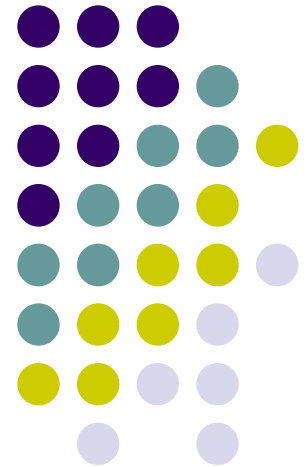


Homo erectus and Contemporaries

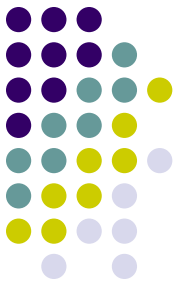


The Genus *Homo*

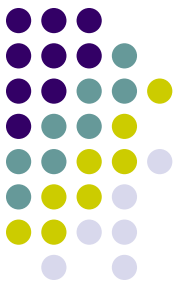


- Humans are, by definition, members of the genus *Homo*.
- Modern people are *Homo sapiens*.
- There were earlier species of our genus that are now extinct.
- In the past, there were times when several species of humans and other hominids were alive.

Homo erectus



- By 1.8 mya, one of the early transitional human populations had evolved into a new, fully human species in Africa.
- Some researchers now split them into two species - *Homo ergaster* and *Homo erectus*.
 - The *ergaster* fossils are earlier, dating from 1.8-1.5 mya, and found mostly in East Africa.
 - The *erectus* discoveries date from 1.2-0.4 mya and have been found widespread in Africa, Asia, and Europe.



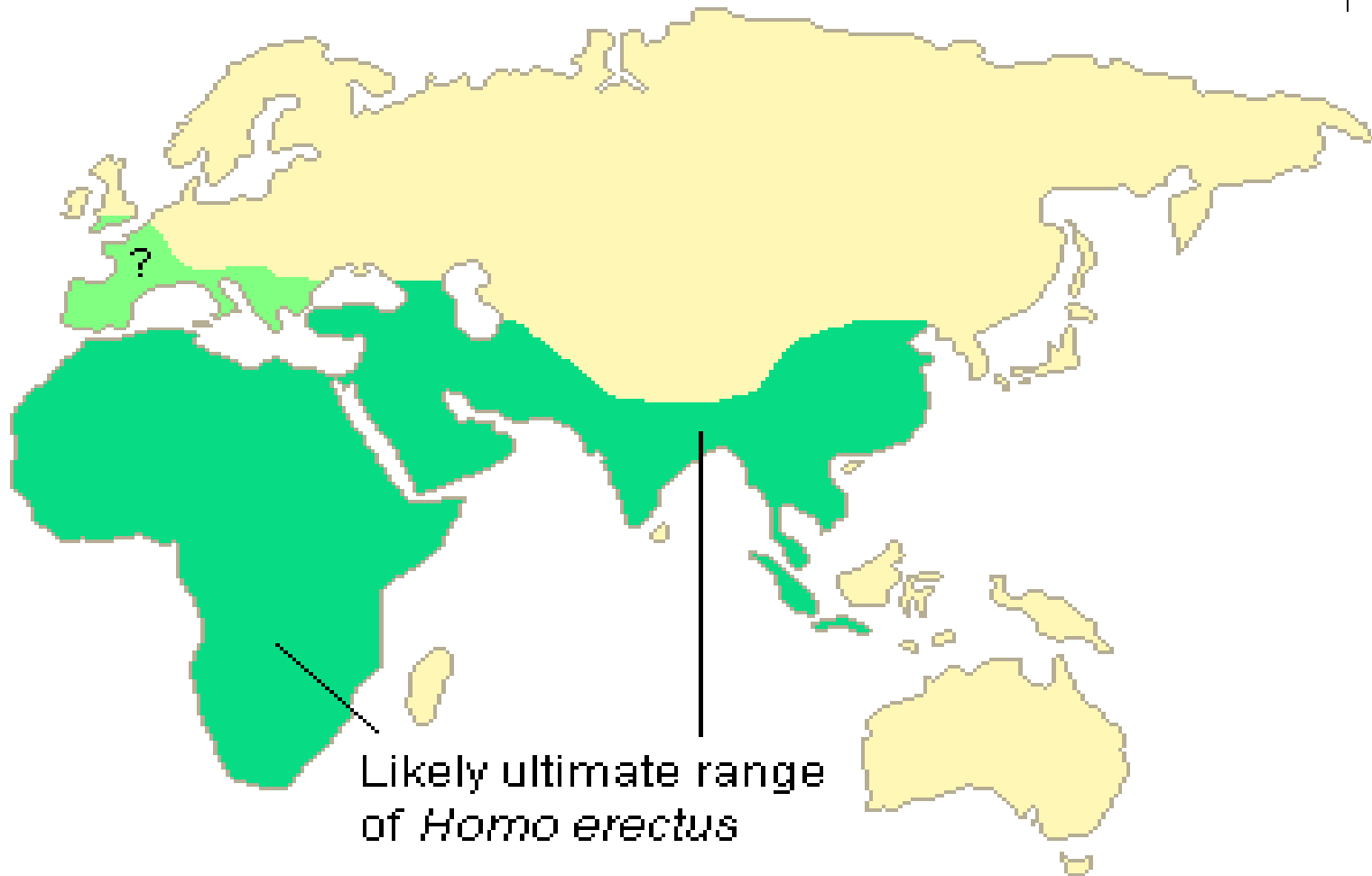
Homo erectus



As a species, *Homo erectus* existed over 1 million years.

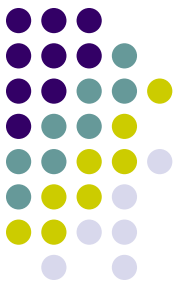
The behavioral capacities of *Homo erectus*, along with the morphological changes, help us understand its success as a hominid species.

***Homo erectus* was the first hominid to expand into new regions of the world.**



Likely ultimate range
of *Homo erectus*

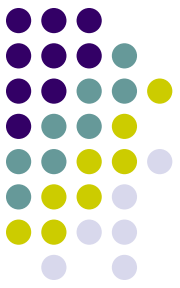
Homo erectus adapted to new environmental opportunities.



- They were true pioneers in developing human culture and in moving out of Africa to populate tropical and subtropical environmental zones elsewhere in the Old World, possibly as early as 1.8 million years ago.
- Surprisingly, however, they remained largely unchanged anatomically until about 600,000 years ago.



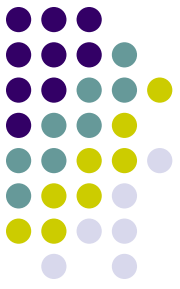
Migrations were made possible by greater intelligence and new cultural technologies.



- After 600,000 years ago there were progressive evolutionary developments in features of the head that were characteristic of modern humans.
- By about half a million years ago, some *Homo erectus* were able to move into the cooler temperate environmental zones of Asia and Europe for the first time.

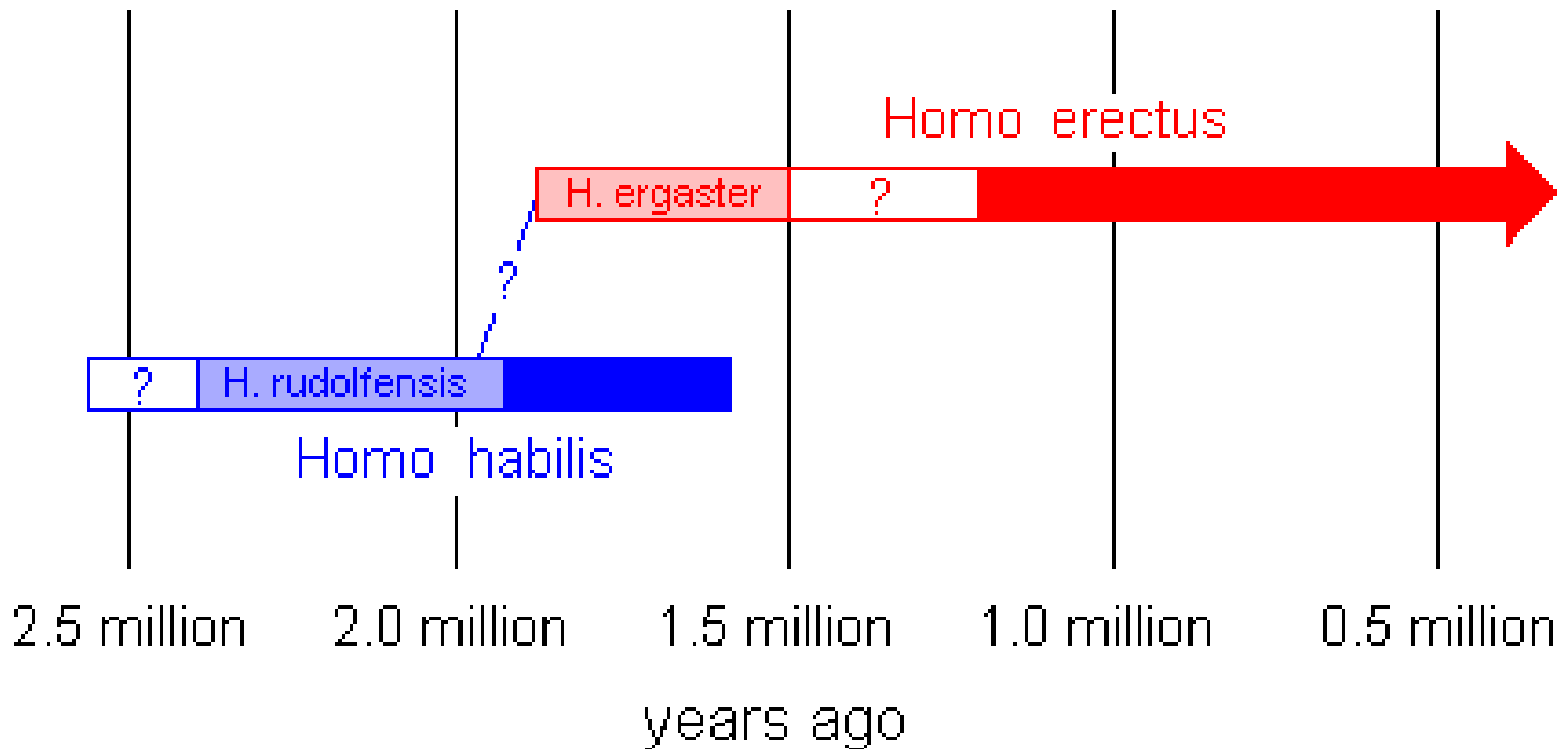


Homo erectus Terminology

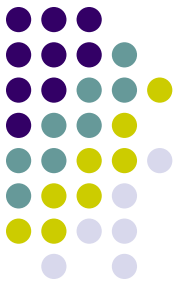


- Early fossils had a different name:
 - Javanese remains were called *Pithecanthropus*.
 - The fossils found in china were called *Sianthropus*.
- After World War II the taxonomic splitting was combined under the classification, *Homo erectus*.

The earliest *Homo erectus* were contemporaries of late *Homo habilis* in East Africa for several hundred thousand years.

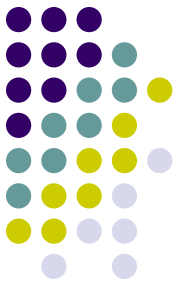


The Pleistocene (1.8 mya - 10,000 ya)



- During this time, also known as the “ice age”, the Northern hemisphere was covered in ice.
- During periods of glacial advance, sea levels lowered to expose land bridges, influencing hominid migrations.
- *Homo erectus* appeared and disappeared during the Pleistocene.

Morphology of *Homo erectus*



- Brain size is related to overall body size.
- Body size dramatically increased compared to earlier hominids.
- Cranium had a distinctive shape with a thick cranial bone and large brow ridges.
- Shovel-shaped incisors suggest an adaptation in hunter-gatherers.

Discoveries in Java



- Six sites in eastern Java have yielded all the *Homo erectus* fossils found on this island.
- Dates range from 1.8 mya to 1.6 mya
- This is suggestive of an early exit from Africa, shortly after *Homo erectus* evolved from *Homo habilis*



Java Fossils



Discoveries in Peking



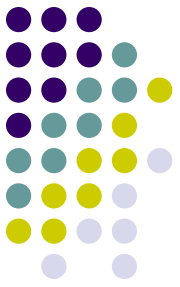
- “Dragon bones” used as medicine and aphrodisiacs were actually ancient bones.
- 40 male and female adults and children have been found near Zhoukoudian.
 - The cave site was occupied for 250,000 years by late *Homo erectus*.
 - 40% of the bones were from individuals less than 14 years old, 2.6% were from individuals between 50-60 years.

The Zhoukoudian Evidence



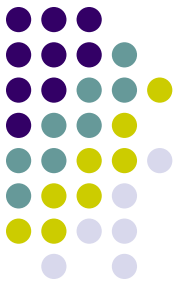
- The skeletal evidence is especially important since it represents a population.
- Human remains were associated with large quantities of animal bones (likely food refuse).
- A few of the bones were burned in a way that suggests cooking to some researchers.
- In addition, more than 100,000 stone, bone, antler, and horn tools were excavated.

The Loss of the Zhoukoudian Remains



- With the exception of two teeth, all of the *Homo erectus* bones from Zhoukoudian were lost in late 1941, when the Japanese Army invaded the Beijing area during World War II.
- There have been a number of intriguing guesses about what happened to the bones.
- In 1949, the Peoples Republic of China established a \$100,000 reward for their return.
- It has not been claimed.

Peking Fossils

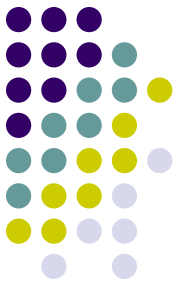


Discoveries in East Africa



- Louis Leakey unearthed a fossil skull at Olduvai.
- An almost complete skull was discovered in east Turkana.
- In Ethiopia, an abundance of Acheulian tools have been found as well as a robust mandible dating to 1.3 mya

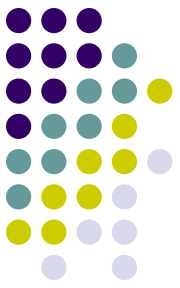
The most complete
Homo erectus skeleton
ever found.



In 1984, Richard Leakey's team working at Nariokotome on the western side of Lake Turkana found a nearly complete *Homo erectus* skeleton of a 12 year old boy dating to 1.6 million years ago.



East African *Homo erectus*

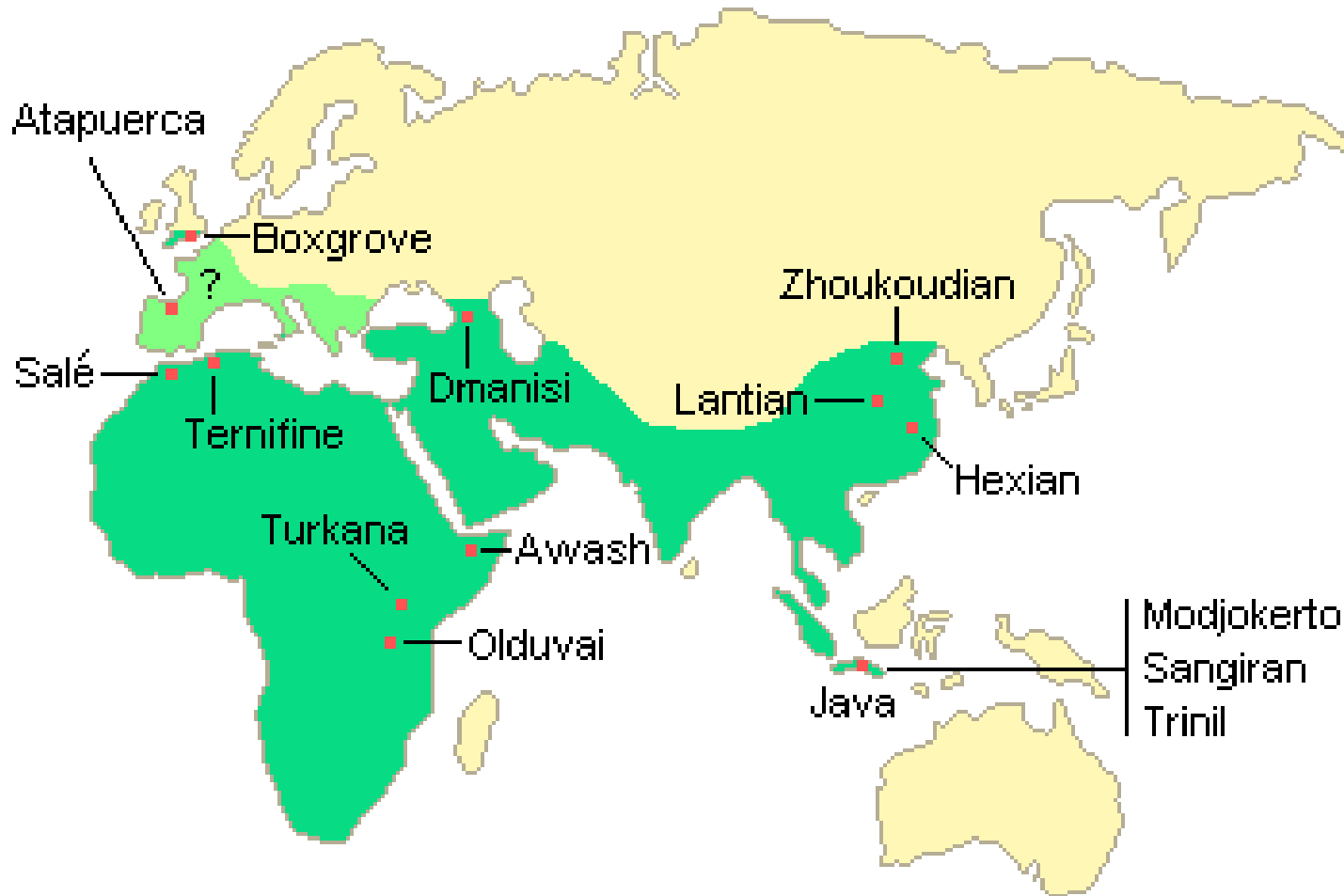
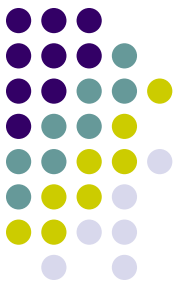


- East African specimens have thinner cranial bones than those found in Asia.
- Some scientists argue that the African and Asian *erectus* finds should be classified as separate species.
- The African and Asian populations are separated by more than one million years.

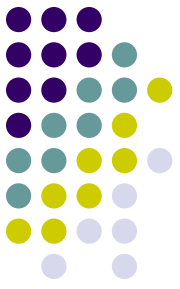
East African Fossils



It appears that an early rather than late *Homo erectus* expansion out of Africa occurred.

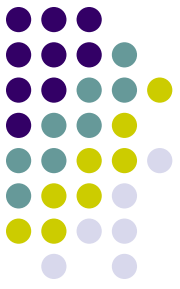


Homo erectus Anatomy



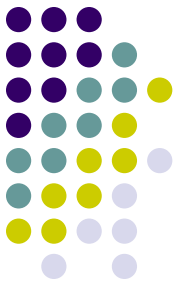
- Below the neck, the *Homo erectus* were anatomically very much like modern humans.
- Their pelvis and leg bones were essentially the same as modern people in shape and relative proportions (but denser).
- This strongly supports the view that they were equal to us in their ability to walk and run bipedally.

Homo erectus Body Scale



- With the evolution of *Homo erectus*, there was a significant increase in body size compared to earlier hominids.
- Past estimates of *Homo erectus* stature frequently were in the 5-5½ feet range for adult males and around 100 pounds or a bit more.
- The discovery of the "Turkana Boy" in 1984 brought this into question – he was only 12 years old when he died but already 5 feet 3 inches tall - had he lived to adulthood, he very likely would have grown to 6 feet.

Homo erectus Craniums



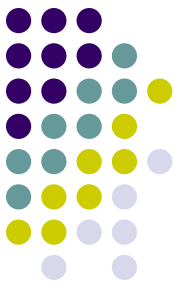
- *Homo erectus* heads were strikingly different from ours in shape.
- Their foreheads were relatively shallow, sloping back from very prominent brow ridges (i.e., supraorbital tori).
- Compared to modern humans, the *Homo erectus* brain case was more elongated from front to back and less spherical.

Homo erectus Cranial Capacity



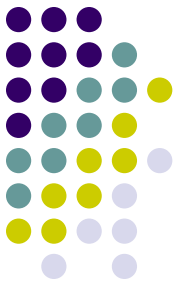
- Adult *Homo erectus* brain size ranged from about 750-1250 cm³ with an average of nearly 1000 cm³.
-
- Individuals at the upper end of this range overlap some modern people in cranial capacity.
- These larger brained *Homo erectus* are considered by some paleoanthropologists to be a more recent species (*Homo heidelbergensis* or early archaic *Homo sapiens*).

Technological Trends in the Pleistocene



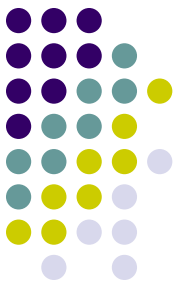
- Expansion of the brain enabled *H. erectus* to develop sophisticated tools:
 - Biface - stone that was worked on both sides and used to cut, scrape, pound, and dig.
 - Thousands of Acheulian hand axes have been found with remains of large animals.
- *Homo erectus* is seen as a potential hunter and scavenger.

Trends in the Pleistocene



- *Homo erectus* liked to move around – their outward spread into various environmental zones is evidence of their extensive travels.
- Stone tools found on the island of Flores, suggest that *H. erectus* constructed ocean-going vessels, but no evidence of such things has been recovered.
- *Homo erectus* embraced culture as a strategy of adaptation – with tremendous success.

The cultural developments of *Homo erectus* began a new phase of our evolution.



- Culture can affect the direction of human evolution by creating non-biological solutions to environmental stresses.
- When late *Homo erectus* moved into temperate environments, nature should have selected for biological adaptations that were more suited to cooler climates.
- Such things as increased amounts of insulating body fat and insulating hair covering most of the body would be expected.

Homo erectus Adaptations



- *Homo erectus* evidently adapted to the environment by occupying caves, creating fires, and becoming more capable at obtaining meat.
- By using their intelligence and accumulated knowledge, they remained essentially tropical animals despite the fact that they were no longer living only in the tropics.
- Natural selection continued to select for increased brain size and intelligence.