

Defining Species and Naming Bears:
An Episode in the History of Taxonomy

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Abstract

There has often been confusion in naming biological species, as over the years *splitters* and *lumpers* have both had their say. One of the most extreme examples of confusion is that of the naming of the North American brown bear. In 1918 there were considered to be 77 different species of brown bears in North America; now there is thought to be only one. The original proliferation of species appears to have been stimulated by idiosyncratic personal considerations that had nothing to do with bears and little to do with science. The present understanding that there is only one species represents the victory of scientific reasoning over decades of spurious classification. The genesis of error was mainly the product of one

individual, Clinton Hart Merriam, and his authoritative position as chief of the Biological Survey of the United States for twenty-five years.

During my university career in the 1950s, I wrote a paper on the grizzly bear, a creature as renowned as any in North America. I rounded up books and articles that described its size and behaviour in detail, but found only contradictory information about its name. For example, the Boone and Crockett Club, a riflemen's group which kept records of big game, had established arbitrarily that any Alaskan brown bear killed within seventy-five miles of tidewater was to be called a brown bear (Kaniut, 1983, 6). The bears that lived farther inland were grizzlies. This was startling. What if a grizzly decided to wander west of its border? Was it no longer a grizzly? What if a hunter shot a bear from the boundary area -- how could a zoologist classify it since surely it would resemble the other bears in the area?

My curiosity led me in 1959 to a new book by E. Raymond Hall and Keith R. Kelson, *The Mammals of North America*. In over 1100 pages it described and named all the species and subspecies of mammals living on the continent. It was generally a boon to all of us who studied mammals, but not to those specifically involved with

grizzlies and brown bears. To these zoologists, the information it offered was unbelievably complicated -- eighty-seven different kinds, all but ten of them full species. Was it really possible that there were seventy-seven species of brown bear (including the grizzly) from North America? Five of the species came from Admiralty Island in south eastern Alaska. This island, five miles from the mainland, is only ninety miles long and thirty-five wide, a wilderness with a few coastal settlements focused on lumbering and fishing and many bears in the interior. It seemed impossible that these five species, difficult to tell apart as individuals let alone species, stuck to their own kind among the trees, never mating with a bear from one of the other four species despite the limited area they all inhabited.

The problem of naming bears slipped to the back of my mind until recently, when I've taken several trips in the west and encountered grizzlies in the wild. When I checked their current status in recent books, *The Mammals of Canada*, *A World List of Mammalian Species* and *Wild Mammals of North America*, I found that brown bears and grizzlies are now considered to belong to a single species, *Ursus arctos*. This was the name given to the first grizzlies studied scientifically in North America in 1815 (Craighead and Mitchell, 1982). This paper considers why so many different kinds of bears had been described in the years between then and now.

All but five of the eighty-seven different kinds of bears listed in Hall and Kelson's book were named by Clinton Hart Merriam, born in 1855, the energetic director of the United States Biological Survey who devoted most of his life to the study of birds and especially mammals of North America (Manville, 1973). He spent years poring over skins and skulls in the Smithsonian Institution in Washington, DC, but he also spent years travelling and collecting specimens; he made field trips in every state and in Canada and Alaska (not then a state), usually by packhorse (Talbot and Talbot, 1942). He surely encountered bears in the wild, or heard stories about them. He must have known that bears have large territories, and often wander hundreds of miles during the course of a year.

Bears, like other mammals, are classified largely by the shape of their skulls, which are sent from dead animals to museums for this purpose. From his museum research, Merriam knew that the shape of bear skulls varied with the sex and the age of an animal. What stuck in Merriam's mind when he settled down to classify the brown bear, though, remained the marked difference between bear skulls, even those sent to him from the same location (Merriam, 1918). He could have said to himself, bear skulls have all sorts of different shapes; could that be because they are omnivores and have a variety of diets? Maybe one bear eats mostly berries and another likes to gnaw bones, so that their facial muscles develop differently and their skulls

look different, too? Instead, Merriam decided that differences in skull characteristics meant different species, or at least different subspecies.

The present question, then, is why Merriam chose to divide the brown/ grizzly bears of North America into eighty-six groups, (almost identical to the eighty-seven cited in the Hall and Kelson book), rather than the one species and a few possible subspecies recognized today.

I think one reason may be related to Merriam's lifestyle. He moved in high circles, socializing with men such as Theodore Roosevelt, John Muir, Alexander Graham Bell, Admiral Peary, Rudyard Kipling, Sir Baden Powell, and E. H. Harriman (Talbot and Talbot, 1942). It was the railroad financier E.H. Harriman, father of Averell Harriman, who was initially interested in brown bears; he wanted to hunt kodiaks on Kodiak Island in Alaska (Abramson, 1992, 67, 106). In 1899 a doctor had ordered a vacation for Harriman, so Merriam helped arrange a luxury ocean trip up the coast of Alaska for Harriman, his friends and family, and a number of scientists (Palmer, 1954). Later, Merriam was asked to help organize detailed reports about scientific discoveries related to this trip, all to be paid for with Harriman funds. Merriam must have done well, because in 1910 Mrs Harriman established a trust fund for him which confirmed his status as one of the top biologists in the United States. It gave

him freedom to do paid research in any area he wished to pursue for the rest of his life while based at the Smithsonian Institution. Merriam's personal contribution to the Alaskan Harriman trip, published in 1918, would be his work on bears, "Review of the Grizzly and Big Brown Bears of North America (genus *Ursus*)", No. 41 in the North American Fauna series.

Perhaps Merriam's social pretensions influenced his research. He didn't have the fame or power of many of his friends. Maybe he compensated by using his position to create and name new kinds of bears. After all, it would seem more worthwhile to spend twenty years creating a number of different groups of bears than deciding in that time that all the bears were the same. Some of his new species and subspecies he named after friends, and some after men, most of them wealthy, who hunted in the west and sent bear skulls and skins to the Smithsonian for Merriam to measure and describe; he used Harriman money in part to induce hunters and trappers to collect bears from areas underrepresented in this national collection (Merriam, 1918). He named *Ursus townsendi* after Dr Charles Townsend who collected a bear from southeastern Alaska (exact location uncertain); *Ursus kennerlyi* after Dr C.B. Kennerly who hunted bears in Mexico; *Ursus henshawi* for Henry Henshaw the former chief of the Biological Survey, and *Ursus eltonclarki* for Elton Clark of Boston who killed his bear on Chichagof Island in Alaska. Other men he honoured by giving their

names to groups of bears included S.F. Baird who founded the United States National Museum, G.F. Norton, the explorer Warburton Pike, E.W. Nelson, Frank Russell, James Kidder, William Dall of the Smithsonian, George Shiras and Charles Sheldon. Merriam was aware that many zoologists would be surprised by his classification. He writes defensively in his monograph, "The number of species here given will appear to many as preposterous. To all such I extend a cordial invitation to visit the National Museum and see for themselves what the bear skulls show."

Another notion that made acceptable Merriam's complex scheme of bears was that of the expert. Often it is difficult to determine what constitutes a species, which is theoretically defined as a population that interbreeds to produce fertile young. But how can one know what animals actually interbreed in the wild? Captive studies are of no use because even lions and tigers sometimes mate in zoos to produce fertile young (Gray, 1971, 40). A more useful definition of a species is that used by Darwin (p 41): a species is a group of living organisms that an expert claims is a species. This is probably as good as any definition, given the problems involved. However, it also makes the expert's work sacrosanct, no matter how illogical it may appear to everyone else. The expert is the person who has examined all the evidence, so that person is given the final word.

Perhaps also Merriam's biological background was important. His previous taxonomic studies had focused on small mammals -- shrews, weasels and pocket gophers (Manville, 1973). These animals all have a wide distribution in North America, with many species and subspecies. Populations have become isolated in various widespread regions and evolved there into different groups. Bears have had an equally large distribution on the continent, but individual bears have ranged widely so that there has been little chance of isolated populations developing. Merriam may have downplayed in his mind, as already speculated, the wide-ranging behaviour of bears, and focused instead on the variations, just as he had on the variations (this time valid) of shrews, weasels, and pocket gophers.

Coupled to the emphasis on the expert was the lack of a review procedure of scientific work in 1918 when Merriam's bear report was published. With the rise of scientific journals (such as the *Journal of Mammalogy* founded in 1919), articles submitted for publication were increasingly sent to scholars in related fields to review to make sure that the paper had merit (Storer, 1969). However, Merriam's work on bears was published by the United States government before this review procedure existed. It was also written by one of the most eminent biologists in the country, a Smithsonian expert with an assured status; there would be no one in a position to question Merriam's authority.

Once Merriam's bear monograph was published, it was much criticized because of the large number of bears it named (Murie, 1981). It was felt that such general criticism, however, could not invalidate the expert unless someone were to reexamine all the specimens and repeat Merriam's extensive research. No one did so in the forty succeeding years, so that when Hall and Kelson prepared their book, these men felt compelled to use Merriam's classification no matter how dubious it seemed.

Shortly after this, wildlife biologist Robert Rausch of Alaska published in 1963 a review of the lengths (condylobasal) of the skulls of 357 adult male brown bears from Montana and Wyoming through western Canada to Alaska. (He considered other skull measurements as well, but these did not prove to be useful in indicating geographical clines). He concluded that the bears all belonged to one species, *Ursus arctos*, and that there were two subspecies, *U. a. horribilis* over most of the species' range, and *U. a. middendorffi* from Kodiak, Afognak, and Shuyak Islands which are isolated from the first group and do not interbreed with them. He dismissed Merriam's other taxonomic entities because they intergrade, or used to intergrade, with surrounding populations of bears.

Despite Rausch's extensive study, when E. Raymond Hall prepared the second edition of *The Mammals of North America*, published in 1981, he again included all eighty-seven kinds of bears from the earlier

work and did not cite Rausch's article in his bibliography. As we have seen, this view is not now accepted by virtually any biologists who agree that there is only one species of brown/ grizzly bear in North America.

Perhaps Merriam himself was turned off by the multiplicity of bears; with his lifelong endowment to do research, he turned from bear taxonomy to a study of Indian tribes in California and Nevada and did no further work on wild mammals. He continued to champion his classification of bears during his lifetime, though. In the early 1930s, the biologists Adolph and Olaus Murie visited Merriam in his Washington, DC, home (Murie, 1981). He told them about an earlier incident with Theodore Roosevelt, a famous big game hunter, who doubted that there were as many kinds of bears as Merriam proposed. Merriam took two grizzly skulls to the Cosmos Club on an evening when President Roosevelt would be there. He placed them on the mantelpiece where Roosevelt soon spied them. The two men had a lively discussion during which Roosevelt conceded that the skulls were different enough to represent two species. Then Merriam had the pleasure of telling the President that the skulls represented two species that he had questioned. Merriam believed that he had proven to Roosevelt his argument about grizzly taxonomy, but the Murie brothers, and probably the President too, remained doubters.

It is fortunate that Merriam stopped studying brown bears when

he did, because he wasn't an advocate of preserving animals. At that time the concept of endangered species had yet to be generally understood. He pioneered instead the concept of mass killings for the study of small mammals by urging the use of many traps to catch large series of specimens from many locations: for a 1909 monograph on the mouse *Peromyscus*, 27,000 mice had been killed and collected (Craighead and Mitchell, 1982). And bears were no more sacrosanct than small mammals. The first brown bears collected for science were among at least forty-three grizzlies killed by the 1804-1806 Lewis and Clark expedition which travelled westward across United States. In his bear monograph, Merriam states that further study of bear taxonomy is needed, and that "Many bears now roaming the wilds will have to be killed and their skulls and skins sent to museums before their characters and variations will be fully understood" (p 8). He continues "Persons having the means and ambition to hunt big game may be assured that bears are still common in many parts of British Columbia, Yukon Territory, and Alaska, and that much additional material is absolutely required to settle questions still in doubt" (p 8).

If hunters had indeed killed large numbers of bears as Merriam wished, his classification system might never have been questioned as it has been. There would be few or no bears in the wild to give us the data that we have gradually acquired over the years, data which

now tell us that all brown bears and grizzlies belong to one species, *Ursus arctos*.

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