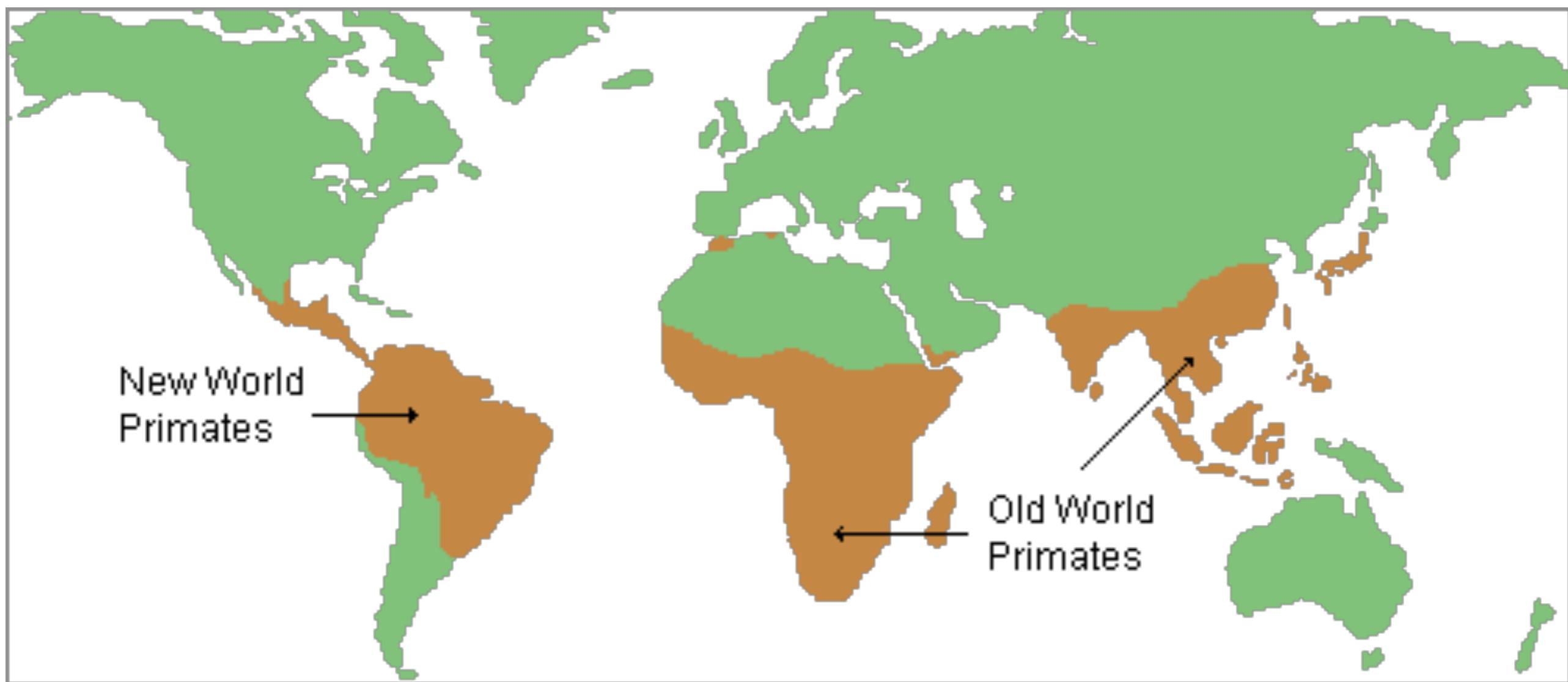


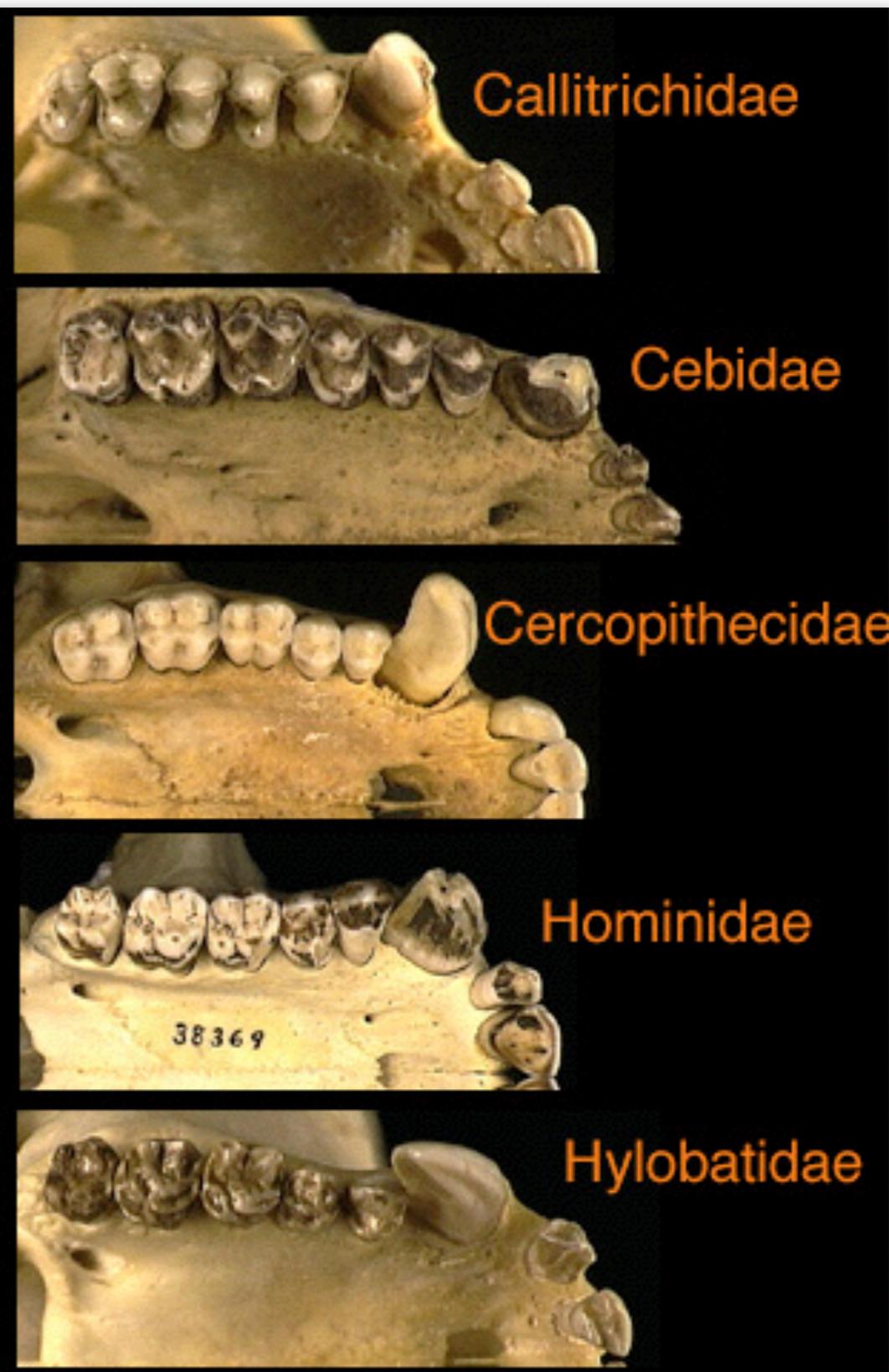
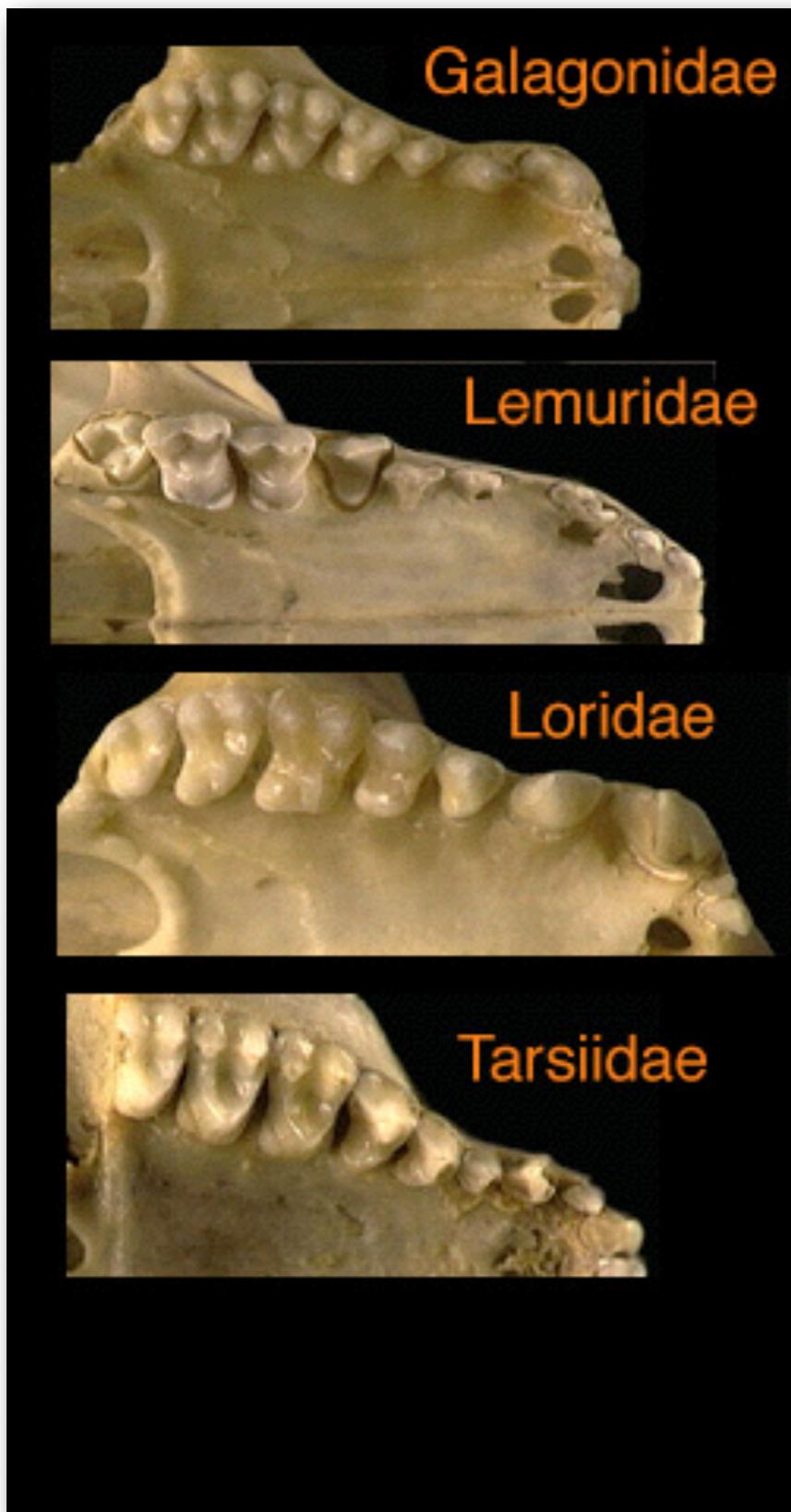
Binocular vision

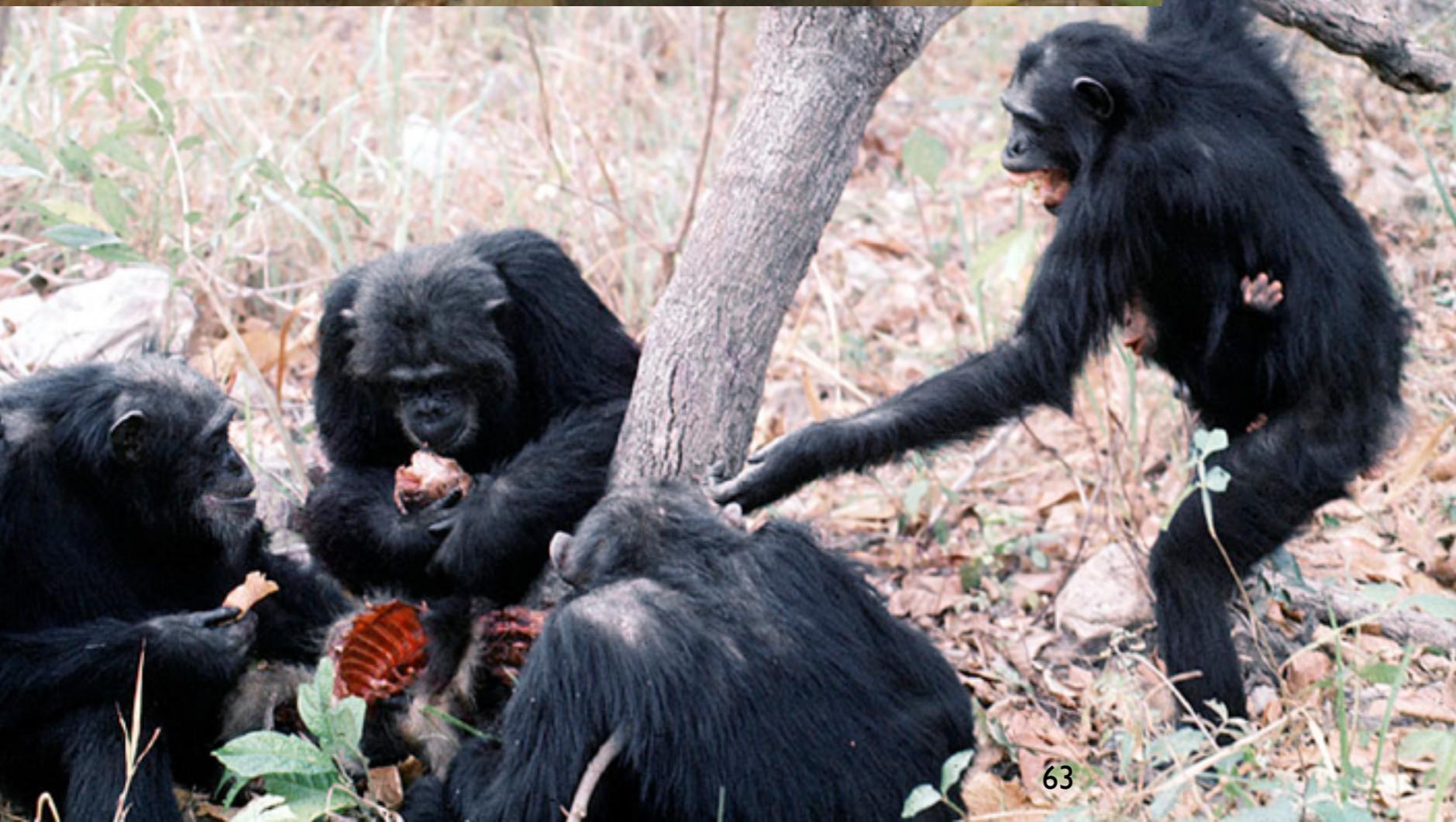


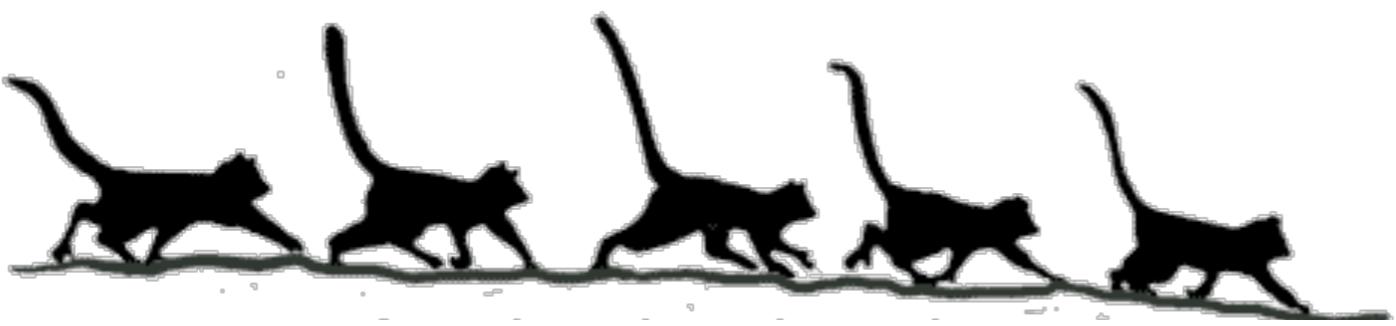
**Diminished sense of
smell**



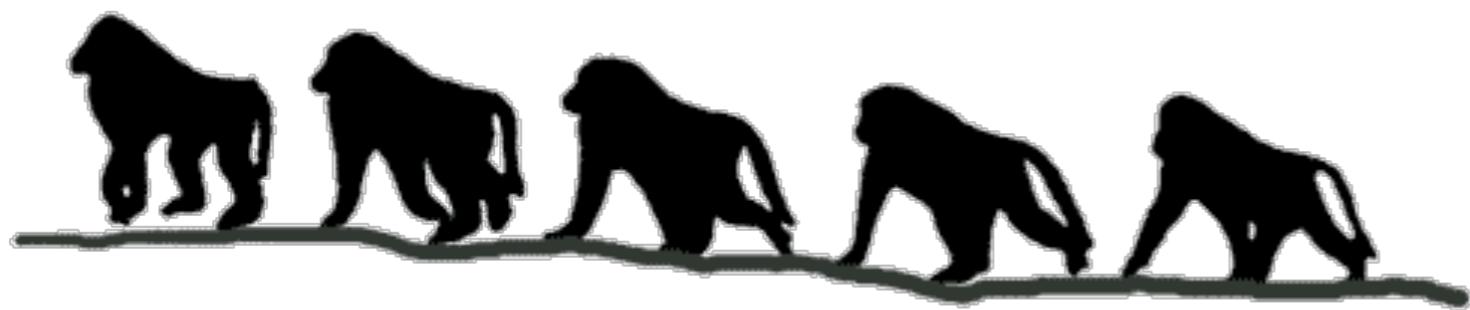




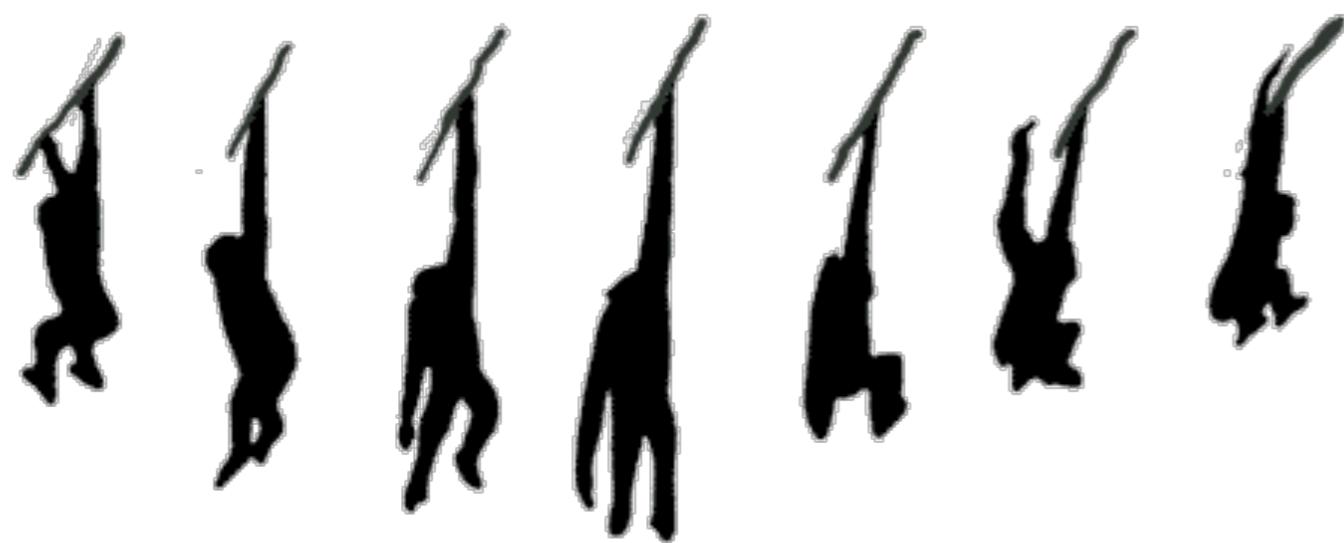




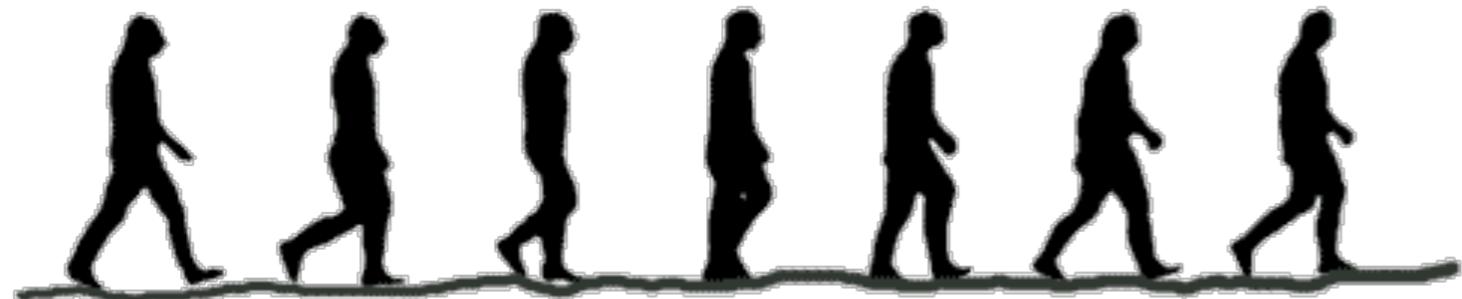
Vertical clinging and
leaping



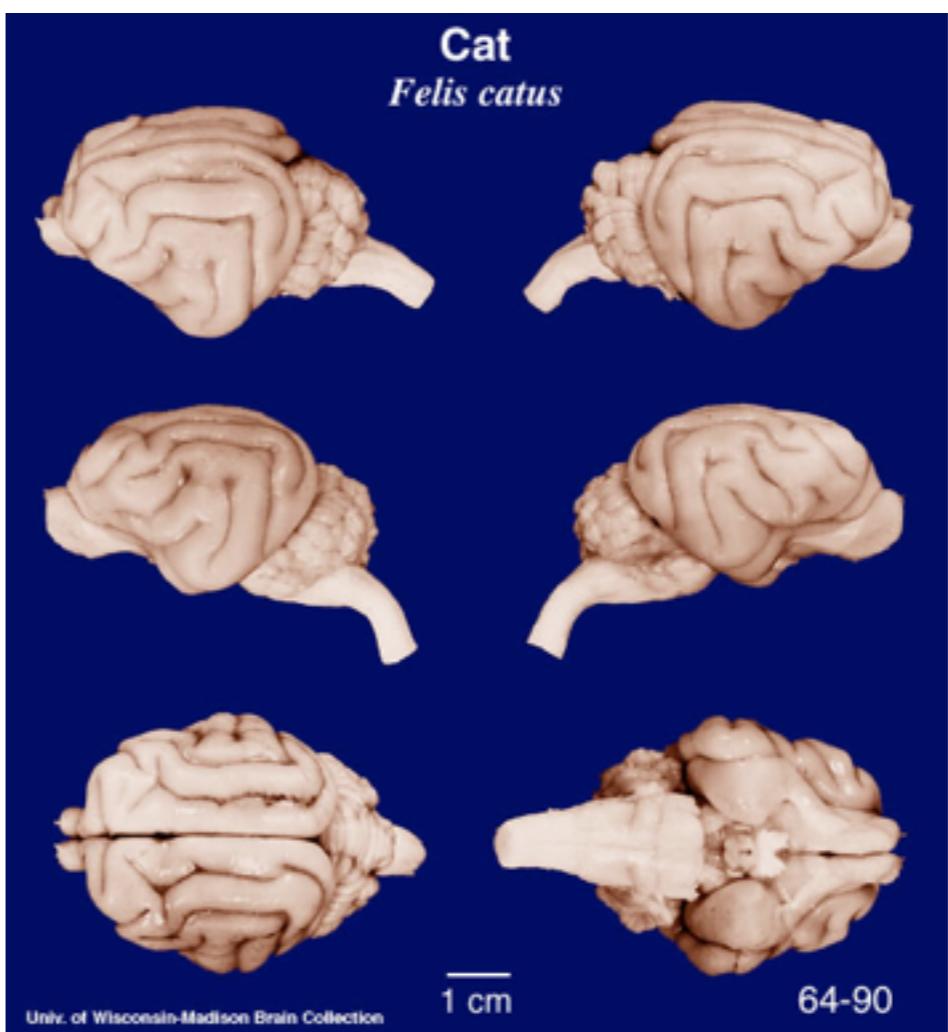
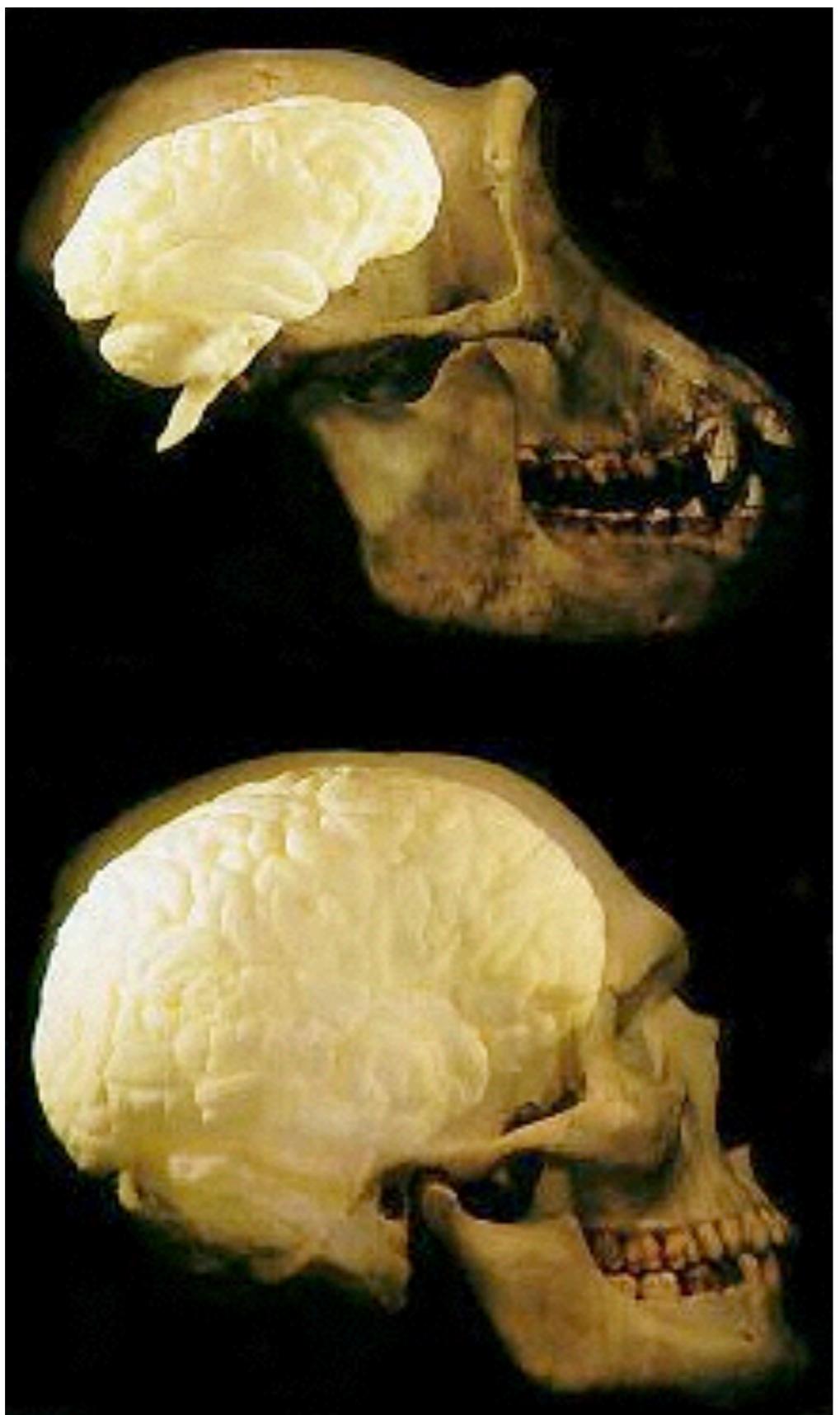
Terrestrial
quadruped
(African apes
knuckle walk)



Brachiation



Bipedality





Longer gestation

Reduced numbers of offspring

Delayed maturation

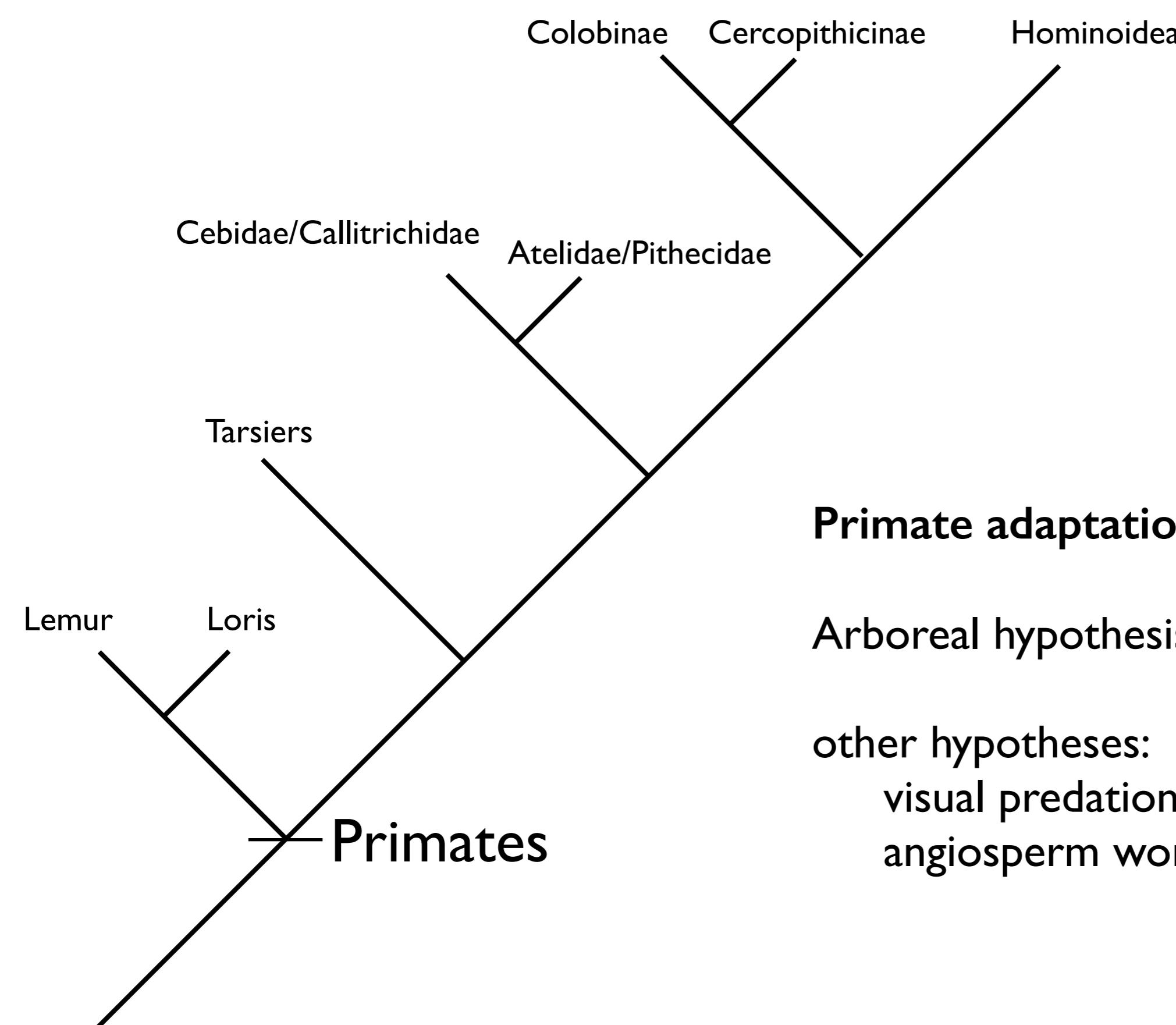
Longer lifespan



Behavioral flexibility

BBC





Primate adaptations:

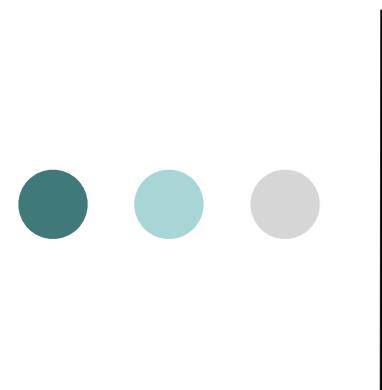
Arboreal hypothesis

other hypotheses:

visual predation hypothesis

angiosperm world

- ● ● |
 - Why Do Anthropologists Study the Social Behavior of Primates?
 - What Determines the Behavior of Nonhuman Primates?
 - Do Nonhuman Primates Possess Culture?



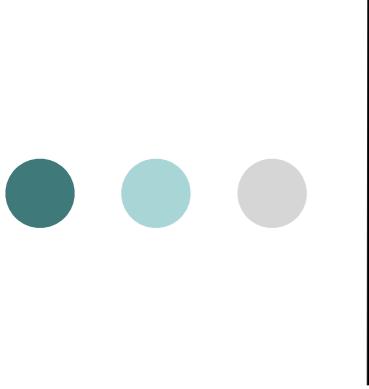
Studying Primate Behavior

- **Apes in the wild**

- **Difficult to gain confidence of the primates**
- **But better able to judge behavior without human interference**

- **Apes in captivity (e.g. zoos, reserves, refuges)**

- **Convenient and easy to study**
- **But their behavior may be altered**



Primates as Models for Human Evolution

- Because we cannot observe the way in which our ancestors behaved and apes are our closest living relatives, paleoanthropologists have been hopeful that observations made among the living apes might shed light on the lifeways of our ancient pre-human ancestors.
- This perspective is known as the **primate analogy**.



The Primate Analogy

These three species of primates are favored among anthropologists as models for how our ancestors may have behaved:

- **Baboons**
- **Chimpanzees**
- **Bonobos**



The Primate Analogy: Baboons

Advantages:

1. live in same environment as our ancestors – the Eastern and Southern African savanna
2. aggression and male dominance in society were once seen as the norm in human evolution (ex: the Man the hunter hypothesis)

Problems:

1. baboons are not hominoids (and we do not posses ischial callosities)
2. humans are less sexually dimorphic and human societies are not always organized around a dominance hierarchy



The Primate Analogy: Chimpanzees

Advantages:

1. chimps and humans share 98.5% of their genetic material
2. capacity for cultural behavior – language, tool-making
3. like baboons, chimps appear to have an aggressive streak we assume was part of human evolution (ex: the Man the hunter hypothesis)

Problems:

1. humans are not bound to the estrus cycle
2. chimpanzees have undergone highly specialized adaptations – e.g. knuckle-walking



The Primate Analogy: Bonobos

Advantages:

1. like chimps, bonobos and humans share 98.5% of their genetic material
2. capacity for cultural behavior – language, tool-making
3. bonobos are not bound to an estrus cycle for copulation

Problems:

1. What to make of bonobo behavior in evolutionary terms



Primate Social Organization

- Primates are social animals
- All mammals (but also social insects, some birds) are social animals in the sense that they often live in groups
- Primates (including humans) live in very complex social groups and are capable of a variety of social behaviors rarely seen in other mammals

Primate Social Organization



Although all primate societies are characterized by a dominance hierarchy, each species (and sometimes groups within a species) has preferred forms of social organization



Lowland Gorilla Societies

- Lowland gorillas favor **age-graded groups** consisting of a dominant male (silverback), younger males, adult females, and children
- Sometimes identified as “**harems**”, only the silverback male mates with the adult females
- There can be competition for the dominant male position within the group

● ● ● |

Lowland Gorilla Societies



A silverback male.

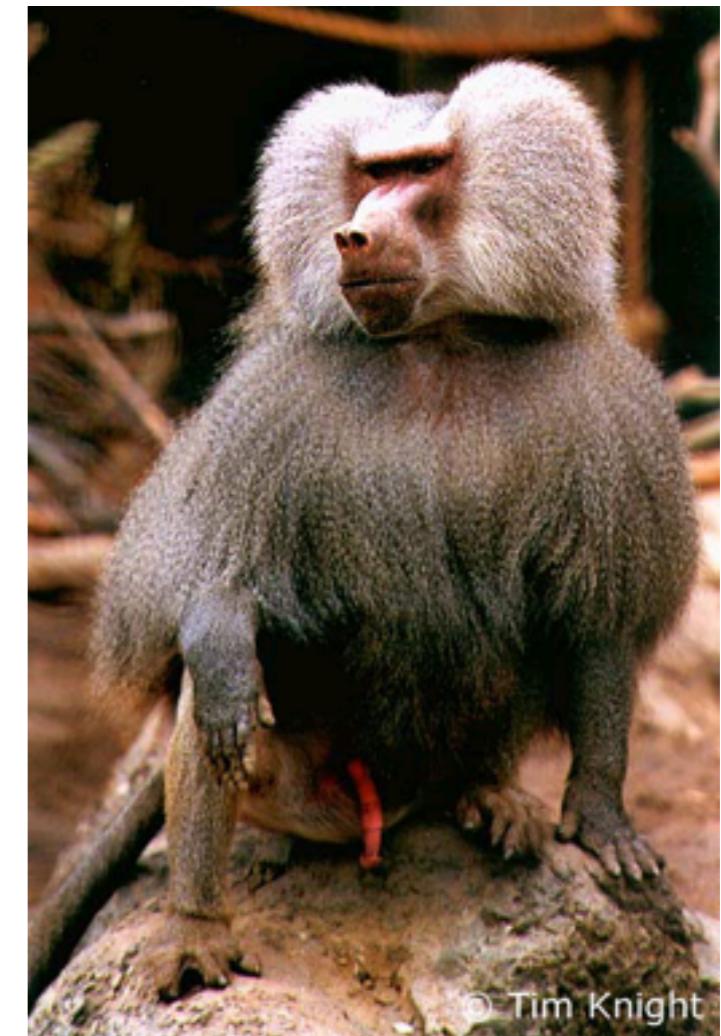


Chimpanzee and Bonobo Societies

- Chimpanzees favor **multi-male/multi-female groups** with some age-grading
- Bonobos favor **polyamorous** unions within multi-male/multi-female groups

Savanna Baboon Societies

Like lowland gorillas, baboons favor age-graded groups (sometimes identified as “harems”)



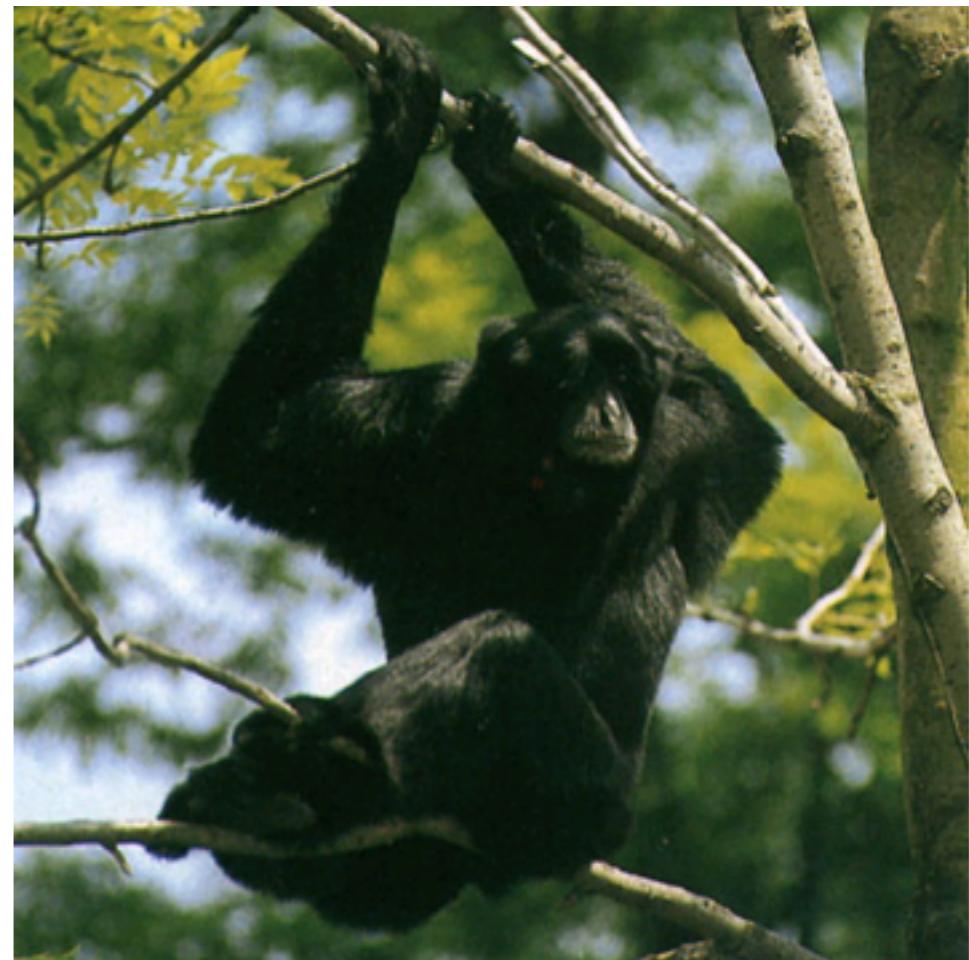
© Tim Knight

Siamang and Gibbon Societies

- Tend to form monogamous pairings



Silvery Javan Gibbon



Siamang

Individual Interaction and Bonding

- All primate societies have ways of settling disputes – **social control**

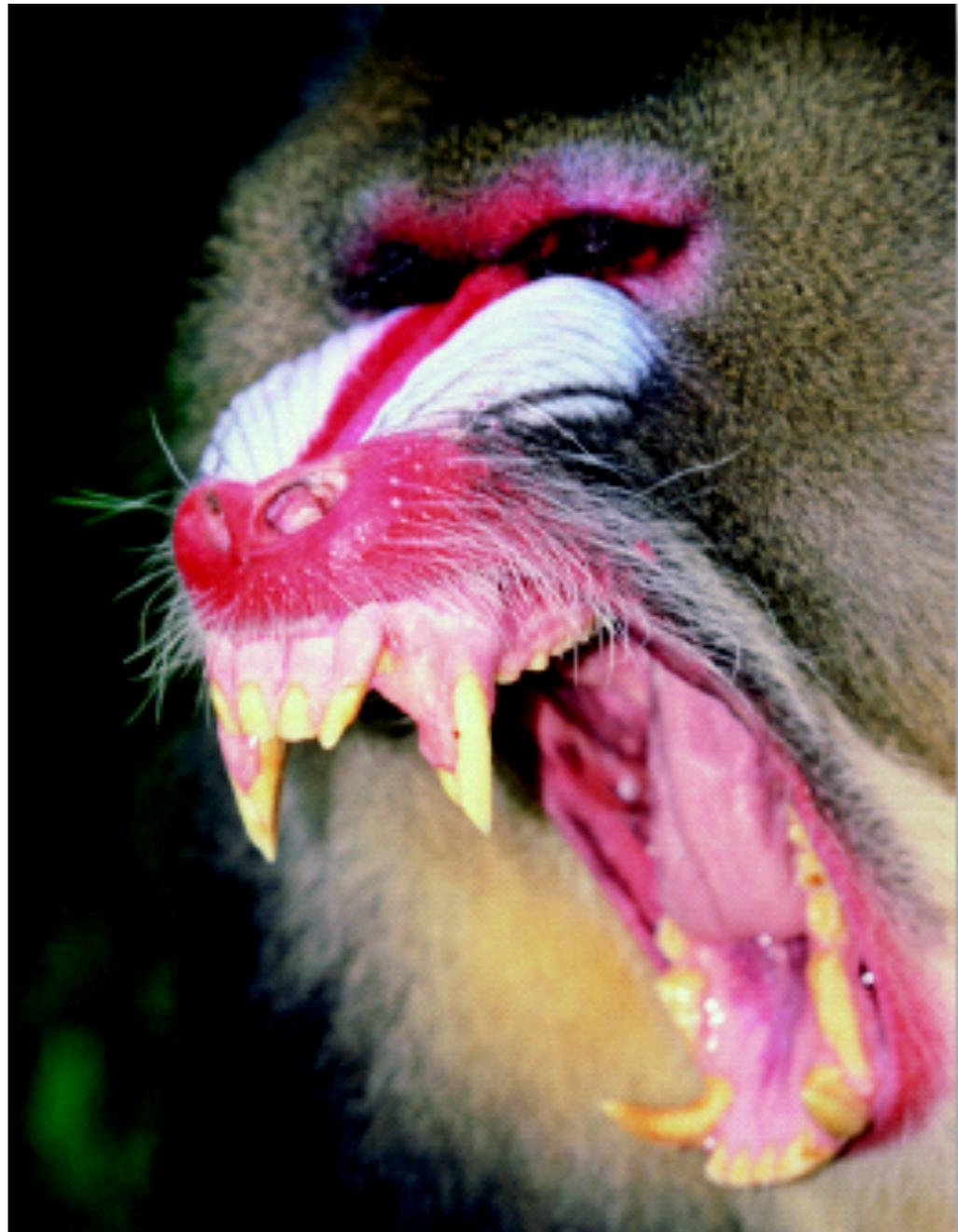
- Examples include:

- Grooming (also provides tasty snacks and hygiene)
- aggressive displays (not always violence)
- genital manipulation (among



Individual Interaction and Bonding

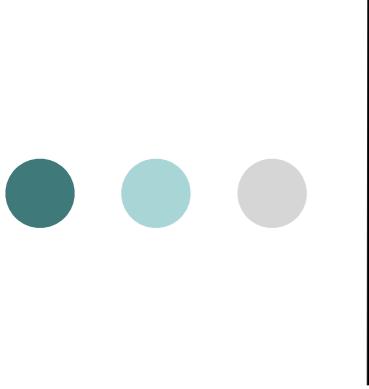
An example of
an
aggressive
display from
a mandrill.



Individual Interaction and Bonding



Lowland Gorilla female and juvenile interacting.



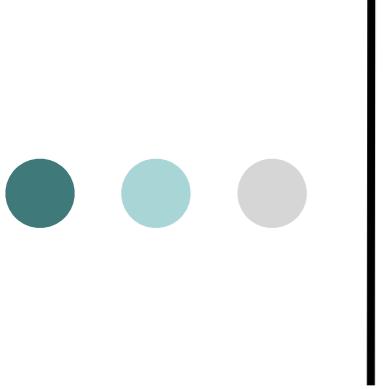
Individual Interaction and Bonding

- Most primates are **omnivores** (usually frugivores and folivores with the opportunistic eating of insects)
- Chimpanzees and bonobos supplement this diet by the deliberate and organized **group hunting** of other primates like the colobus monkey

Sexual Behavior

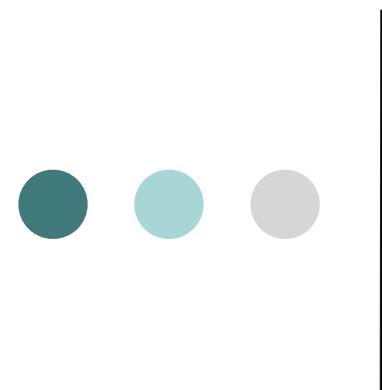
- All primate females signal ovulation through an **estrus cycle** (usually accompanied by seasonal genital swellings)





Sexual Behavior of Chimpanzees

- For chimps, sexual activity occurs only when females signal their fertility through genital swelling.
- Dominant males try to monopolize females, although cooperation from the female is usually required for this to succeed.
- A female and a lower-ranking male sometimes form a temporary bond, leaving the group together for a few private days during the female's fertile period.



Sexual Behavior of Bonobos

- Bonobos do not limit their sexual behavior to times of female estrus, bonobo female genitals are perpetually swollen.
- **Concealed ovulation** in bonobos may play a role in the separation of sexual activity for social reasons and pleasure from the biological task of reproduction.
- Primatologists have observed every possible combination of ages and sexes engaging in an array of sexual activities (oral sex, tongue-kissing, and massaging each other's genitals).

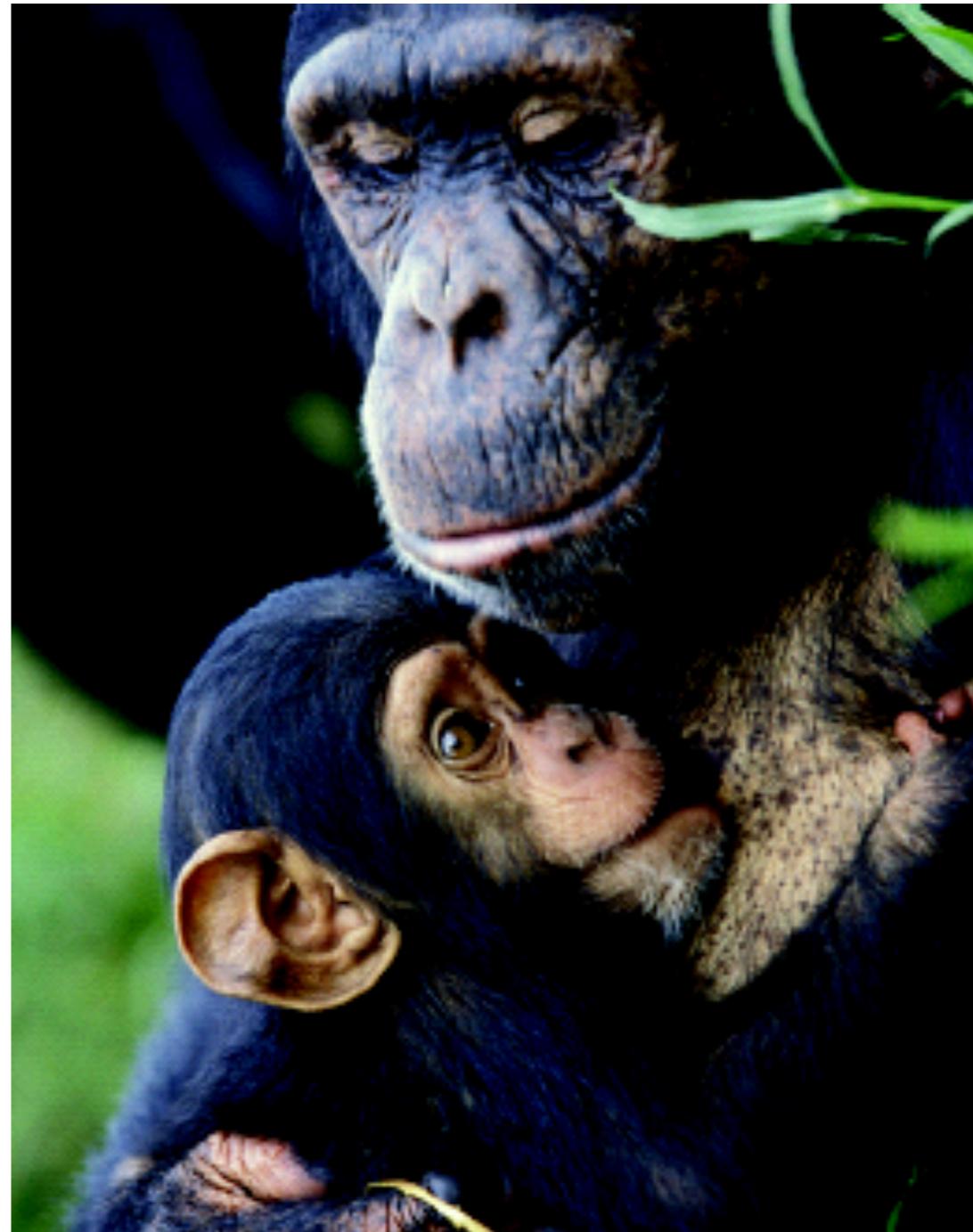
Reproduction and Care for the Young

- Reproduction among primates follows a **k-selection strategy** (fewer offspring are born but they require greater parental care)
- This reproductive strategy means that the **mother-infant social bond** is very important in primate societies, especially among hominoids (apes and humans)
- However, this bond can be replaced by other social bonds:
 1. **father-infant bonds**
 2. **allomothering**



Reproduction and Care for the Young

An example of the mother-infant bond among chimpanzees.

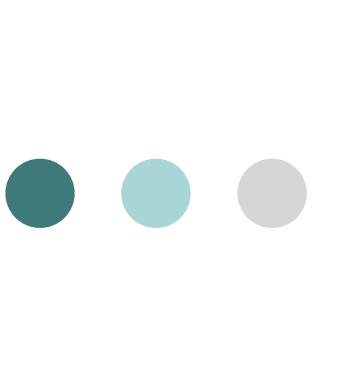


Play and Learning

- Young chimpanzees and bonobos learn by observation, imitation, and practice how to interact with others and manipulate them for his or her own benefit.
- Young primates learn to match their interactive behaviors according to each individual's social position and temperament.
- Anatomical features such as a free upper lip allow varied facial expression, contributing to greater communication among individuals.
- Young chimpanzees and bonobos also learn to how to make and use tools.



Japanese macaques
playing together.



Tool-Making

- The Great Apes and some Catarrhine monkeys are also able to make tools
- Their ability to not only invent tools but to share the skill with others makes tool-making a **cultural behavior** in the sense that it is learned and shared behavior attached to a specific social group (**NOT THE WHOLE SPECIES!**)

Tool-Making

Japanese Macaques can make snowballs and have playful snowball fights and they have also learned how to wash sweet potatoes.

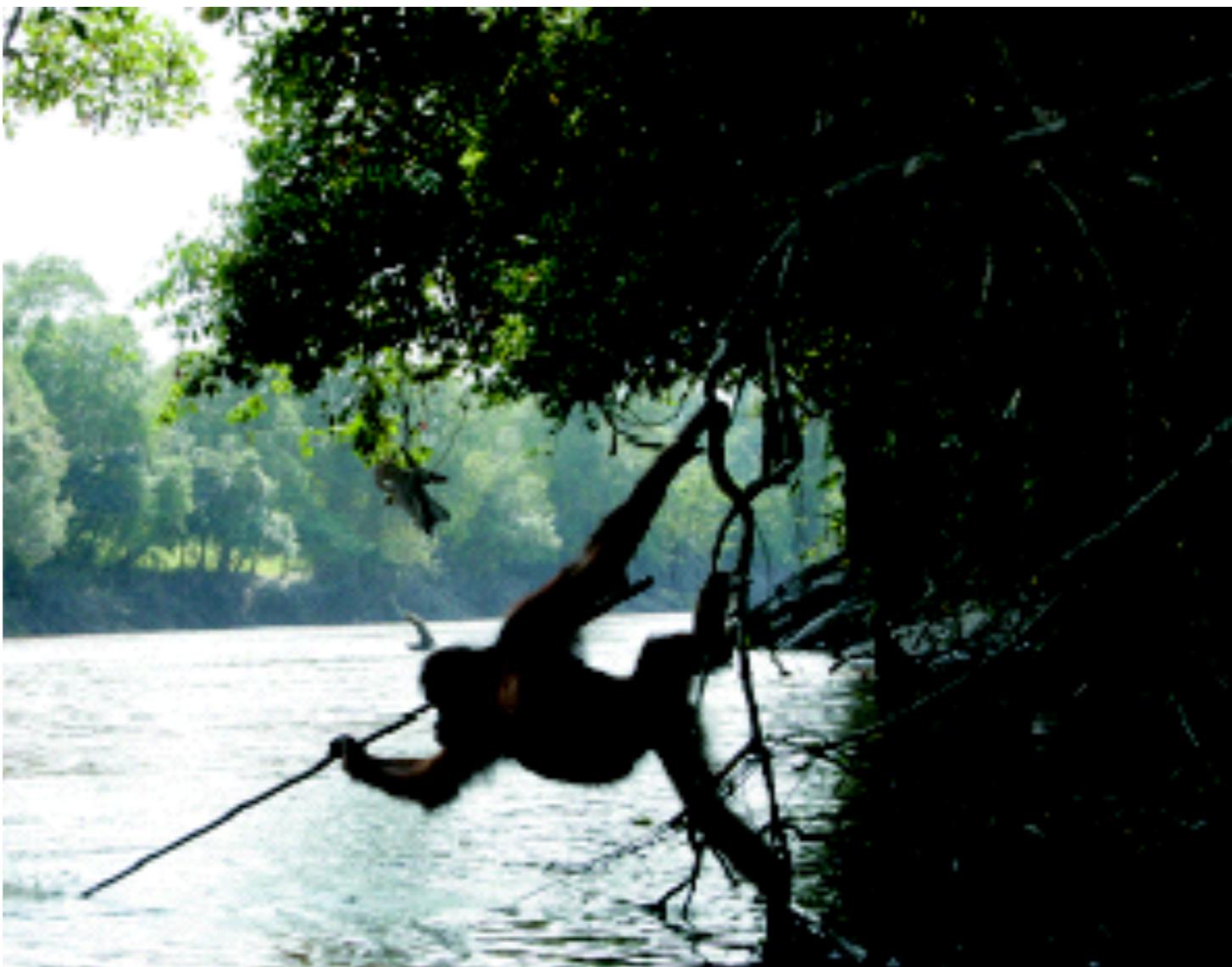


Tool-Making



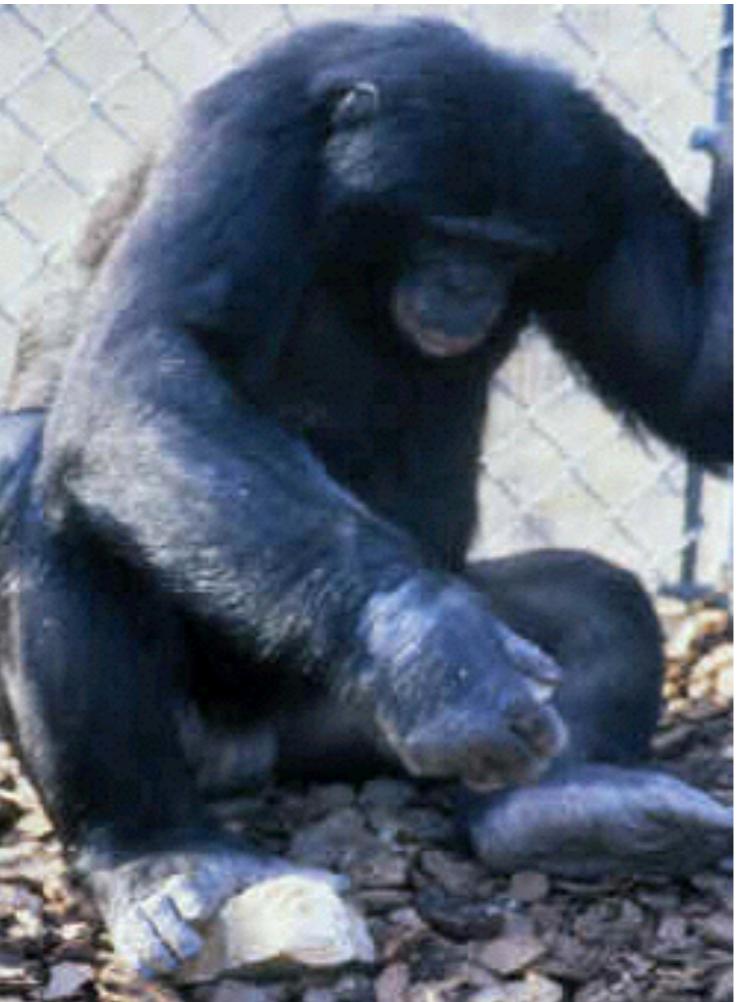
Chimpanzees are famous for modifying natural objects to make tools (the very definition of the word “tool”)

Tool-Making



Orangutans have also been observed to make tools in the same manner as chimpanzees (i.e. by modifying natural objects)

Tool-Making

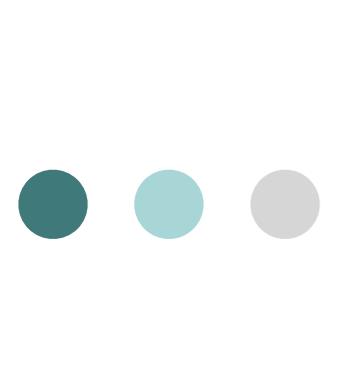


Bonobos have been observed making stone tools using a flake-knapping technique similar in many ways to the stone tool technologies of our ancestors



Primate Communication

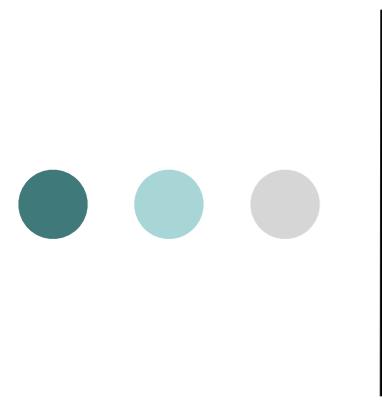
- Early Views of Primate Communication:
 - Only anatomically modern humans were capable of language (as a verbal symbolic system)
 - Apes and our non- or pre-human ancestors could communicate but not like us.



Primate Communication

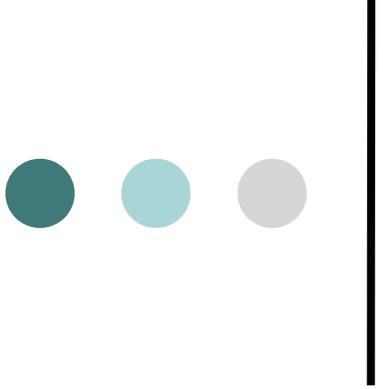
What Defines Human Language?

- Human language is **symbolic**
- Human language has **syntax**
- Human language is **not dependent on a direct stimulus**
- Human languages can be **modified** (new words are added, old ones removed, syntax can be changed)



Primate Communication

- Captive apes can be taught to use symbols for communication
- Apes who use symbolic communication follow syntax and can modify their “language” by creating new words
- Apes in the Wild do not use syntax or symbols and their communication is stimulus-dependent



Primate Communication: For Class Discussion

- PRIMATE VOCALIZATIONS ONLINE:

http://gorillafund.org/020_gnews_0603c_frmset.html

<http://www.exn.ca/main/reserve/africa/sounds/orangutan.aif>

<http://www.wjh.harvard.edu/~mnkylab/media/chimpcalls.html>

<http://pin.primate.wisc.edu/av/vocals/>



Do Apes Have Culture? Class Discussion

- The answer appears to be YES! There is variation among groups in the use of tools and patterns of social engagement that seem to derive from the traditions of the group rather than being biologically determined.
- What does this observation mean for the ways in which we think of, and treat, non-human primates (especially apes)?

Our Treatment of Apes: Class Discussion



Chimpanzee in a Lab.