The Role of Hunting in Anthropogeny

Glossary

Acheulean (Mode 2) Tools: An archaeological industry of stone tools characterized by distinctive oval and pear-shaped bi-faced "hand-axes." Acheulean tools were produced during the Lower Palaeolithic era across Africa and much of West Asia, South Asia, and Europe, and are typically found with *Homo erectus* remains.

Aurignacian (Mode 4): An archaeological industry of stone tools characterized by worked bone and antler points with grooves cut in the bottom, as well as fine stone blades and bladelets struck from prepared cores rather than using crude flakes. It is associated with the earliest modern humans in Europe and their migration from the Near East.

Bonobo (*Pan paniscus*): One of the two species comprising the genus, *Pan,* having branched from chimpanzees ~1 million years ago. Sometimes referred to as "pygmy chimpanzee." Bonobos, compared to chimpanzees, are more gracile, have female social dominance, relatively long legs, pink lips, a dark face, a "tail-tuft" through adulthood, and parted long head hair . The species is omnivorous and inhabits primary and secondary forests, including seasonally inundated swamp forests. The bonobo is found in a 500,000 km^2 (190,000 sq mi) area of the Congo Basin, only south of the Congo River, in the Democratic Republic of the Congo. Due to political instability, little field work in their natural habitat has been performed. Most behavioral knowledge is a result of studies of captive bonobos.

C_3 Plants: Plants that only use the Calvin-Benson Cycle for fixing CO_2 from the air. Photosynthesis in these plants involves the reaction of CO_2 with C_5 RuBP (ribulose-1,5-biphosphate) to form two C_3 phosphoglyceric acid molecules (3PGA) in the Calvin Cycle, making hexose carbohydrates. C_3 plants originated during the Mesozoic and Paleozoic eras, predating C_4 plants. C_3 plants thrive in moderate sunlight and temperature environments. The $^{12}C/^{13}C$ isotope ratio of C_3 plants is unique and can be determined from mass spectrometry. C_3 plants have more ^{12}C compared to C_4 Plants, and have less ^{13}C in their tissue compared to what naturally occurs in the atmosphere. e.g. Herbaceous plants, cool season grasses, tree leaves, flowers, stems, and fruits.

C_4 Plants: Plants that use a supplementary method of CO_2 uptake to form a four-carbon sugar compound. Photosynthesis in these plants involves the reaction of CO_2 with C_3 phosphoenolpyruvate (PEP) to form C_4 oxaloacetatic acid (OAA), which is converted into malic acid. Malic acid is then broken down into CO_2 (which enters the Calvin Cycle to form sugars and starch) and pyruvic acid (3-carbon molecule), which is then converted back to PEP. C_4 plants are well adapted for habitats with high daytime temperatures and intense sunlight. The $^{12}C/^{13}C$ ratio of C_4 plants is distinct and can be determined from mass spectrometry. C_4 plants have less ^{12}C but more ^{13}C compared to C_3 Plants. The ^{13}C in C_4 tissue is still less than what naturally occurs in the atmosphere. e.g. Tropical grasses, including crabgrass, corn, sugarcane, sorghum.

$^{12}C/^{13}C$ Isotope Ratio: Due to their different photosynthetic pathways, C_3 and C_4 plants have different ratios of ^{12}C and ^{13}C isotopes in their tissues. This ratio difference allows researchers to derive diet information from the fossilized tissue of animals, including human ancestors. Isotope ratios indicative of C_3 plants suggest browsing from foliage while C_4 isotope ratios suggest grazing.

Please note: this information does not differentiate between a diet of eating C_3 and C_4 plants, eating the meat of an animal that consumed those plants, or a combination of the two.

Calvin-Benson Cycle: The set of chemical reactions that take place in chloroplasts of plants during photosynthesis. This light-independent process converts carbon atoms from the atmosphere into three-carbon sugars.

Carnivore: An organism that derives its energy and nutrient requirements from a diet consisting mainly or exclusively of animal tissue, whether through predation or scavenging.

Chimpanzee (*Pan troglodytes*): One of the two species comprising the genus, *Pan,* having branched from bonobos ~1 million years ago. Sometimes referred to as "common chimpanzees." Native to sub-Saharan Africa, chimpanzees are found in and around the Congo Basin (north of the Congo River) and throughout West Africa. Chimpanzees are divided into four subspecies, based on appearance and distribution. Compared to bonobos, chimpanzees are somewhat larger, more aggressive, and exhibit male social dominance.

Denisovans: An extinct hominin population contemporary with Neanderthals **that hybridized with ancient humans**. Knowledge of Denisovan morphology is limited to two small fossils found in Siberia.

Ecology: The interaction of an organism with their physical environment, along with other organisms.

Fatty Acid: A molecule composed of a long chain of lipid-carboxylic acid, which is either saturated (single bonds between the components of the fatty acid chain) or unsaturated (at least one double bond within the fatty acid chain).

Foraging: Searching for wild food or provisions as opposed to cultivating food crops.

Galago: A number of species of prosimians that are small, nocturnal, and native to continental Africa. Also known as bushbabies. Galagos often nest in tree hollows during the day. Chimpanzees have been observed hunting with "spears" for nested galagos, and they are also hunted by Hadza hunter-gatherers.

"Great Apes": A taxonomic family that was once incorrectly used to denote chimpanzees, bonobos, gorillas and orangutans, but not humans.

Hominid: A classification comprising all modern and extinct "Great Apes" and humans.

Hominin: A classification of species comprising humans and extinct relatives (ex. *Australopithecus*, *Paranthropus* and *Ardipithecus* - not all are ancestral to humans) following the split with the common ancestor with chimpanzees.

***Homo*:** The genus that comprises the species *Homo sapiens*, as well as several extinct species classified as ancestral to, or closely related to, humans.

***Homo erectus*:** An extinct hominin species with fossil evidence from 1.9 million (possibly earlier) to 70 thousand years ago and found from Africa to Indonesia. May have been the first hominin to leave Africa. *H. erectus* DNA may be retrievable from other species due to archaic admixture.

Hunter-Gatherer: A human living in a society in which most or all food is obtained by foraging (collecting wild plants and pursuing wild animals), in contrast to agricultural societies, which rely mainly on domesticated species.

Given the higher contribution from gathering, perhaps they should be called Gatherer-Hunters.

Isotope: Each of two or more forms of the same element that contain equal numbers of protons but different numbers of neutrons in their nuclei, and hence differ in relative atomic mass but not in chemical properties; in particular, a radioactive form of an element.

Isotopic Signature: The ratio of non-radiogenic "stable isotopes," stable radiogenic isotopes, or unstable radioactive isotopes of particular elements in an investigated material.

Macronutrient: A substance required in relatively large amounts by living organisms: Fats, proteins, carbohydrates in an animal diet or chemical elements such as potassium, magnesium, calcium as required by plants.

Marrow: The soft fatty substance in the cavities of bones that produces blood cells.

"Mating Success" Hypothesis: In relation to hunting, a hypothesis that has been documented or proposed for humans, some earlier hominins, and chimpanzees that the tactical sharing of meat develops and maintains social bonds and/or increases mating success. In humans, this success is possibly amplified by an individual's prowess or reputation.

Micronutrients: a chemical element or substance required in trace amounts for the normal growth and development of living organisms that the organism cannot synthesize itself.

Mousterian (Mode 3): An archaeological industry of stone tools characterized by a method of stone-knapping known as the Levallois Technique (prepared core technology) to form hand-axes, scrapers, triangle points, and denticulates, and is most associated with Neanderthals. It lasted roughly from 160,000 BP to 40,000 BP.

Neanderthals: An extinct Eurasian hominin species that existed from 500,000 to 30,000 years ago and interbred with ancient humans.

Obesity: Excessive body fat that increases the risk of health problems. Defined as a Body Mass Index (BMI) of 30.0 or higher.

Oldowan (Mode 1) Tools: An archaeological industry of stone tools characterized as simple flakes struck off an unmodified core, most commonly as "choppers" for pounding, breaking, and bashing. Oldowan tools are the earliest widespread stone tool industry in prehistory and were used during the Lower Paleolithic, from 2.6 - 1.7 million years ago, by ancient hominids across much of Africa, South Asia, the Middle East and Europe. It is most associated with *Australopithecus garhi*, *H. habilis*, *H. ergaster*, and early *Homo erectus*.

Omnivore: An organism that derives its energy and nutrient requirements from a diet of plant, animal, and fungal origin.

Pair bonding: Forming a close relationship with another individual through courtship and sexual activity.

Prosimian: A group of primates that includes all living and extinct galagos, lemurs, lorises, and tarsiers. They are considered to have characteristics that are more "primitive" (ancestral) than those of monkeys, apes, and humans.

Savanna-Woodland Mosaic: A transitory ecotone between the tropical moist broadleaf forests of Equatorial Africa and the drier savannas and open woodlands to the north and south of the forest belt. The forest-savanna mosaic consists of drier forests, often gallery forest, interspersed with savannas and open grasslands.

Scavengers: Organisms that search for and feed on carrion, dead plant material, or refuse.

Social Bond: The degree to which an individual is integrated into the society, or 'the social'. Social bond is the binding ties or social bonding to the family. Social bond also includes social bonding to the school, to the workplace and to the community.

Stable Isotopes: Isotopes that do not decay into other elements.

Starch: A plant storage molecule in the form of a polysaccharide. Starch is obtained chiefly from cereals, tubers, and potatoes. It is an important constituent of the human diet due to its digestibility, unlike many other polysaccharides, such as plant cellulose, pectins, and xylans (polyxylose).

Type 2 Diabetes (Adult On-Set): A chronic metabolic disorder that affects the way the body processes blood sugar (glucose). It is characterized by high blood sugar, insulin resistance, and relative lack of insulin and primarily occurs as a result of obesity and lack of exercise.

This glossary is the product of the Anthropogeny Graduate Specialization students, Anthropogeny faculty, CARTA staff, and the symposium speakers.