

Lecture 9: Key Terms and Concepts

Vocabulary:

prime movers	hypotheses
multiple factor/systems approaches	theories
teleology	models
	scenarios

Notes: Hominin/human origins: hypotheses and speculation

prime movers versus more integrated approaches in explaining origins of humans/hominids

the fallacy of teleology - A doctrine explaining phenomena by final causes or outcomes.

The two major developments in human evolution

-) transition to bipedal locomotion
-) elaboration of brain/culture system

Generally acknowledged functions of bipedalism

-) seeing over tall grass - greater ability to avoid predators
-) carrying weapons
-) tool use, free hands
-) long distance stride and energy efficiency
-) carrying young (delayed maturation - longer learning time)
-) provisioning - carrying food
-) thermo-regulation potential

Conditions for the original adoption of bipedalism - continued debate

arboreal bipedalism
forest and woodland floor adaptation
savanna, light woodland adaptation

Hypotheses - old and new

-) **Tool use and hunting hypothesis** - Darwin is an early proponent - male focus, esp. hunting
principal elements: bipedalism, tool using in hunting/defense, small canines, intelligence, manual skills, tool making, tool using - sociability
-) **Tool use and gathering hypothesis** - Nancy Tanner - *On Becoming Human* a response to perceived male chauvinistic bias of previous model

argues for primacy of gathering - based on chimp models - female chimps more frequent tool users

long range gathering and foraging strategy in which adults carried babies, tools and food over a wide range, eventually becoming upright bipeds.

female food gathering/tool use heightened sociability and increased communication was advantageous, leading to brain/culture elaboration.

-) **Aquatic ape hypothesis** - Elaine Morgan - 1972 - *The Descent of Woman*
 - a feminist viewpoint (developed ideas first suggest by a marine biologist, Alister Hardy in 1960) argues apes became aquatic in the late Miocene and the Pliocene as the African environment dried out, animals took to water for shelter and resources. - Then returned to land in the past couple of million years.

a recent variant (2002) of the underlying aquatic nature of early hominin evolution is that of M. Verhaegen who suggests that bipedalism is an adaptation for wetland wading and climbing as early hominins foraged for plants in shallow water and along stream channels

Dietary and foraging posture related models

-) **Small object feeding** - C. Jolly (1970) "Seed eaters"
 - based on baboon model - *Theropithecus gelada*
 - developed as a feeding posture to eating small objects which are evenly distributed within patches, in low trees and bushes. A refinement of these views can be found in
 - Mark F. Teaford and Peter S. Ungar
 - 2000 Diet and the evolution of the earliest human ancestors.
 - Proceeding of the National Academy of Sciences USA 97 (25) 13506-11.*

Abstract: Over the past decade, discussions of the evolution of the earliest human ancestors have focused on the locomotion of the australopithecines. Recent discoveries in a broad range of disciplines have raised important questions about the influence of ecological factors in early human evolution. Here we trace the cranial and dental traits of the early australopithecines through time, to show that between 4.4 million and 2.3 million years ago, the dietary capabilities of the earliest hominids changed dramatically, leaving them well suited for life in a variety of habitats and able to cope with significant changes in resource availability associated with long-term and short-term climatic fluctuations.

-) **Foraging postures** - Recently Jonathan Kingdon (2003) in *Lowly Origin* suggests that bipedalism arises as a condition from preadaptations evolved among Miocene "squat feeding ground apes". Features such as stable flexed leg, broad pelvis, flexible waist, vertical spine, good head balance and mobile shoulders evolve before bipedalism.
-) **Habitat Variability/Instability** - R. Potts (1996)
 - bipedalism as an adaptation to instability of habitats in periods of marked environmental change.
 - Bipedalism combined with retained arboreal abilities provides earliest hominids a wide and flexible ecological niche.

Energy efficiency models - based on the assumption that bipedal locomotion is evolving in an open hot tropical savanna among diurnal gathering and ?scavenging/hunting? hominoids.

-) **Energy efficiency of bipedal locomotion model**
special advantage of bipedalism - greatest energy efficiency - walking at a slow pace.

-) **Thermo-regulation model** - P. Wheeler (1991)
bipedalism reduces skin exposure to sun and heating in midday.

Models involving reproductive and social behaviors relating to food acquisition

-) **Provisioning/supplemental feeding model** - Lovejoy

-) **Dual reciprocity subsistence model** - “food sharing” - Isaac

Models involving behaviors relating to social cooperation within and between groups

-) **Coalitional enforcement hypothesis** - Bingham
the possibility of “remote killing” promotes social cooperation