BEARS MAGAZINE

GHOST GRIZZLIES

DOES THE GREAT BEAR STILL HAUNT COLORADO?
–BY DAVID PETERSEN

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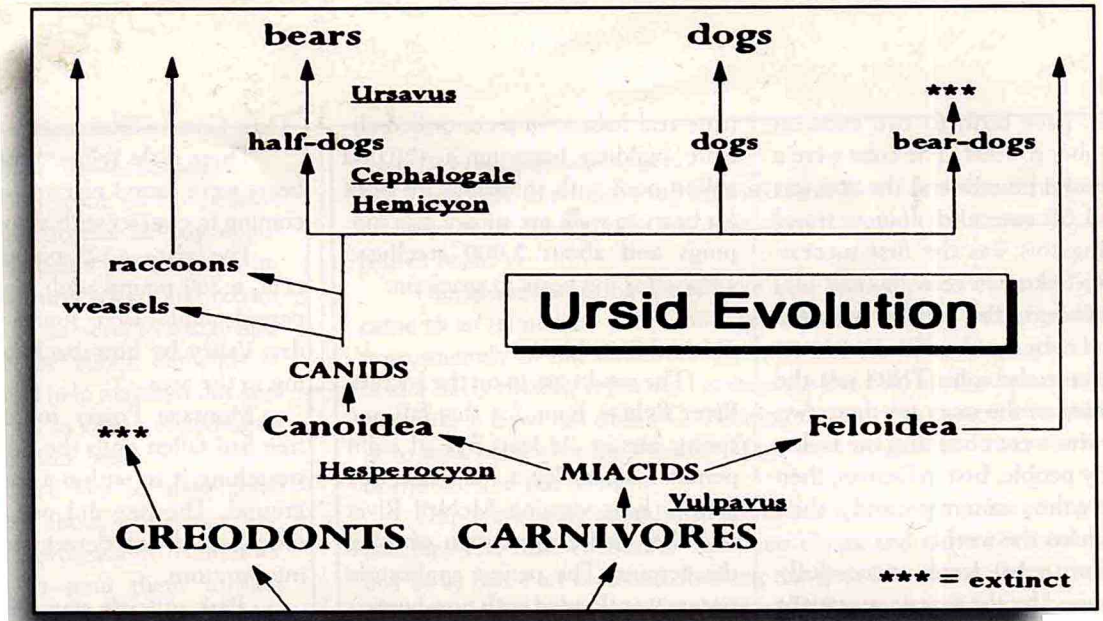

Tracking the Great Bears

The year was 1918. Ursophiles, naturalists, and the hunting community anxiously waited for the long-promised classification of North Amer-ica's grizzly bears. It had taken C. Hart Merriam many years, dollars, and friendships to acquire the skulls for analysis. How many different grizzlies were there? Would you know them all if you saw them? It should be easy to tell grizzlies apart. Right? It should be easy to tell all bears apart. Right?

Well, maybe not so easy.

It lumbered out of the dark green, coastal rain forest of British Columbia into my view—a large, creamy-white bruin. My mind said "polar bear," but geography said, "no polar bears here." The bear was a Kermode, a white-colored black bear, but not an albino. These white bears fooled fur buyers and naturalist's alike for decades. Early Canadian fur buyers thought that the small white skins brought to them by natives were from young polar bears. The skins, the traders assumed, must have been transported south along Indian trade routes from the Arctic to British Columbia.

All were fooled until Dr. William Hornaday of the New York Zoological Society noticed something was amiss. His collaborator Francis Kermode, of the Provincial Museum at Victoria, B.C., collected three additional skins for the Society museum. From these skins Dr. Hornaday named a new species, *Ursus kermodei*, not realizing that a single female could have both a black and a white cub at the same time. The Kermode, as the white black-bear is called, is definitely not a separate species but a black bear with a distinct colored coat—white.

If black bears can be white, maybe it isn't so easy to tell all bears apart, especially, if one only sees the bears in the backyard. Few people have a chance to examine bears either from large geographic areas or from long geologic time series. Dr. Merriam had access to the largest collection of grizzly skulls and skins ever assembled when he pronounced that there were 85 species and subspecies of grizzly bears in North America. In the world of biological names, this is known as species splitting. As a leading ursid paleontologist, Dr. Elaine Anderson, says, "Given that there are splitters, lumpers, and 'splumpers,' 85 is clearly too many." In hindsight, and with newer techniques, we now know that there is only one species of North American grizzly bear, *Ursus arctos*, and two subspecies. But more about this debate in future issues.

The great diversity of bears never ceases to amaze me. Imagine the different bears that have roamed earth since bears first appeared. They range from the largest North American predator ever to dog-sized ursids, including the giant short-faced bear, spectacled bear, panda bear, cave bear, honey bear, other fossil bears and many more. Would we know them?! Defining a bear, it turns out, is not all that easy. Even the eight existing species of bears (I include pandas) are not always easy to identify. Grizzlies and black bears are constantly mistaken for each other. Scientists have long debated whether the panda bear is really a bear. Some believe there may still be two species of bears in South America.

Over the next several issues of *Bears Magazine*, I plan to travel through geologic time from before bears to the recent bears looking at the question of knowing the bears. This issue we'll start with the dawn bears (*Ursavus* spp.) and learn how they differed from their progenitors and related carnivores. Next, we'll

– by Jim Halfpenny, Ph.D. –

visit the First Bear (*Ursus minimus*) progenitor of the cave, grizzly, black, Asiatic black, sloth, and sun bears. Future columns will include red, white, and blue black bears; hybrid bears, panda's thumbs, and polar bear throw backs; sealing grizzlies and salmon fishing polar bears; the Merriam dilemma—85 grizzlies; bear genetics and mother bears; and did cave bears model for the cave artist?

But for now, back to the Dawn Bear. Seventy million years ago when dinosaurs ceased to roam the earth, small furred insectivorous mammals crawled out of the brush. They were destined to eventually sire the ursids, but that took another 65 million years or so. Would you have recognized the forbearers to the bears? Probably not. All mammals looked similar back then. It is difficult to tell their fossils apart today.

Initially, two major groups of meat-eating mammals evolved: creodonts and carnivores, both having large species reminiscent of bears. Yet the one of the only things the meat eaters had in common was their teeth were adapted for shearing off large pieces of meat. The shearing or cutting teeth, known as carnassials, include an upper and lower tooth whose sharp edges slide past each other like scissors. Creodonts were different from carnivores in that their carnassials were formed from upper and lower molars. In carnivores, the carnassial pair is the last upper premolar (P^4) and the lower first molar (M_1). While the creodonts had some nice teeth, their small brain cases were a dead end evolutionary line. They eventually went extinct, leaving the carnivore stock to develop into bears.

Carnivores, with their larger brains, adapted to prey on evolving fleet-footed ungulates. The earliest carnivores belonged to the extinct family, Miacidae, which arose over 55 million years ago and included *Vulpavus* and *Hesperocyon* (they only have scientific names, no common names). These carnivores exhibited larger brains and had lost the last upper molar as they moved into the meat eating niche.

Miacids gave rise to two super families: Canoidea (dogs, weasels, raccoons, bears) and Feloidea (cats, hyenas, civets, mongooses). Canoids began to fill the niche of intelligent pursuit, while feloids filed the niche of clever stalking. In the dog lineage, the fossil record from that time contains three closely related, hard-to-distinguish groups: dogs (canids), half dogs (hemicyons), and bear dogs (amphicyons).

Paleontologists often do not agree on lineages of these mammals—bears, dogs or in-betweens. Certainly field naturalists at that time would have found it difficult to distinguish the forerunners of bears. The miacid *Hesperocyon*, which was small and primitive in build, appears to be on the line that leads to dogs. Amphicyons, while bear-like and of enormous size, differ from bears in several key traits including digitigrade locomotion similar to dogs (walking on their toes) whereas bears are plantigrade (walking on the soles of their feet).

Two hemicyonids, *Hemicyon* and *Cephalogale*, appear to be close to the lineage leading to bears, most significantly because they show backward movement of the main P^4 cusp called the protocone and some broadening of molar cusps. *Cephalogale*, which appeared in the fossil record about 40 million years ago, was fox-like but had the most enlarged, cusped tooth of any carnivore suiting it for a more generalized diet including vegetation. It was *Cephalogale* that began to combine a diet by predation and herbivory—the omnivorous niche. The ability to feed on plants when seasonally available and to switch to animal food as needed would be a key ingredient in the survival of the soon to evolve bears.

Cephalogale, or a close relative, gave rise to the "dawn bears," genus *Ursavus* around five million years ago. Dawn bears had reduced carnassials and enlarged molars to allow for crushing and grinding. These characteristics help distinguish bears from dogs (crushing and shearing teeth) and cats (shearing teeth).

During the Pliocene and Pleistocene (five million to 10,000 years ago), increased seasonality of climate and changing vegetation patterns fueled an explosion in the diversity of bears. Bears were preadapted to survive changes by their large body mass, ability to hibernate, and omnivorous nature. *Ursavus* is pivotal in the evolution of later bears. *U. elemensis*, The dawn bear, gave rise to *Protursus simpsoni* in Spain. *P. simpsoni*, a sheepdog-sized ursid supported more advanced dentition and gave rise to *Ursus* including the sloth and sun bears. *U. depereti* gave rise to the panda bear. *Ursavus* also gave rise to *Plionarctos*, forbearer of the South American spectacled bear.

The genetic radiation of bears occurred before humans were even a gleam in their parent's eyes. At most, humans have been around two to three million years, bears over five million years. Many of the early species on the ursid tree appeared very similar in form. They would have been difficult to tell apart. This leads to some intriguing questions. If we were present as new species are evolving, would we even know it? Perhaps the ursid radiation continues today, but can we recognize it? Worse yet, has the world-wide persecution of bears and destruction of their habitat masked or terminated the radiation?! ■

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