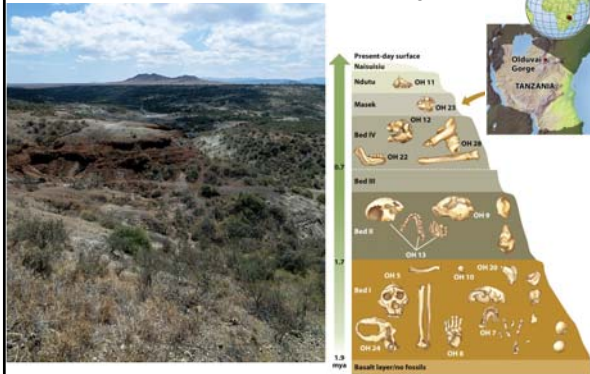


Chapter 10- Early Hominid Origins and Evolution:  
The Roots of Humanity



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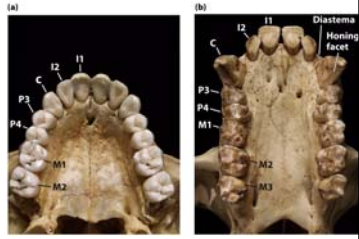
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1. What is a Hominid?

- a. Bipedal Locomotion: Getting Around on Two Feet
  - i. Evolved before large brain size
  - ii. Walking on two limbs (with associated skeletal changes)
- b. Nonhoning Chewing: No Slicing, Mainly Grinding
  - i. Refers to the way the mouth processes food
  - ii. Lack of projecting canine, diastema
  - iii. More pressure on front portion of chewing muscles



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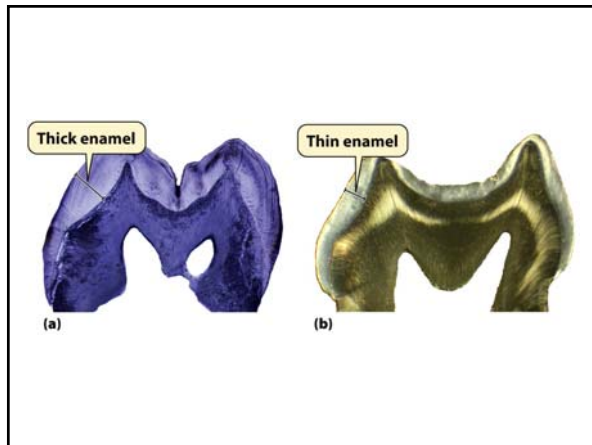
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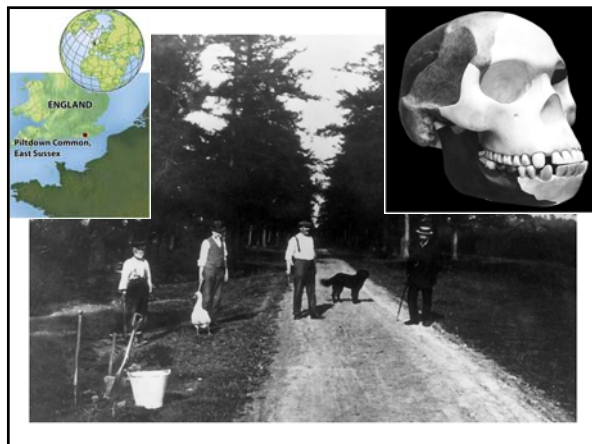
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**2. Why Did Hominids Emerge? Three Hypotheses**

- a. Charles Darwin's Hunting Hypothesis
  - i. Bipedalism had freed the hands for carrying weapons.
  - ii. Intelligence increased; size of canines diminished.
  - iii. Tool production and use essential for development of human intelligence.
  - iv. New evidence shows this not to be the case.
- b. Peter Rodman and Henry McHenry's Patchy Forest Hypothesis
  - i. Human origins and bipedalism related to the greater efficiency in some habitats of moving on two limbs rather than four.
  - ii. Bipedalism arose in areas where forests were fragmented and food resources also became scattered.
  - iii. As forests fragmented, bipedalism freed the hands to pick up food allowing for both tree and ground food resources to be exploited.

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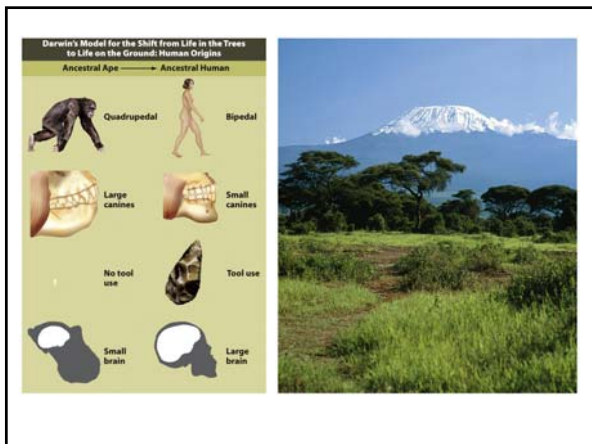
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2. Why Did Hominids Emerge? Three Hypotheses (cont'd)

c. Owen Lovejoy's Provisioning Hypothesis

- i. Freeing the hands was important in allowing males to assist females more efficiently in procuring food; thus "provisioning" acted as a form of sexual competition among males for females.
- ii. Birth spacing would also be reduced, since females would have to move around less and would have access to greater food resources.
- iii. Lovejoy's hypothesis makes the argument for monogamous fathers.

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2. Why Did Hominids Emerge? Three Hypotheses (cont'd)

d. Sexual Dimorphism and Human Behavior

- i. Many primate species are highly sexually dimorphic, with males larger than females.
- ii. Some scientists see little sexual dimorphism in early hominids; therefore males would have been more cooperative and less competitive.

e. Bipedality Had Its Benefits and Costs: An Evolutionary Tradeoff

- i. Bipedalism was a clear advantage to early humans.
- ii. It allows for a better view of the horizon, but also exposes the individual to predators.
- iii. Walking along with lifting or carrying heavy loads can cause back injury.
- iv. The circulatory system also faces a greater burden.

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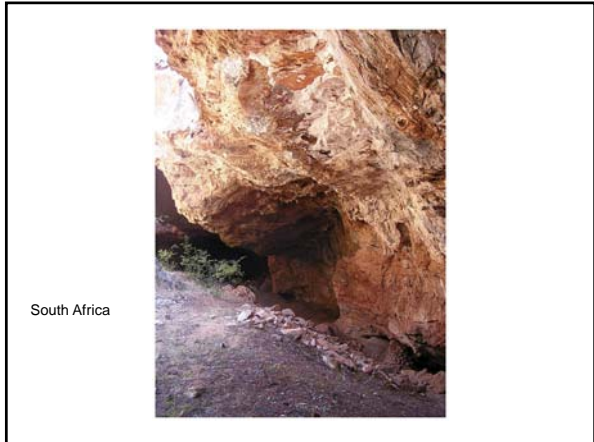
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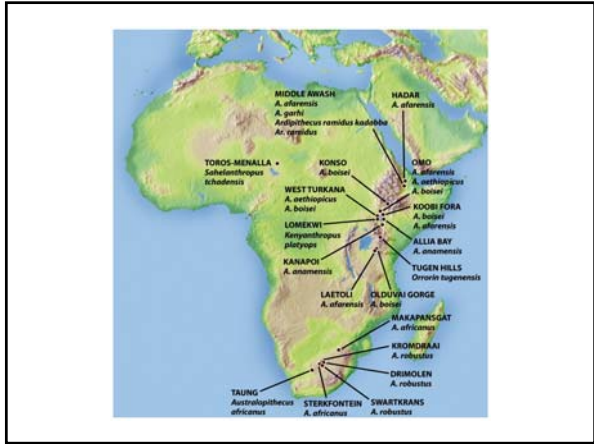
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3. Who Were the First Hominids?

a. The Pre-Australopithecines

i. *Sahelanthropus tchadensis*

- 1) Found by Michel Brunet in 2001
- 2) Located in central Africa and dated to 7–6 mya
- 3) Brain size (cranial capacity) of 350 cc
- 4) Foramen magnum indicative of likely bipedality
- 5) Nonhoning chewing complex
- 6) Close to pongid/hominid divergence



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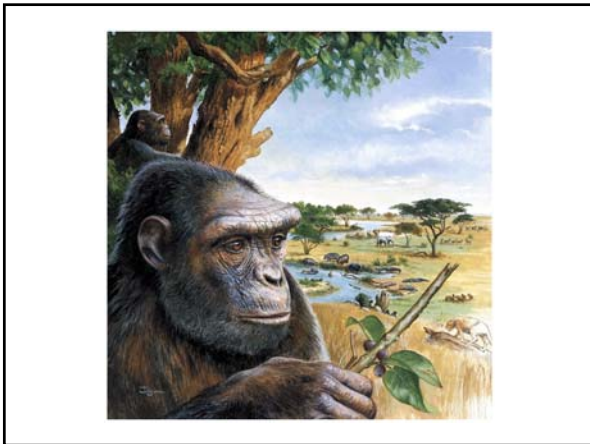
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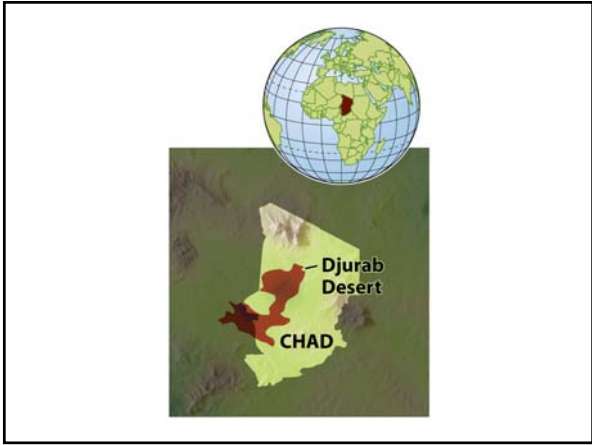
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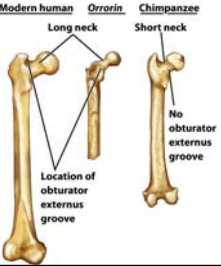
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3. Who Were the First Hominids? (cont'd)

a. The Pre-Australopithecines

i. *Orrorin tugenensis*

- 1) Found by Brigitte Senet and Martin Pickford
- 2) Located near Lake Turkana and dated to 6 mya
- 3) Femurs indicative of bipedalism
- 4) Curved hand phalanx, suggesting time spent in trees
- 5) Nonhoning chewing complex
- 6) Lived in a forest

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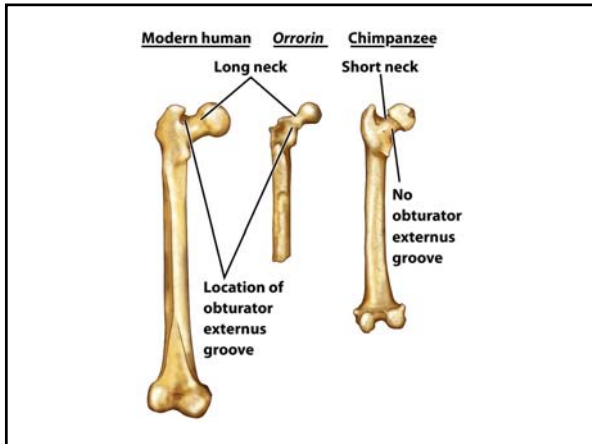
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3. Who Were the First Hominids? (cont'd)

a. The Pre-Australopithecines

i. *Ardipithecus kadabba* and *Ardipithecus ramidus*

- 1) Found by Tim White and Yohannes Haile-Selassie
- 2) Located at Aramis and dated to 5.8–4.4 mya
- 3) Partial skeleton, other bones, and teeth
- 4) Variation in tooth wear; possessed thin enamel
- 5) Lived in a forest
- 6) Time spent on ground and in trees

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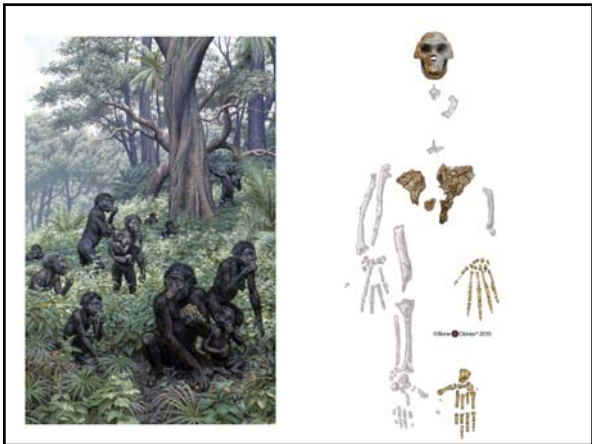
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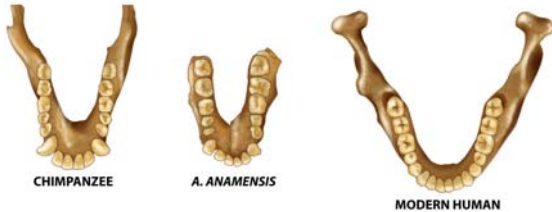
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3. Who Were the First Hominids? (cont'd)

b. The Australopithecines (4–1 mya)

i. *Australopithecus anamensis* (4 mya)

- 1) Found by Maeve Leakey, Carol Ward, and Alan Walker; other remains studied by Tim White
- 2) Located at Lake Turkana and Ethiopia and dated to 4 mya
- 3) Physically somewhat similar to *Ardipithecus*
- 4) Large canines, parallel tooth rows, different cusp pattern on lower first premolar



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3. Who Were the First Hominids? (cont'd)

b. The Australopithecines (4–1 mya)

ii. *Australopithecus afarensis* (3.6–3.0 mya)

- 1) Found by Donald Johanson, Maurice Taib, and Tim White
- 2) Located in Laetoli and Hadar (found first in Hadar) and dated to 3.6–3.0 mya
- 3) Lucy (type specimen) is very complete for the age, 40 percent of skeleton found
- 4) Bipedal but with shorter legs, resulting in a slightly different stride
- 5) Long arms, curved finger bones, suggesting tree use
- 6) Cranial capacity of 430 cc
- 7) At Laetoli, assemblages include hominids as well as footprints of three hominids
- 8) Lived in varied habitats

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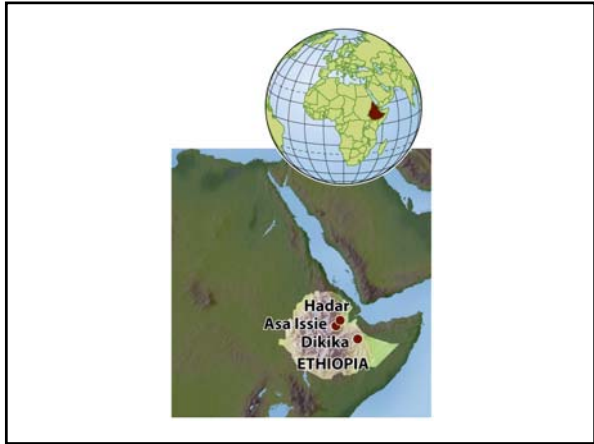
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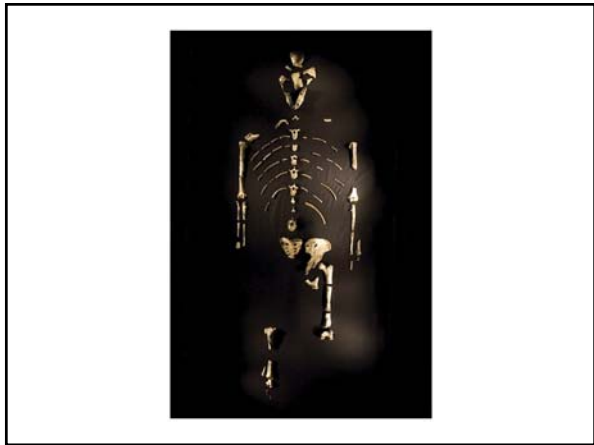
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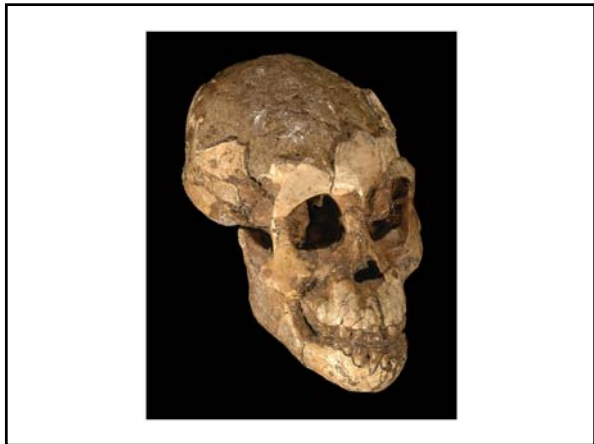
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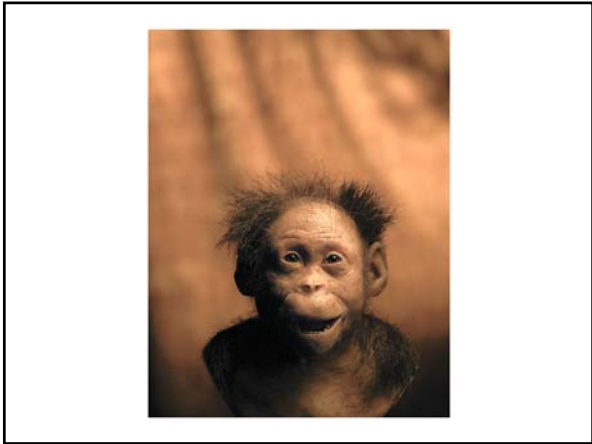
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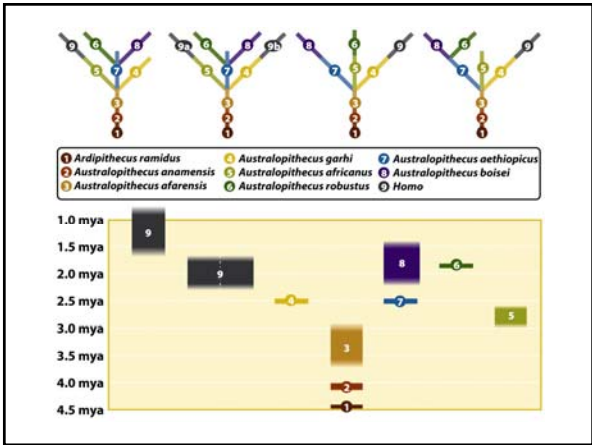
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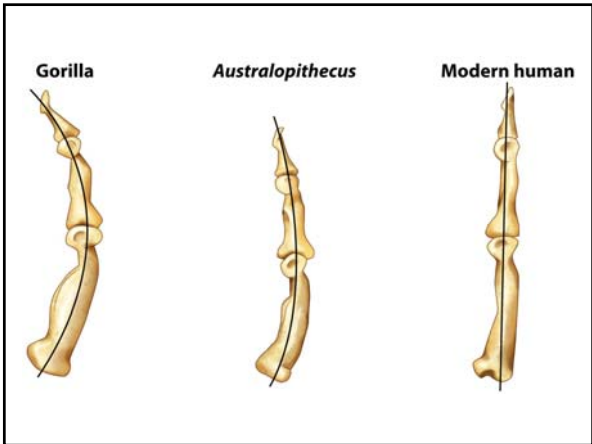
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3. Who Were the First Hominids? (cont'd)

b. The Australopithecines (4–1 mya)

iii. *Australopithecus (Kenyanthropus) platyops* (3.5 mya)

- 1) Found by Maeve Leakey and colleagues
- 2) Found at Lake Turkana and dated to 3.5 mya
- 3) Woodland habitat
- 4) Flat face with some primitive characteristics

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3. Who Were the First Hominids? (cont'd)

c. Diversification of the *Hominidae*: Emergence of Two Evolutionary Lineages from One (3–1 mya)

i. *Australopithecus garhi* (2.5 mya): First Maker and User of Tools

- 1) Found by Berhane Asfaw and colleagues
- 2) Located in Ethiopia and dated to 2.5 mya
- 3) Bones, teeth, partial skeleton, and a skull
- 4) Larger teeth than earlier australopithecines
- 5) More humanlike humerus-to-femur ratio
- 6) Cranial capacity of 450 cc
- 7) Probable ancestor of *Homo*
- 8) Associated mammal bones with cutmarks, leading to conclusion that *A. garhi* made Oldowan tools, the earliest stone tools.
- 9) Stone tools long associated with meat consumption; some wear may indicate tools were also used for digging in ground.

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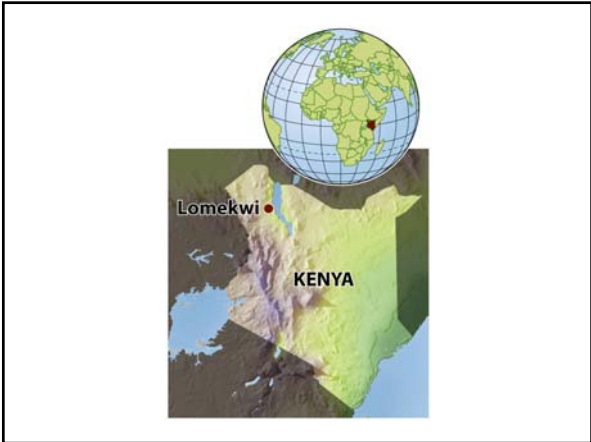
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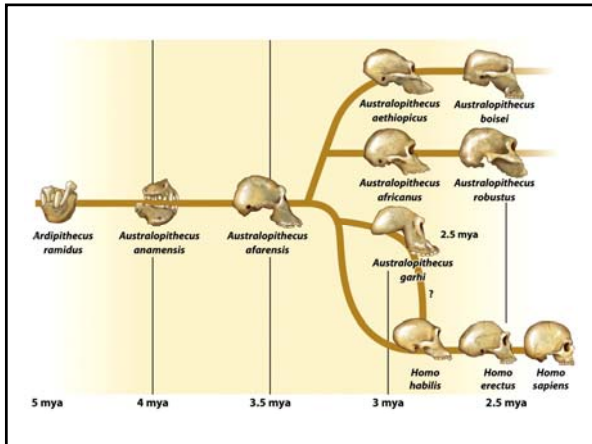
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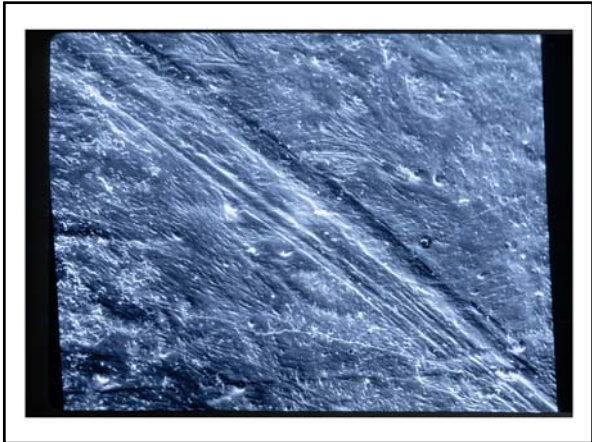
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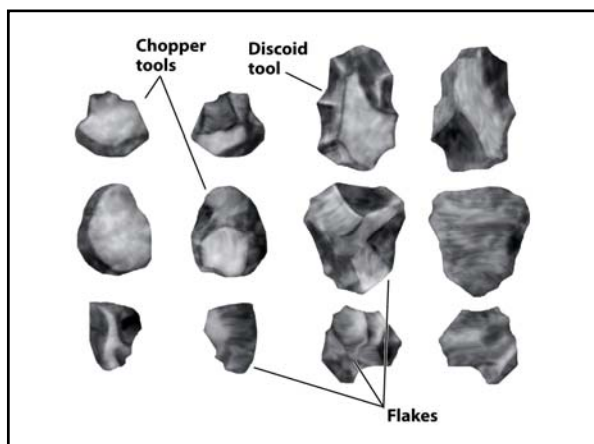
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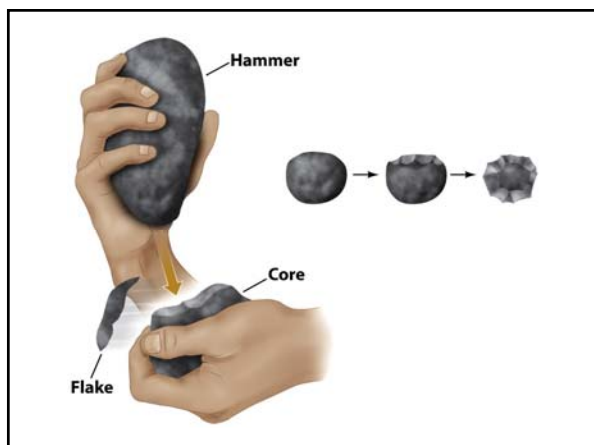
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3. Who Were the First Hominids? (cont'd)

d. Evolution and Extinction of the Australopithecines

i. *Australopithecus aethiopicus* and *Australopithecus boisei*

- 1) Found in Lake Turkana (*A. aethiopicus*), Olduvai Gorge (*A. boisei*), and other locations in Africa
- 2) *A. aethiopicus* dates to 2.5 mya and had a cranial capacity of 410 cc
- 3) *A. boisei* dates to 2.3–1.2 mya and had a cranial capacity of 510 cc
- 4) Smaller front teeth, larger back teeth
- 5) Sagittal crest for attachment of chewing muscles
- 6) Dietary focus on harder foods

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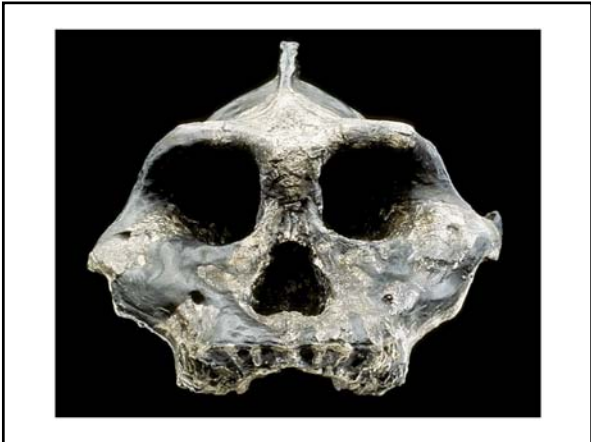
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3. Who Were the First Hominids? (cont'd)

d. Evolution and Extinction of the Australopithecines

ii. *Australopithecus africanus*

- Found by Raymond Dart
- Found at Taung, South Africa and other sites, dating to 3-2 mya
- Larger teeth than *A. afarensis*
- Brain size of 450 cc

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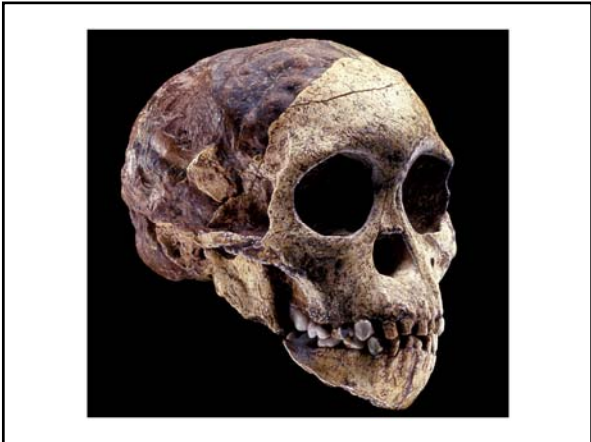
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3. Who Were the First Hominids? (cont'd)

- d. Evolution and Extinction of the Australopithecines
  - iii. *Australopithecus robustus*
    - 1) Found in South Africa and dated to 2 mya
    - 2) Large premolars and molars, with a large face and sagittal crest
    - 3) Similar to East African forms
    - 4) Brain size of 530 cc
  - iv. Evolution of earliest hominids resulted in a diverse group of species.
  - v. Change in facial structure reflected dietary specialization.
  - vi. No large change found in brain size.
  - vii. *A. garhi* may have been ancestor of *H.habillis*.

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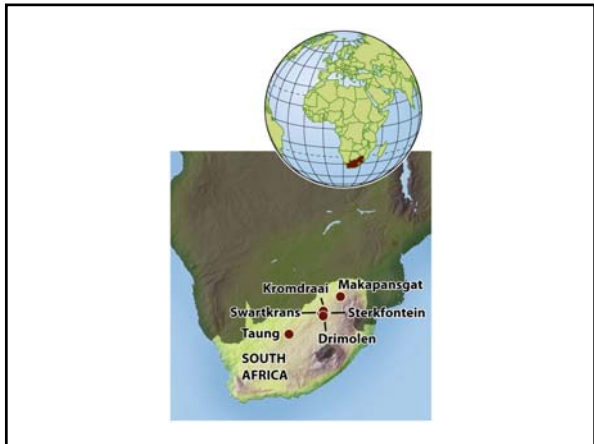
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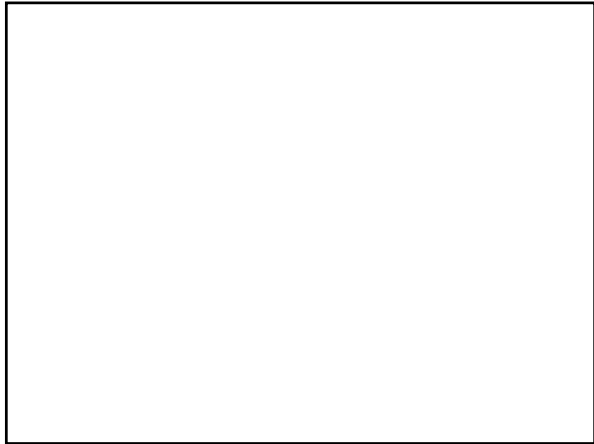
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This concludes the Norton Media Library  
Slide Set for Chapter 9

**Our Origins**  
**Discovering Physical Anthropology**

by  
Clark Spencer Larsen

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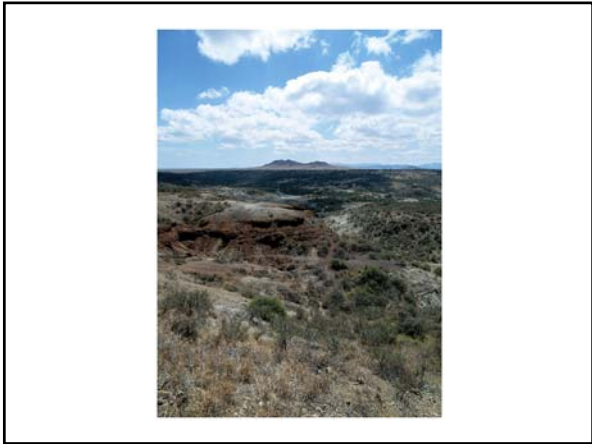
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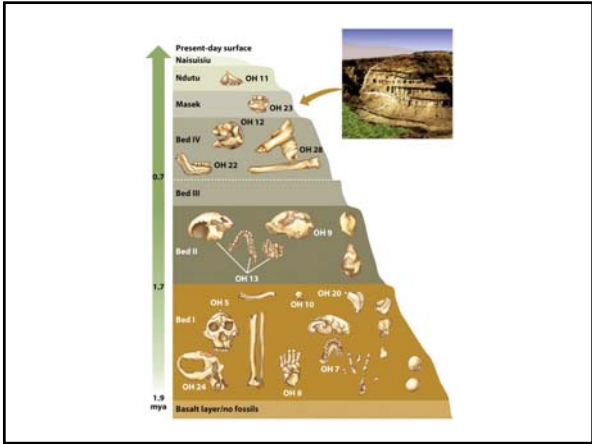
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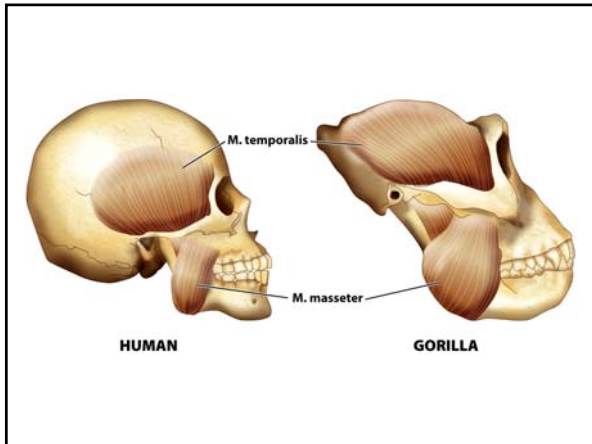
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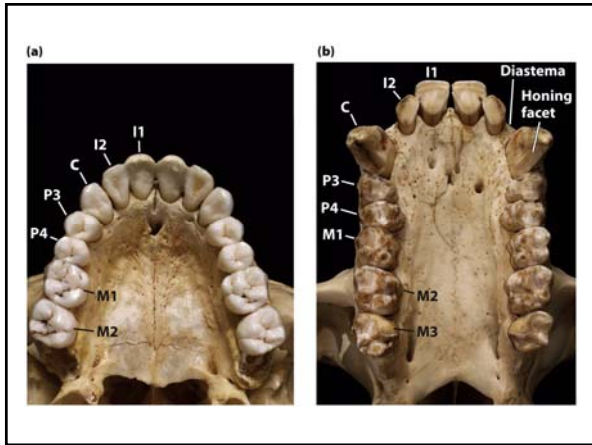
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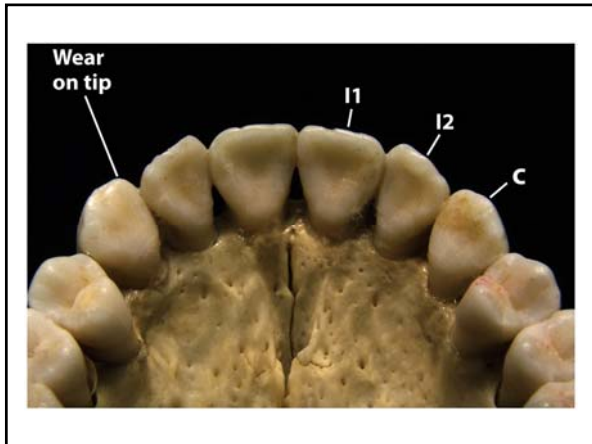
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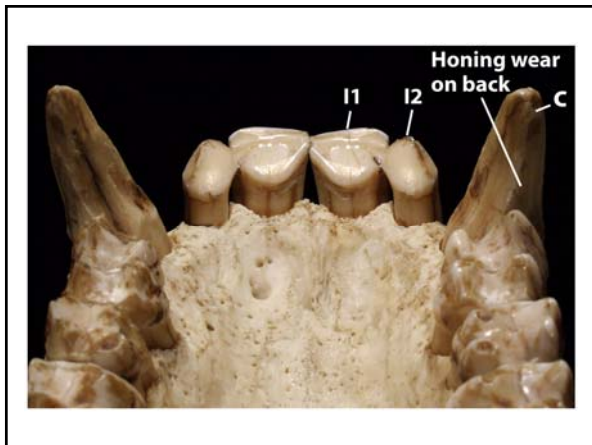
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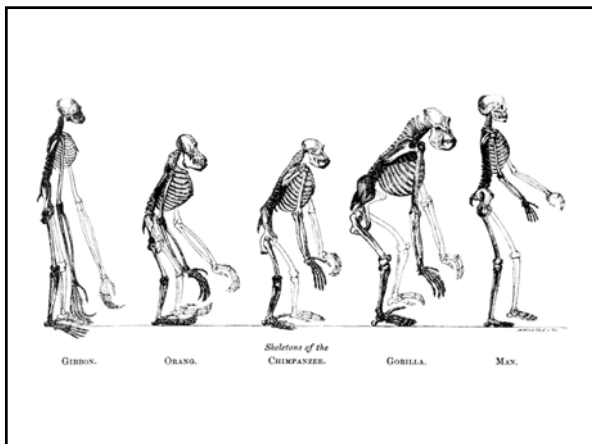
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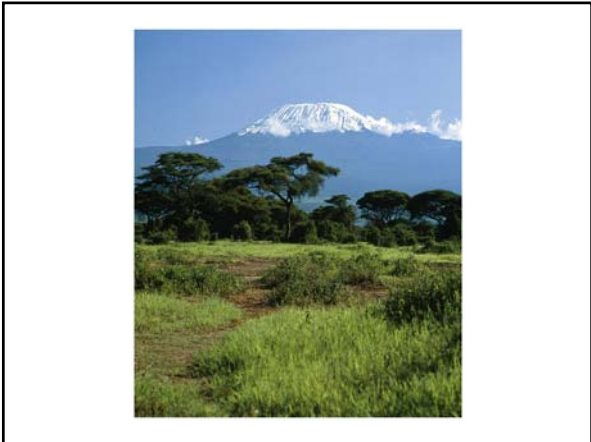


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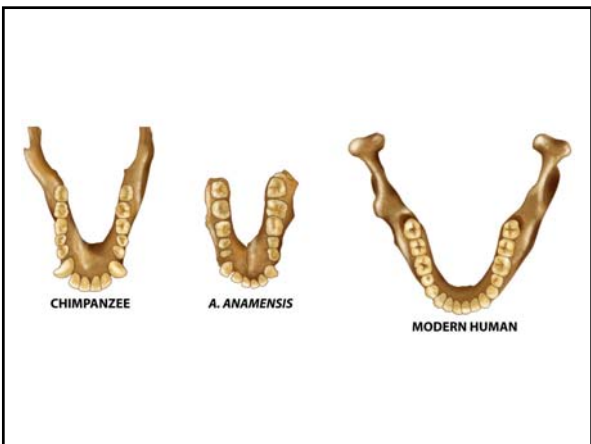
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