

ANTHROPOLOGY: "The study of humans around the world and through time" (Kottak Glossary)

THE FOUR FIELD APPROACH

General Terms:

Anthropology: The study of the human species and its immediate ancestors.

History: encompassing past, present, and future; biology, society, language, and culture. It is a comparative field that examines all societies, ancient and modern, locally and globally.

Society: Organized life in groups shared with humans by monkeys, apes, and ants, among other animals.

Culture: The learned behavior that is passed on through teaching.

Evolution: Change by which organisms evolve with environmental pressures.

Ecology: The study of the relationship between organisms and their environment.

Biological Anthropology: The study of human evolution and the biological basis of human behavior.

Social Anthropology: The study of human culture, society, and social organization.

Archaeology: The study of human history and prehistory through the excavation of material remains.

Discipline Specific Terms:

Biological Anthropology: The study of human evolution, cross-cultural study of human biology, and the relationship between biology and culture.

Physical Anthropology: The study of human evolution and the biological basis of human behavior.

Cultural Anthropology: The study of human culture, society, and social organization.

Linguistic Anthropology: The study of language and its relationship to culture and society.

Archaeology: The study of human history and prehistory through the excavation of material remains.

Historical Anthropology: The study of human history and prehistory through the excavation of material remains.

Biocultural Anthropology: The study of human evolution and the biological basis of human behavior.

Medical Anthropology: The study of the relationship between biology and culture.

Environmental Anthropology: The study of the relationship between humans and their environment.

Applied Anthropology: The study of the relationship between humans and their environment.

Chapter 1: What is Anthropology?

General Terms:

Anthropology: The study of the human species and its immediate ancestors.

Holistic: encompassing past, present, and future; biology, society, language, and culture. It is a comparative field that examines all societies, ancient and modern, simple and complex, local and global.

Society: Organized life in groups; shared with humans by monkeys, apes, wolves, mole rats, and ants, among other animals.

Culture: traditions and customs transmitted through learning.

Adaptation: the process by which organisms cope with environmental forces and stresses (biological and cultural).

Food production: an economy based on plant cultivation and/or animal domestication (food production replaced foraging as the sole basis for human subsistence—this reflects adaptation).

General anthropology: anthropology as a whole: cultural, archaeological, biological, and linguistic. Anthropology is also inherently multi- and inter-disciplinary.

Discipline Specific Terms:

Cultural anthropology: the comparative, cross-cultural study of human society and culture.

Ethnography: fieldwork in a particular cultural setting.

Ethnology: the study of sociocultural differences and similarities (an examination of the results of ethnography—refer to diagram on p. 7).

Archaeology: the study of human behavior through material remains.

Ecology: the study of interrelations among living things in an environment.

Paleoecology: the study of the ecosystems of the past.

Excavation: involves digging through a succession of levels at a particular archaeological site.

Paleontologist: a scientist who studies fossils.

Paleoanthropologist: an anthropologist who studies the fossil record of human evolution.

Cultural resource management: deciding what needs saving when entire archaeological sites cannot be saved.

Biocultural: combining biological and cultural approaches to a given problem.

Physical/Biological anthropology: the study of human biological variation in time and space.

1. Human evolution as revealed by the fossil record.
2. Human genetics.
3. Human growth and development.
4. Human biological plasticity (considers impact of environmental stresses).
5. Primatology.

Linguistic Anthropology: the study of language and linguistic diversity in time, space, and society.

Sociolinguistics: investigates relationships between social and linguistic variation.

Applied anthropology: using anthropology to solve contemporary problems.

Methodology Terms

(See Charts on page 14 & 15—“Steps in the Scientific Method”):

Hypothesis: A suggested but as yet unverified explanation.

Science: field of study that seeks reliable explanations, with reference to the material and physical world.

Theory: a set of ideas formulated to explain something.

Association: an observed relationship between two or more variables.

Q3

Notes—Chapter 2—Anthropology—Culture

Culture is . . .

- Learned.
(enculturation=the process by which culture is learned and transmitted across generations.)
- Symbolic.
(symbol=something, verbal or nonverbal, that stands for something else.)

According to Leslie White, “dependent upon symboling . . . Culture consists of tools, implements, utensils, clothing, ornaments, customs, institutions, beliefs, rituals, games, works of art, language, etc.” (p. 20 of Kottak Text).

- Shared.
(pertains to groups)
- Informed by biology and nature.
(“Our culture—and cultural changes—affect the ways in which we perceive nature, human nature, and ‘the natural’”—p. 22.)
- All-encompassing.
(includes the day-to-day, the seemingly trivial, and the culturally significant.)
- Integrated.
(system of beliefs, customs, traditions, behaviors, etc. Core values=key, basic, or central values that integrate a culture.)
- Instrumental.
(to human survival—it sets us apart.)
- Adaptive.
(in other words, contributes to human survival.)
- Maladaptive.
(in other words, can be harmful to humanity.)
- Evolutionary in nature.
(primate “societies” have physical traits that resemble human traits, and primates have developed patterns in behavior that showcase their evolution, such as food washing or tool use; however, this is NOT fully developed human culture (i.e. marriage, kinship, cooperative societies, economies, language, and the list goes on).)
- Hominid: Member of hominid family; any fossil or living human, chimp, or gorilla.
- Hominin: Hominids excluding the African Apes; all the human species that have ever existed.

Culture can be . . .

- Universal.
(for instance, infant dependency, tool use, language, etc.)
- General
(widespread cultural patterns. For instance, family group vs. kinship system. Some cultures are patriarchal others are matriarchal.)
- Particular.
(a very specific cultural norm. For instance, a local food dish. Particular culture traits are becoming less and less common through globalization.)

Cultures has levels (refer to chart on bottom of p. 28), such as . . .

- International.
(Cultural traditions that extend beyond national boundaries.)
- National.
(Cultural features shared by citizens of the same nation.)
- Local.
- Subculture.
(Different cultural traditions associated with subgroups in the same complex society).

The crisis of cross-cultural understanding:

- Ethnocentrism=judging other cultures using one's own cultural standards.
- Cultural rights=rights vested in religious and ethnic minorities and indigenous societies.
- Cultural relativism=idea that behavior should be evaluated not by outside standards but in the context of the culture in which it occurs.
- Human rights=rights based on justice and morality beyond and superior to particular countries, cultures, and religions.
- IPR=intellectual property rights; an indigenous group's collective knowledge and its applications.

How culture changes:

- Diffusion=borrowing of cultural traits between societies.
- Acculturation=an exchange of cultural features between groups in firsthand contact.
- Independent invention=the independent development of a cultural feature in different societies.

Culture and globalization:

- Globalization defined=the accelerating interdependence of nations in the world system today.
- Smith and Doyle's dual sense of globalization:
 - 1) Globalization as fact: the spread and connectedness of production, communication, and technologies across the world. As used in this book, this is the primary meaning of globalization.
 - 2) Globalization as contested ideology and policy: efforts by the International Monetary Fund (IMF), the World Bank, the World Trade Organization (WTO), and other international financial powers to create a global free market for goods and services.

Notes—Chapter 3—Anthropology—Applied Anthropology

The Role of the Applied Anthropologist:

- ② Malinowski called early applied anthropology, “practical anthropology.”
- ② Initially, in Great Britain, anthropologists were concerned with colonial spaces.
- ② Initially, in the United States, anthropologists were concerned with issues associated with Native Americans.
- ② Anthropologists were associated primarily with academic departments through the 1960s.
- ② The 1970s and 1980s were a transitional period—anthropologists started working with a greater degree of frequency with governmental and other agencies.
- ② TODAY: Applied Anthropology is seen as a “helping profession.”
- ② Applied Anthropology defined: Using anthropology to solve contemporary problems.

Development Anthropology:

- ② This is a field that examines the sociocultural dimensions of economic development.
- ② The major goal of development policy to create equity.
- ② Increased equity: reduction in absolute poverty, with a more even distribution of wealth.
- ② Strategies for innovation:
 - 1) Working collaboratively with local people.
 - 2) Cultural compatibility.
 - 3) Respond to local need.
 - 4) Involve men and women in planning.
 - 5) Harness traditional organizations.
- ② There is the possibility for overinnovation, or trying to achieve too much change at once.
- ② Another problem is underdifferentiation, or seeing less-developed countries as all the same, ignoring cultural diversity. The planning stages of these projects miss the strategy of collaboration.
- ② Many governments do not consider indigenous ways of life. This can be another hurdle for development projects. However, this is not to say that there are not exceptions to this rule (Kottak cites the example of Madagascar).

Anthropology and Education:

- ② This field studies students in the context of their families, peers, and in terms of enculturation in order to maximize learning.

- ② This field involves a lot of educational research. The finding from this research can be implemented in the learning environment.

Urban Anthropology:

- ② This field studies cities and urban life.
- ② In 2008, for the first time, the world's population living in cities surpassed 50%.
- ② City life, then, remains of central concern to urban anthropologists.
- ② Urban anthropologists are interested in combatting urban poverty and urban slums.
- ② There is also an environmental component to urban anthropology as well. How is city life maladaptive?
- ② Urban vs. rural: the culture, traditions, and social systems are inherently different in these two cultural settings.

Medical Anthropology:

- ② The comparative, biocultural study of disease (as well as illness), health problems, and health care systems.
- ② Medical anthropology has clear policy applications.
- ② In addition, medical anthropology is interested in reducing disease and illness.
- ② Kottak cites a lot of examples here:
 - 1) Early mortality in south America.
 - 2) Epidemic diseases.
 - 3) Obesity.
 - 4) Parasitic infections.
 - 5) HIV Infection and AIDS
- ② Health care systems: Beliefs, customs, and specialists concerned with preventing and curing illness.

Anthropology and Business:

- ② Anthropological perspective and research can be valuable to a corporation or business.

Public and Applied Anthropology:

- ② Efforts to extend anthropology's visibility beyond academia and to demonstrate its public policy relevance.
- ② This has been a movement or attitude in Anthropology that has been gaining traction since the 1990s.

Film on Forensic Anthropology

METHODS

- ✓ Multidisciplinary.
- ✓ Excavation and analysis of visible remains:
 - 1) Paleontology—study of ancient life through fossils.
 - 2) Palynology—study of ancient plants and their environs through pollen analysis.
 - 3) Bioarchaeology—study of human biological evolution.
 - 4) Paleoanthropology—Study of hominid, hominin, and human life through fossils.
 - 5) Anthropometry—measurement of human body parts and dimensions.
 - 6) Bone biology—the study of bone as biological tissue.
 - 7) Paleopathology—study of disease and injury in skeletons from archaeological sites.
- ✓ Study of microscopic evidence.
- ✓ Study of hand-held tools.
- ✓ Use of aerial remote sensing.
- ✓ Use of satellite images.
- ✓ New science of molecular anthropology (analysis of DNA sequences).
- ✓ Systematic survey must follow an excavation (focus is settlement patterns).
- ✓ Stratigraphy is the study of layers of deposits/rock/sediment.

KINDS OF ARCHAEOLOGY

- ✓ Experimental archaeology (replication of ancient techniques and processes).
- ✓ Historical archaeology.
- ✓ Colonial archaeology.
- ✓ Classical archaeology.
- ✓ Underwater archaeology.
- ✓ Contract archaeology.

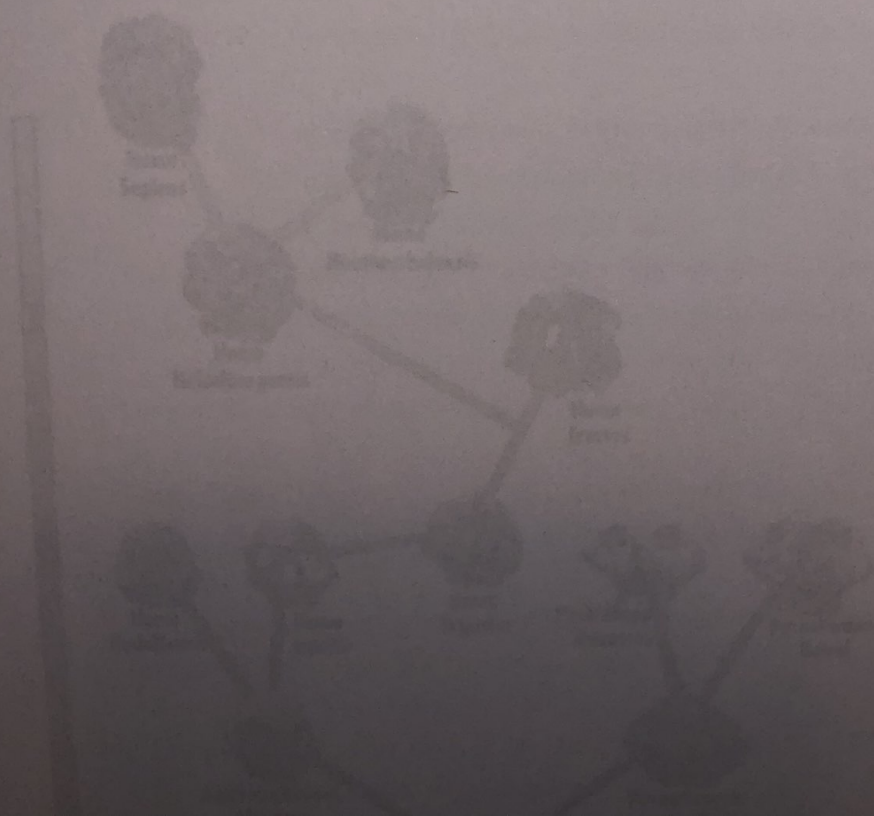
DATING THE PAST (NOTE: fossilization is rare)

- ✓ Taphonomy—the study of processes affecting remains of dead animals.
- ✓ Relative dating—establishing a time frame based on strata of sediments or other materials.
 - 1) This is known as stratigraphy—examination of the way in which earth sediments accumulate in strata.
- ✓ Absolute dating—establishing dates in numbers or ranges of numbers.
 - 1) Carbon 14—used to date organic remains via radiometric decay of carbon-14.
 - 2) Potassium-argon—used to date inorganic substances, like rocks and minerals. This dating technique measures the decay of potassium—argon.
 - 3) Uranium series dating—tracks the decay of radioactive uranium.
 - 4) Thermoluminescence and Electron spin resonance—both TL and ESR measure electrons that are constantly being trapped in rocks and minerals.
- ✓ Dendochronology—tree-ring dating.
- ✓ Molecular dating—uses genetic analysis of DNA sequences to estimate evolutionary relationships.
- ✓ Specimens and artifacts can be crossdated using various techniques above.

ETHICS

- ✓ International element to anthropology—requires cooperation.
- ✓ International teams.
- ✓ Informed consent is essential—from all participants and local communities impacted by excavation.
- ✓ AAA code of ethics:

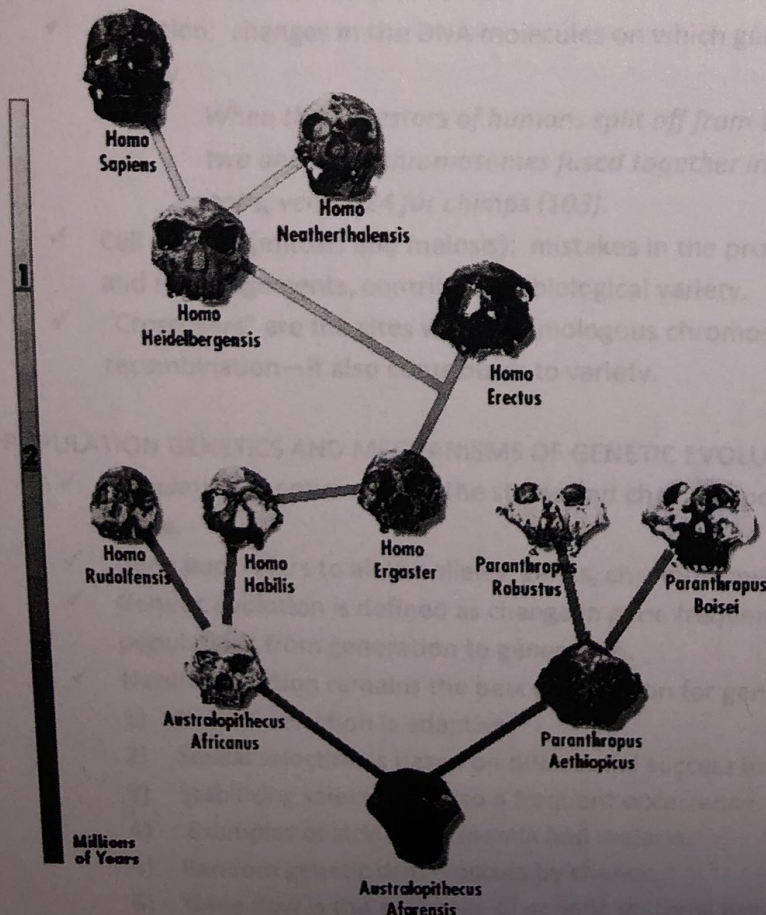
- 1) Include host country's colleagues in research planning and requests for \$.
 - 2) Establish truly collaborative relationships with those colleagues and their institutions.
 - 3) Include host country colleagues in dissemination and publication of research.
 - 4) Ensure that something is "given back" to host country.
- ✓ Intellectual property rights: who gets to keep artifacts?
- ✓ Creationism was still the accepted understanding of human origins.
 - ✓ Carlus Linnaeus (first theory of taxonomy, which grouped life forms on the basis of similarities and differences.)
 - ✓ Fossil discoveries during the 18th and 19th century call creationism into question.
 - ✓ Catastrophism (theory that various catastrophes destroyed ancient species).
 - ✓ The idea of evolution was originally known as transformism.
 - ✓ Erasmus Darwin hypothesized the common ancestry of all animal species (influenced Charles Darwin).
 - ✓ Charles Lyell's principle of uniformitarianism also influenced Charles Darwin. This theory indicates the present is the key to the past and all life forms are related to one another.
 - ✓ Charles Darwin is the father of the concept of natural selection. This was the theory he wrote in his famous book, *The Origin of Species*.
 - ✓ Natural selection is the process by which the forms most fit to survive and reproduce in a given environment do so in greater numbers than others in the same population.
 - 1) Example of the Giraffe's neck.
 - 2) Example of peppered moths.
 - ✓ For natural selection to work there must be variety within that population to allow for differential reproductive success.



NOTES: CHAPTER 5

EVOLUTION

- ✓ 18th century interest in biological diversity.
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GENETICS

- ✓ Charles Darwin realized that for natural selection to operate there must be variety in the population undergoing selection.
- ✓ Genetics is the science that emerged after Darwin and helps us understand the causes of biological variation.
- ✓ Gregor Mendel:
 - 1) Studied pea plants.
 - 2) Mendel exploded the "paint-pot" theory of the blending of traits in offspring.
 - 3) Heredity is discovered to be made up of discrete units.
 - 4) DNA molecules make up genes and chromosomes, which are the basic hereditary units.
 - 5) DNA provides much of the variety on which natural selection operates.
 - 6) Genetic units are called "genes" or "alleles."
 - 7) Genes can be dominant or recessive.
 - 8) Mixed offspring are known as "heterozygous."
 - 9) Offspring with identical alleles are called "homozygous."
 - 10) Genotype is hereditary makeup.
 - 11) Phenotype is expressed physical characteristics.
 - 12) Law of independent assortment: traits are inherited independently of one another.
 - 13) Recombination is important in biological evolution because it creates new types on which natural selection can operate.

BIOCHEMICAL, OR MOLECULAR, GENETICS

- ✓ Mutation: changes in the DNA molecules on which genes and chromosomes are built. This contributes to variety.

When the ancestors of humans split off from those of chimpanzees around six million years ago, two ancestral chromosomes fused together in the human line. Humans have 23 chromosome pairs, versus 24 for chimps (103).
- ✓ Cell division (mitosis and meiosis): mistakes in the process of cell division, including chromosomal breaks and rearrangements, contribute to biological variety.
- ✓ "Crossovers" are the sites where homologous chromosomes have exchanged segments by breakage and recombination—it also contributes to variety.

POPULATION GENETICS AND MECHANISMS OF GENETIC EVOLUTION

- ✓ Population genetics studies the stable and changing populations in which most breeding normally takes place.
- ✓ Gene pool refers to all the alleles, genes, chromosomes, and genotypes within a breeding population.
- ✓ Genetic evolution is defined as change in gene frequency, that is, in frequency of alleles in breeding populations from generation to generation.
- ✓ Natural selection remains the best explanation for genetic evolution.
 - 1) Natural selection is adaptive.
 - 2) Sexual selection is based on differential success in mating.
 - 3) Stabilizing selection is also a frequent occurrence.
 - 4) Examples of sickle-cell anemia and malaria.
 - 5) Random genetic drift—occurs by chance.
 - 6) Gene flow is the exchange of genetic material between populations of the same species. Gene flow works in conjunction with natural selection by providing variety on which selection can work.

THE MODERN SYNTHESIS

- ✓ The combination of Darwin's and Mendel's theories.
- ✓ Microevolution (within species over a few generations) vs. macroevolution (refers to larger-scale or more significant genetic changes in a population or species).

Most biologists assume that species develop gradually as successive mutations accumulate in isolated populations, so that eventually the populations are too different to interbreed. But the time and number of generations required for microevolution to become macroevolution are highly variable (110).

- ✓ Punctuated equilibrium points to the fact that long periods of stasis (stability), during which species change little, may be interrupted (punctuated) by evolutionary leaps. One reason for such apparent jumps (which are revealed by the fossil record) may be extinction of one species followed by invasion by a closely related species.

INTELLIGENT DESIGN VERSUS EVOLUTIONARY THEORY

- ✓ Evolutionary theory is basic to understanding and appreciating human diversity.
- ✓ "Intelligent Design" is not a scientific theory.
- ✓ A judge decided that the Dover School District in Pennsylvania could no longer teach Intelligent Design because it was an endorsement of religion.
- ✓ The school district called out the gaps in evolutionary theory (these "gaps" merely showcase the large scale biological picture that evolutionary theory addresses).
- ✓ Evolution as a scientific theory is a central organizing principle, but evolution is supported by facts.
- ✓ Intelligent Design advocates claim that life forms are too complex to have been formed by natural processes and must have been created by a higher intelligence.
- ✓ Intelligent Design proponents do not name the "designer."

RACE: A DISCREDITED CONCEPT IN BIOLOGY

Historical approach to human biological diversity: racial classification.

- There is variance to human populations.
- But this variance is gradual.
- Race is a social construct, a way to categorize human differences that is not biologically accurate ("human populations have not been isolated enough from one another to develop into such discrete groups" p. 95).
- The distinction has to do with race (which gets at shared genetic material) vs. phenotype (which refers to an organism's evident traits).
- "Racial classifications based on phenotype raise the problem of deciding which trait(s) should be primary" (95).
- Racial labels do not actually accurately describe the historical construct pertaining to race.
- Many populations cannot be described by one of the three "great races."
- Many populations could be incorrectly categorized based on overly simplistic racial categories.
- "The analysis of human DNA indicates that fully 94 percent of human genetic variation occurs within so-called races" (96).
- "Although long-term genetic markers do exist, they don't correlate neatly with phenotype" (97).
- AAA (American Anthropological Association) Race Project: this enterprise examines the concept of race over the course of history, through the lens of science, and also keeps in mind lived experience.

Current approach to human biological diversity focuses on "specific differences" (94).

- "Traditional racial classification assumed that biological characteristics such as skin color were determined by heredity and that they were stable (immutable) over many generations" (97).
- Biological similarity is not entirely tied to recent common ancestry—there are multiple factors and multiple regions share similar traits.
- So, geography and natural selection are at play in terms of skin color differences/variation.
- Interesting examples of peoples living in the tropics, issue of vitamin D, sun exposure problems, etc.

Facial features:

- Natural selection also impacts facial features/traits.
- Interesting examples of tooth size and nose length.

Size and body build:

- "Average body size tends to increase in cold areas and to decrease in hot ones [. . .]" (101).
- Body shape differences showcase adaptation to regional climate through natural selection.
- "Slender bodies with long digits and limbs are advantageous in tropical climates" (101).

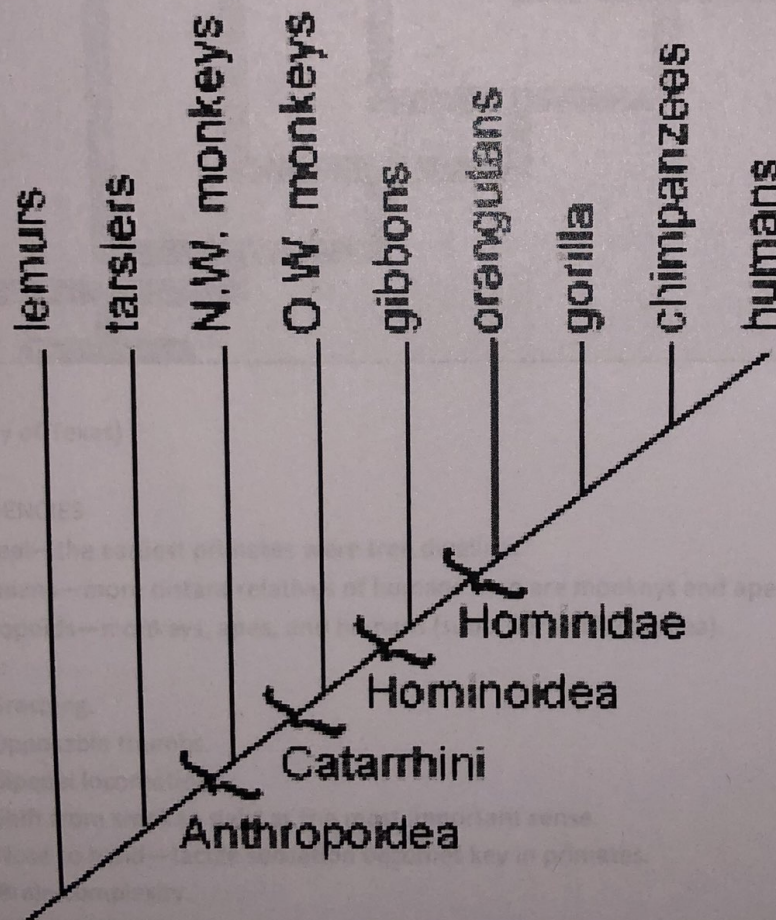
Genes and disease:

- "There are additional examples of human biological diversity that reflect adaptation to environmental stresses, including disease, diet, and climate" (101).
- Examples: malaria, smallpox, HIV/AIDS, lactose intolerance.

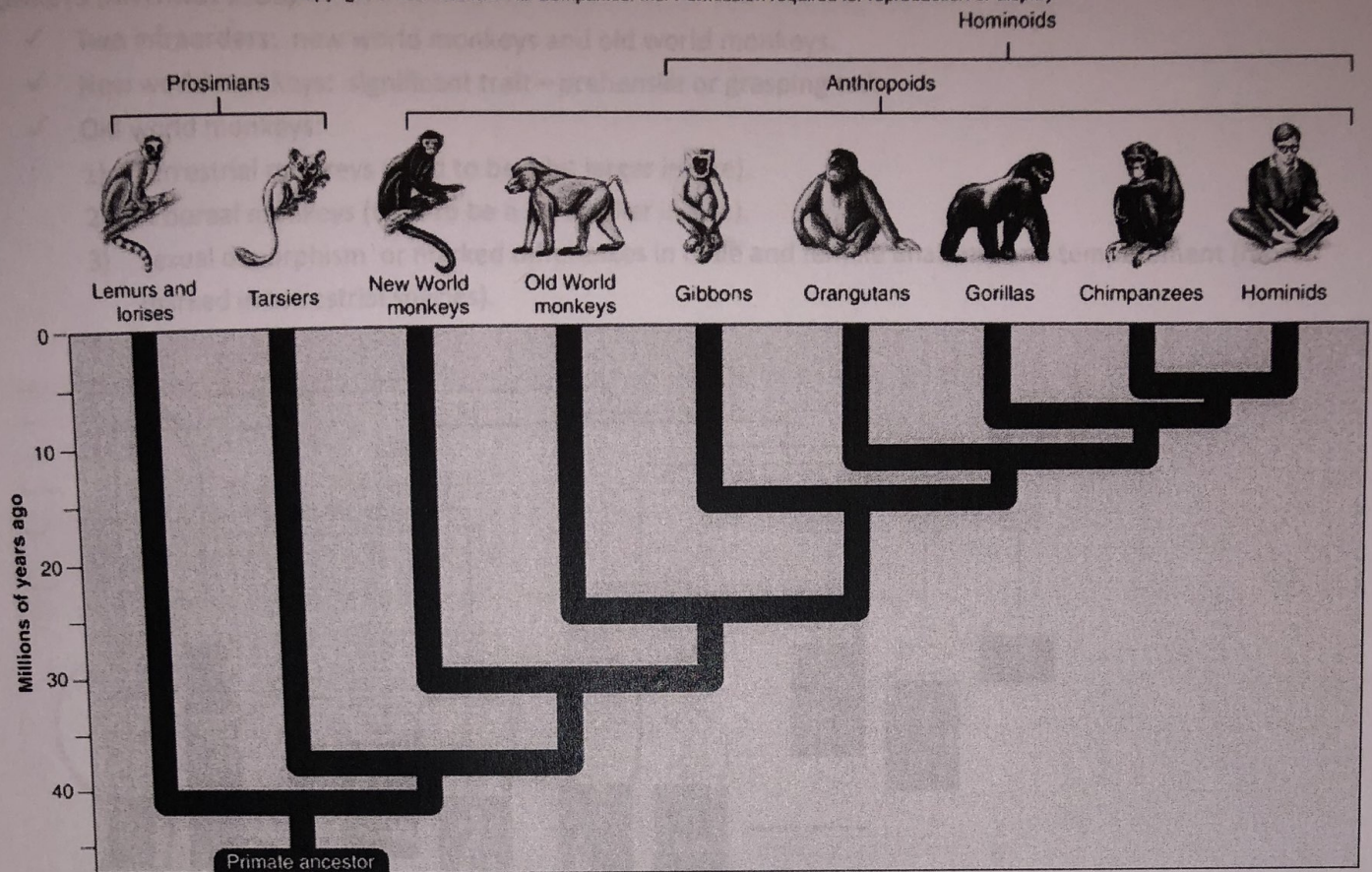
OUR PLACE AMONG PRIMATES

- ✓ Primatology—the study of apes, monkeys, and prosimians.
- ✓ Taxonomy—classification scheme (refer to table on page 110).
- ✓ Homologies—traits inherited from a common ancestor.
- ✓ Analogies—adaptive traits due to convergent evolution.
- ✓ Convergent evolution—similar selective forces produce similar adaptive traits.

Figure 1: Phylogenetic tree of primates



(from University of Montana)



(from University of Texas)

PRIMATE TENDENCIES

- ✓ Arboreal—the earliest primates were tree dwellers.
- ✓ Prosimians—more distant relatives of humans than are monkeys and apes.
- ✓ Anthropoids—monkeys, apes, and humans (suborder anthropoidea).
- ✓ Traits:
 - 1) Grasping.
 - 2) Opposable thumbs.
 - 3) Bipedal locomotion.
 - 4) Shift from smell to sight as the most important sense.
 - 5) Nose to hand—tactile sensation becomes key in primates.
 - 6) Brain complexity.
 - 7) Parental investment.

PROSIMIANS

- ✓ Prosimians are the earlier primates, appearing approx. 65 million years ago (anthropoids appear approx. 40 million years ago).
- ✓ Often nocturnal.
- ✓ Often arboreal.
- ✓ Examples: lemurs, tarsiers, and lorises.

MONKEYS (ANTHROPOIDS)

- ✓ Two infraorders: new world monkeys and old world monkeys.
- ✓ New world monkeys: significant trait—prehensile or grasping tails.
- ✓ Old world monkeys:
 - 1) Terrestrial monkeys (tend to be a bit larger in size).
 - 2) Arboreal monkeys (tend to be a bit smaller in size).
 - 3) Sexual dimorphism or marked differences in male and female anatomy and temperament (more marked in terrestrial species).

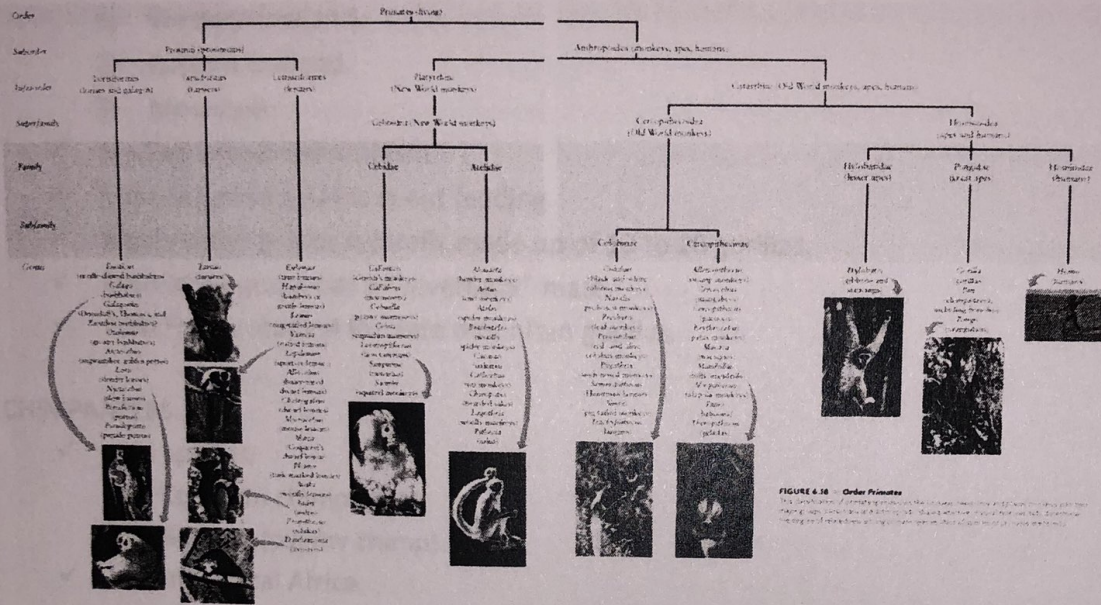


FIGURE 4.16 • Order Primates
This distribution of primates across the various regions of Africa illustrates the major groups found in the continent. Shading indicates physical features that distinguish the groups: red indicates all living primates, black indicates all living hominoids, and yellow indicates all living hominids.

APES

- ✓ Great apes (hominoids):
 - 1) Orangutans.
 - 2) Gorillas.
 - 3) Chimpanzees
 - 4) (Humans).
- ✓ Lesser apes:
 - 1) Gibbons.
 - 2) Siamangs.
- ✓ Body size tends to be larger than other primates.
- ✓ Apes live in forests or wetlands
- ✓ Brachiation and knuckle-walking are frequent modes of locomotion.
- ✓ Humans and apes together comprise the hominoid family.

GIBBONS

- ✓ Smallest of the apes.
- ✓ Very agile.
- ✓ Arboreal specialists.
- ✓ Diet consists of fruit, with occasional insects and small animals.
- ✓ Live in primary groups of permanently bonded males and females.

ORGANGUTANS

- ✓ Highly endangered.
- ✓ Sexual dimorphism is marked.
- ✓ Arboreal.
- ✓ Difficult to study.
- ✓ Dr. Birute Galdikas has worked extensively with orangutans.

GORILLAS

- ✓ Three subspecies of gorillas:
 - 1) Western lowland.
 - 2) Eastern lowland.
 - 3) Mountain.
- ✓ Marked sexual dimorphism
- ✓ Most of gorilla's day is spent feeding.
- ✓ Stable social groups typically made up of 10 to 20 gorillas.
- ✓ Each social group has a "silverback" male.
- ✓ Dian Fossey studied the rare mountain gorillas.

CHIMPANZEES

- ✓ Two species:
 - 1) Common chimpanzee.
 - 2) Bonobo (pygmy chimp).
- ✓ Live in tropical Africa.
- ✓ Omnivorous.
- ✓ Less sexual dimorphism.
- ✓ Jane Goodall to this day advocates for and studies chimpanzees.
- ✓ She has studied the complex social structure of the chimps in Gombe.

BONOBOS

- ✓ They are only found in the Democratic Republic of Congo.
- ✓ Female bonobos seem to "rule."
- ✓ Communities are female-centered, peace-loving, and egalitarian.
- ✓ Sex used to resolve conflict.
- ✓ They are ancestral chimps.

BEHAVIORAL ECOLOGY AND FITNESS

- ✓ Behavioral ecology: study of the evolutionary basis of social behavior.
- ✓ Differential reproduction—members of same species compete to maximize reproductive fitness.
- ✓ Individual fitness—measured by the number of direct descendants an individual has.
- ✓ Inclusive fitness—reproductive success measured by the genes one shares with relatives.

PRIMATE EVOLUTION

- ✓ The fossil record offers evidence for no more than 5 percent of extinct types of primates—WOW!
- ✓ Anthropologists are concerned with the Cenozoic period (began 65 m.y.a. and lasted until 10,000 years B.P.).
- ✓ After worldwide extinction at the beginning of the Cenozoic period, mammals replaced reptiles as the dominant large land animals.
- ✓ Early primates appeared during the Cenozoic period.
- ✓ Arboreal theory: primates became primates by adapting to arboreal life.
- ✓ Primate fossils found throughout the Cenozoic period (on a global scale).
- ✓ Primate fossils reveal that the first primates evolved in Asia.
- ✓ Primates were in Africa by 38 m.y.a.
- ✓ For primate evolution, see the chart above.
 - 1) Anthropoids became the most numerous primates at around 34-23 m.y.a.)
 - 2) Hominoid fossils became abundant between 23-5 m.y.a.)
 - 3) The Miocene apes were flourishing after 16 m.y.a.)
 - 4) The last common ancestor of humans, chimpanzees, gorillas, and orangutans? *Pierolapithecus catalaunicus*—this primate lived approximately 13 million years ago.

WHO WERE THE EARLIEST HOMINIDS?

- ✓ See the chart on page 131 for detailed chronology.
- ✓ *Sahelanthropus tchadensis*:
 - 1) 6-7 million years old.
 - 2) Discovered in Chad in 2001.
 - 3) "Time frame" when humans and chimps would have been diverging from a common ancestor.
 - 4) Fossil is also known as "Toumai," which means "hope of life."
 - 5) Blends ape-like and human characteristics.
 - 6) Chimp-like brain.
 - 7) Most likely bipedal.
- ✓ *Orrorin tugenensis*:
 - 1) Discovered in Kenya in 2001.
 - 2) The discovery included 13 fossils from 5 individuals.
 - 3) These fossils were dated at approximately 6 million years ago.
 - 4) *Orrorin* was bipedal.
 - 5) Skull features place *Orrorin* in the hominid line.
- ✓ *Ardipithecus kadabba* and *Ardipithecus ramidus*:
 - 1) *Kadabba* dates back to 5.8 m.y.a.
 - 2) The *Kadabba* find consists of 11 specimens from 5 individuals.
 - 3) *Ramides* dates back to 4.4 m.y.a.
 - 4) The *Ramides* remains consisted of fossils from 17 individuals.
 - 5) *Ardipithecus* are ape-like in size, anatomy, and habitat.
 - 6) *Ardipithecus* (aka "Ardi") represents early (dated to 3.2 m.y.a.) on the largely agreed upon "human lineage" (2002).
 - 7) The "Ardi" is considered to be a "cushy ape" which may have been both arboreal and bipedal.
 - 8) *Ardipithecus* is the earliest hominid found for which both arboreal and bipedal locomotion is documented.
 - 9) *Ardipithecus* was the size of a modern-day chimpanzee.
 - 10) The "Ardi" fossils, and what they tell us about early hominids, are discussed in the video.

NOTES: CHAPTER 8: EARLY HOMININS

WHAT MAKES US HUMAN?

- ✓ **Bipedalism**—Ardipithecus, the earliest widely accepted hominin genus (5.8-4.4 m.y.a.) has a “transitional pelvis,” which allowed for walking and arboreal movement.
- ✓ Advantages of bipedalism—ability to see over long grass, to carry items back to “home base,” and to reduce the body’s exposure to solar radiation.
- ✓ **Larger brain** (although there were evolutionary challenges as hominins brains increased over time).
- ✓ **Tools**—more frequent tool use.
- ✓ Hominin tool manufacture begins around 2.6 m.y.a.
- ✓ **Teeth**—early hominins had larger back teeth to chew through tough vegetation (this adaptation has been lost in modern humans).

CHRONOLOGY OF HOMININ EVOLUTION

- ✓ Hominins are a late arrival in terms of the history of the Earth (refer to the helpful analogy on the bottom of page 130).

WHO WERE THE EARLIEST HOMININS?

- ✓ See the chart on page 131 for detailed chronology.
- ✓ *Sahelanthropus tchadensis*:
 - 1) 6-7 million years old.
 - 2) Discovered in Chad in 2001.
 - 3) Time frame when humans and chimps would have been diverging from a common ancestor.
 - 4) Fossil is also known as “Toumai,” which means “hope of life.”
 - 5) Blends ape-like and human characteristics.
 - 6) Chimp-like brain.
 - 7) Most likely bipedal.
- ✓ *Orrorin Tugenensis*:
 - 1) Discovered in Kenya in 2001.
 - 2) The discovery included 13 fossils from 5 individuals.
 - 3) These fossils were dated at approximately 6 million years ago.
 - 4) *Orrorin* was bipedal.
 - 5) Skull features place *Orrorin* in the hominin line.
- ✓ *Ardipithecus Kadabba* and *Ramidus*
 - 1) *Kadabba* dates back to 5.8 m.y.a.
 - 2) The *Kadabba* find consists of 11 specimens from 5 individuals.
 - 3) *Ramidus* dates back to 4.4 m.y.a.
 - 4) The *Ramidus* remains consisted of fossils from 17 individuals.
 - 5) *Ardipithecus* are apelike in size, anatomy, and habitat.
 - 6) *Ramidus* (aka “ardi”) replaces Lucy (dated to 3.2 m.y.a.) as the largely agreed upon “earliest hominin skeleton” (168).
 - 7) “Ardi” is considered to be a female that would have been four feet tall and 120 pounds (twice as heavy as Lucy).
 - 8) “Ardi” is a transitional skeleton suited for arboreal climbing and bipedal locomotion.
 - 9) Her brain was the size of a chimp’s brain.
 - 10) Her hands, arms, and legs resemble extinct ape appendages.

✓ *Kenyanthropus*:

- 1) Discovered by Maeve Leakey in Kenya in 1999.
- 2) Fossil is a nearly complete skull and partial jawbone.
- 3) The fossil dates back to 3.5 m.y.a.
- 4) This skull represents the "flat-faced 'man' of Kenya" (169).
- 5) This may be an entirely new branch of the early human family tree—in other words another hominin line.
- 6) *Kenyanthropus* would have lived in the same era as Lucy.
- 7) There seems to be much debate about how *Kenyanthropus* relates to *A. Afarensis*.

THE VARIED AUSTRALOPITHECINES

- ✓ There is an abundant fossil record of the australopithecines.
- ✓ These fossils were once considered to be a part of a distinct taxonomic subfamily.
- ✓ Each of the australopithecines is now considered to be distinct.
- ✓ The six species are as follows (dating is based primarily on stratigraphy):
 - 1) *A. Anamensis* (4.2-3.9 m.y.a.)
 - 2) *A. Afarensis* (3.8-3.0 m.y.a.)—gracile
 - 3) *A. Africanus* (3.0?-2.0? m.y.a.)—gracile
 - 4) *A. Garhi* (2.5 m.y.a.)
 - 5) *A. Robustus* (2.0?-1.0? m.y.a.)—robust
 - 6) *A. Boisei* (2.6?-1.2 m.y.a.)—robust
 - 7) *A. Sediba* (1.98-1.78 m.y.a.)—a new and interesting find from 2008-2010. May have evolved into the earliest *Homo* genus.
- ✓ Refer to table on page 135 for a family tree of the Australopithecines.
- ✓ Refer to illustration that compares dentition in apes, *A. Afarensis*, and humans on page 136.
- ✓ Refer to table on page 137 that compares weight and brain size between humans, chimps, and the Australopithecines.
- ✓ Refer to the photo on page 141 for a distinction between robust and gracile Australopithecines.

THE AUSTRALOPITHECINES AND EARLY HOMO

- ✓ Somewhere between 3 and 2 m.y.a, the ancestors of *Homo* became reproductively isolated from the later Australopithecus.
- ✓ *Homo Erectus* emerges by 1.9 m.y.a.
- ✓ *Homo* had a larger brain and a re-proportioned skull.
- ✓ The split between Australopithecines and the *Homo* line remains somewhat unclear, and is not entirely pinned down.

OLDOWAN TOOLS

- ✓ The oldest tools from Oldovai Gorge in Tanzania are 1.9 million years old.
- ✓ Similar tools have been found in Ethiopia, Congo, and Malawi.
- ✓ Flakes (used as cutting tools) and choppers (used for food processing) are the two types of Oldowan stone tools.
- ✓ Pieces of bone and horn have also been found.
- ✓ *Homo Habilis* or *A. Garhi* may be the first tool users.

NOTES: CHAPTER 9: ARCHAIC HOMO

EARLY HOMO

- ✓ Chronology (helpful chart on page 156):
 - 1) *Homo Rudolfensis* (2.4?-1.4? m.y.a.)
 - 2) *Homo Habilis* (2.4?-1.4? m.y.a.—some conflict regarding relationship to *Homo Rudolfensis*).
 - 3) *Homo Erectus* (1.9?-0.3 m.y.a.—some conflict regarding relationship to *Homo Habilis*).
 - 4) *Homo Sapiens* (0.3 m.y.a.-present)
 - *Archaic Homo Sapiens* (300,000-28,000).
 - *Neandertals* (130,000-28,000).
 - 5) Anatomically modern humans (150,000-present).
- ✓ The *Homo* line has larger brain size.

OUT OF AFRICA I: *H. ERECTUS*

- ✓ *Homo Erectus* was the first hunter (based on archaeological evidence: better tools, changes in the jaw and teeth structure, and thicker bones for protection while hunting).
- ✓ The first Paleolithic tools emerge at this time (flaking, chopping, as well as hand axes, cleavers, and picks)
- ✓ *Homo Erectus* was also a gatherer—they foraged “new tracts of edible vegetation” (189).
- ✓ *H. Erectus*’s skeleton was conducive to long distance hunts (larger and longer legged).
- ✓ *H. Erectus* had a significantly larger cranial capacity.
- ✓ *H. Erectus* is much closer to *Homo Sapiens* than to *Australopithecines*.
- ✓ There is also evidence for cooperative hunting among the *H. Erectus*.
- ✓ Use of fire was part of the adaption to *Homo Erectus* (It remains unclear the extent or ability of *H. Erectus* to control and contain fire.).
- ✓ Fire opened the range of climates available for *H. Erectus* habitation.
- ✓ There may have been some rudimentary developments in speech with *Homo Erectus*.
- ✓ Refer to map on page 193 for wide distribution of *H. Erectus* fossils.
- ✓ The *H. Erectus* diaspora was most likely the result of the search for meat.

ARCHAIC HOMO SAPIENS

- ✓ *Archaic Homo Sapiens* lived in Africa for 100,000 years before starting the settlement of Europe—around 50,000 b.p.
- ✓ We know more about European *Homo Sapiens* because of the extent of the archaeological record that has been unearthed in Europe.
- ✓ Brain size of *Archaic Homo Sapiens* is comparable to modern humans.
- ✓ Ice ages and interglacial periods were weather trends that the *Archaic H. Sapiens* contended with.

LINKING ARCHAIC *H. SAPIENS* AND NEANDERTALS

- ✓ *H. Antecessor* and *H. Heidelbergensis*:
 - 1) The 780,000 year old *H. Antecessor* may be the common link between *homo Sapiens* and *Neandertals*.
 - 2) *H. Heidelbergensis*, which dates back to 500,000 b.p., may be a transitional fossil (between *H. Erectus* and later hominins).
 - 3) The archaeological record shows that the *Homo* line had moved across Europe—they had reached England’s coast 700,000 years ago.

THE NEANDERTALS

- ✓ The first *Neandertal* fossil was found in 1856 in Germany (REMEMBER: Darwin's *Origin of Species* would not be published until 1859).
- ✓ There was no framework for understanding human evolution.
- ✓ *Neandertals* wore clothes and used more complex tools.
- ✓ The *Neandertals* were stocky, with large trunks.
- ✓ The *Neandertal* face seems to be "pulled forward"—this is an evolutionary response to the ice age cold.
- ✓ Other characteristics: huge front teeth, broad faces, large brow ridges, rugged skeleton and musculature.
- ✓ *Neandertal* tools were sophisticated—they had 14 categories of tools used for different purposes (refer to the diagrams on pages 159 and 160).
- ✓ Tools were used for scraping animal hides, as well as for sawing, gouging, and piercing.

THE NEANDERTALS AND MODERN PEOPLE

- ✓ The current predominant view is that modern humans evolved in Africa and eventually colonized Europe, displacing *Neandertals* there.
- ✓ *Neandertals* have been stereotyped as brutish cave men and women—this is most likely inaccurate.
- ✓ Some still believe that *Neandertals* are the ancestors of modern humans, but the predominant view is that modern humans displaced *Neandertals*.

THE DENISOVANS

- ✓ In 2010 a hominin group, which would be a distant cousin to Neanderthals, was discovered.
- ✓ This group lived in Asia from 400,000 m.y.a to 50,000 m.y.a.
- ✓ Not a lot of fossils have been found. Thus far a finger fragment and wisdom tooth have been found.
- ✓ More fossils need to be found to pin down this fossil's location on the human family tree.

HOMO FLORESIENSIS (THE HOBBIT)

- ✓ These fossils were found in a cave on Flores, an Indonesian island.
- ✓ The stature of the hobbit was small (pygmy size due to island downsizing?).
- ✓ However, the fossils resembled *Homo Erectus*.
- ✓ And the fossils reveal the hobbit walked upright.
- ✓ *Homo Floresiensis* appears to have been wiped out by volcanic eruption.

HUMAN EVOLUTION STUDY CHART

PRE AUSTRALOPITHECINE FOSSILS (recent fossil discoveries)

- ❖ *Sahelanthropus tchadensis*: 6-7 million years ago.
- ❖ *Orrorin Tugenensis*: 6 m.y.a.
- ❖ *Ardipithecus Kadabba* and *Ramidus*: 5.8 m.y.a. and 4.4 m.y.a.
- ❖ *Kenyanthropus*: 3.5 m.y.a.

THE VARIED AUSTRALOPITHECINES

- ❖ *A. Anamensis* (4.2-3.9 m.y.a.)
- ❖ *A. Afarensis* (3.8-3.0 m.y.a.)—gracile
- ❖ *A. Africanus* (3.0?-2.0? m.y.a.)—gracile
- ❖ *A. Garhi* (2.5 m.y.a.)
- ❖ *A. Robustus* (2.0?-1.0? m.y.a.)—robust
- ❖ *A. Boisei* (2.6?-1.2 m.y.a.)—robust
- ❖ *A. Sediba* (1.98-1.78 m.y.a.)

THE AUSTRALOPITHECINES AND EARLY HOMO

- ✓ Somewhere between 3 and 2 m.y.a, the ancestors of Homo became reproductively isolated from the later Australopithecus.
- ✓ *Homo Erectus* emerges by 1.9 m.y.a
- ✓ Homo had a larger brain and a repositioned skull.
- ✓ The nature of the split between Australopithecines and the Homo line remains not entirely pinned down.

EARLY HOMO

- ❖ *Homo Rudolfensis* (2.4?-1.4? m.y.a.)
- ❖ *Homo Habilis* (2.4?-1.4? m.y.a.—some conflict regarding relationship to *Homo Rudolfensis*).
- ❖ *Homo Erectus* (1.9?-0.3 m.y.a.—some conflict regarding relationship to *Homo Habilis*).
- ❖ *Homo Sapiens* (0.3 m.y.a.-present)
 - ✚ Archaic *Homo Sapiens* (300,000-28,000).
 - ✚ Neandertals (130,000-28,000)—genetically specific from *Homo Sapiens*.
 - ✚ Denisovans (400,000-50,000)—distant genetic relative to Neandertals.
- ❖ Anatomically modern humans (150,000-present).