Packrats: Time Travel to the Past

By Cathryn Hoyt

Have you ever been camping in the desert and "lost" your pocketknife, or your compass, or your shiny new camp fork? Have you seriously wondered whether you were losing your mind? Have faith. You were probably just the victim of a packrat.

The packrat is a compact, long-tailed rodent with prominent eyes and large ears. It gets its common name from its habit of collecting—whether it be bits of bone, plant material, or your pocketknife. This collecting habit may be an annoyance to you, but it's proven to be a boon for paleo-ecologists who use packrat middens or dens to learn about the past.

Unlike other desert rodents, packrats void copious amounts of urine and thus rely on succulent plant material and protection from the sun to maintain their water balance. They seek shelter in caves, rock fissures or under mesquite trees and then improve these shelters with a loose mound of sticks, plant material, bones and mammal dung. Often these dens or middens are armored with a thick layer of prickly pear or cholla cactus, making them unappealing to predators that may have a packrat snack in mind.

Because packrat middens are often built in caves or rock fissures where they are protected from the weather, they can survive intact for tens of thousands of years. The very thought makes paleo-ecologists rub their hands together with glee. Here, in a compact little mass, is a time machine into the past.

Ancient middens are rock-hard and usually protected by a glistening coat of amberrat [*pronounced "amber rat"*] or fossilized rat urine. When "melted" in warm water, the hard midden falls apart and the various pieces of plant material, bones, insect casings and pollen can be picked out and analyzed. Gradually, as the bits and pieces are identified, a picture of what lived within 50 meters of the packrat's shelter begins to develop. By analyzing numerous middens from the same general area, paleo-ecologists can see how the environment has changed over thousands of years.

We often think that the desert has *always* looked the way it does today. But the packrat middens tell a different story.

The master at packrat midden story interpretation for the Chihuahuan Desert region is Dr. Thomas Van Devender, a research scientist with the Arizona-Sonora Desert Museum. He and his colleagues have analyzed hundreds of packrat middens throughout the Chihuahuan Desert.

Fourteen of the middens they looked at came from Maravillas Canyon in the Black Gap Wildlife Management Area. The oldest samples indicate that the canyon slopes were covered with a woodland of pinyon pine, shrub oak and junipers 28,000 years ago.

Two species of junipers were found in the samples: red-berry juniper and ash juniper. This is interesting because—while red-berry juniper is still the most common juniper in the Trans-Pecos—the ash juniper is fairly rare in this region now. With the climate change that marked the end of the Ice Age, ash junipers retreated eastward and are now most commonly found on the Edwards Plateau.

The presence of ash juniper is believed to be an indication that the climate was wetter during the distant past. Other indicators of nearby water include the remains of over 30 species of amphibians found in the Maravillas Canyon middens.

The Maravillas Canyon middens also revealed another surprise—the remains of a California Condor. These bones, and others found near Mule Ears Peak in Big Bend National Park, indicate that these majestic birds—having a wing span of more than nine feet—soared through the Trans-Pecos skies over 10,000 years ago.

The next time you go to Big Bend National Park and head for Rio Grande Village, stop a moment before the tunnel and look around you. Shut your eyes and imagine the landscape of 24,000 years ago. You'll hear the wind whispering through pine trees and see small motts of oak trees. The oaks are Hinckley oaks—a small tree that rarely grows over three feet tall and is now considered an endangered species. But 24,000 years ago, the Hinckley oak was the dominant oak in a woodland scattered with lechuguilla, althorn and sotol—a combination of plants you'd be hard pressed to find today.

Packrat middens hold many stories, just waiting to be told. Just think what stories will be told when a future paleo-ecologist finds your long-lost compass 20,000 years in the future!

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Have a question or comment about this episode? Contact Nature Notes Coordinator Megan Wilde at mwilde@cdri.org. Or discuss this episode on Nature Notes' Facebook page. This episode originally aired on Marfa Public Radio, January 21, 2010.