Lesson 4D—Narrative: How Do Archaeologists Analyze Ancient Plant and Animal Use?

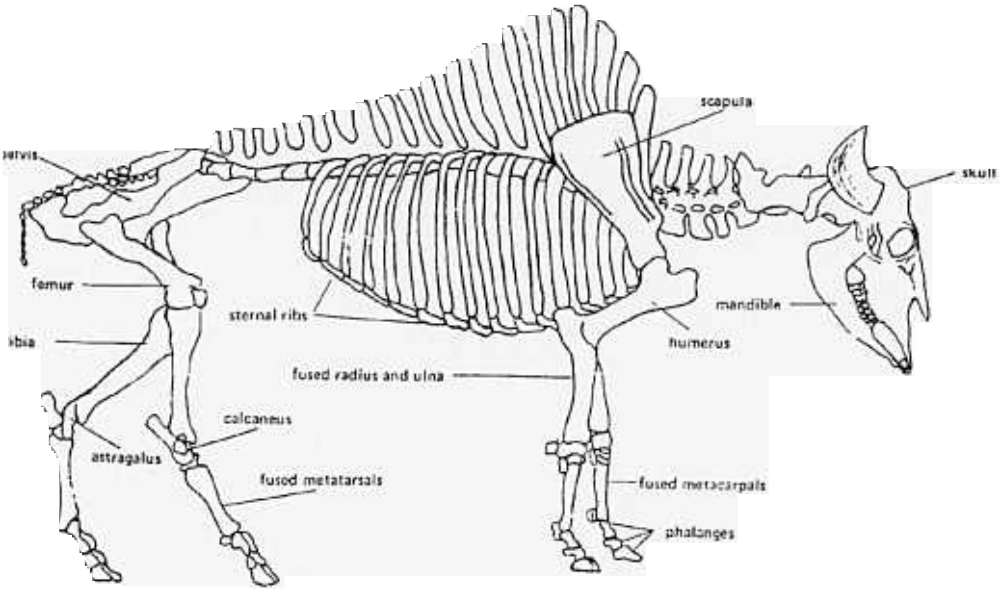
Archaeologists who specialize in plant and animal remains analyze those remains in laboratories.

Archaeologists study animal and plant remains at ancient sites to determine what prehistoric people ate. These remains are sometimes referred to as **ecofacts**, because they tell us about the ecology and environment of prehistoric people. Ancient hunters left animal bones at butchering sites, and both animal and plant remains can be found in or near fire hearths or excavated cooking pits. Nomadic hunters and gatherers usually did not create special trash dumps for disposing their garbage, but village people did.

Bones are a kind of ecofact that archaeologists study. The study of animal bones is called **faunal analysis**. Each animal species has a distinct bone structure. That structure identifies the type of animal a bone came from. A femur, or upper leg bone, of a deer is different in size and shape from that of a bison. **Zoologists** can identify the differences and determine which kind of animal was killed. Sometimes they can also tell the season of the year that an immature animal was killed. They do this by using **tooth eruption schedules.** Animals with "baby" teeth can be distinguished from older adults with full sets of worn teeth. By studying modern animals, zoologists can determine the age at which different baby teeth come in. They then use this information to determine not only how old a young animal was at death, but also—based on birthing in the spring—what season of the year it was when the animal died.

Analysis of a site includes dating bones, charcoal, or any other organic material that contains carbon. An **absolute date** using **radiocarbon dating** can identify the time in prehistory, or how many years ago, a cooking pit was used by ancient people. (See **Lesson 3F—Narrative: How Do Archaeologists Analyze and Date Ancient Technology?** for an explanation of radiocarbon dating.) Archaeologists can also determine the age of bones by using **amino acid dating**. This newer and less-tested technique measures the relative amount of the decay of **protein molecules** within bone. The older the bone is, the more protein decay will have occurred. Through the use of dating and the study of bones, archaeologists can determine the type of animals killed at a site, how long ago they were killed, and sometimes what time of the year they were killed.

The study of plant remains is called **floral analysis**. Generally, the amount of plant remains preserved at archaeological sites is very small. Usually only the hardest parts of plants—like seeds—are preserved. **Carbonized** plant remains that were burned in a cooking fire are better preserved than unburnt plant materials. Also, because these remains were burnt, they are more easily identified as plants used in cooking and eating rather than as plants simply



Different animals have different skeletons. This is a typical buffalo skeleton. By studying the animal bones found at an archaeological site, faunal analysts can usually determine not only which animals were hunted, but also how old they were when they died. *Taken from B. Miles Gilbert,* Mammalian Osteo-Archaeology: North America *(The Missouri Archaeological Society, Inc., 1973).*

growing on the site. When archaeologists excavate a prehistoric site, they save dirt samples and take them to a laboratory. In the lab, specialists use **flotation** to search for ancient plant remains. Flotation is a method of washing the dirt with water. As water is added to the dirt, carbonized seeds and other plant fragments float to the top. Scientists then collect these fragments with a fine screen net and study them under a **microscope**. Just as the bones of each species of animal are unique, each plant species has distinctive seeds and other parts. By studying the plant fragments collected through flotation, archaeologists can determine the plant types eaten and cooked at prehistoric sites.

In search of remains of plants and animals, archaeologists also study the **stratification**, or layering of materials, at sites. The most recent layer of soil is that located at or near the ground surface. Older layers of soil are buried beneath. Determining the age of artifacts and ecofacts through stratification is called **relative dating**; this means that a layer of artifacts is determined to be older or younger relative to the layers above and below it. By studying the contents of different layers, or **strata**, for clues, archaeologists can determine changes in the types of foods eaten by prehistoric people through time.

Archaeologists often call in scientists from other realms of science to help answer questions about plants and animals at prehistoric sites. **Geologists**, **zoologists, botanists,** and **palynologists** (scientists who study plant pollen) often help archaeologists to solve the mysteries of the past. Teamwork is critical to interpreting the past. You can assist in the preserving the past by leaving archaeological sites undisturbed. If you come across an important site or artifact, call your local Forest Service or Bureau of Land Management office or the State Historic Preservation Office (SHPO) in Helena. Preserving the past for future generations is vitally important.

Lesson 4D—Vocabulary: How Do Archaeologists Analyze Ancient Plant and Animal Use?

absolute dating _____

amino acid dating _____

botanists _____

carbonized _____

ecofacts _____

faunal analysis _____

floral analysis _____

flotation _____

geologists _____

microscope _____

palynologists _____

protein molecules _____

relative dating _____

radiocarbon dating _____

strata _____

stratification _____

tooth eruption schedules _____

zoologists _____