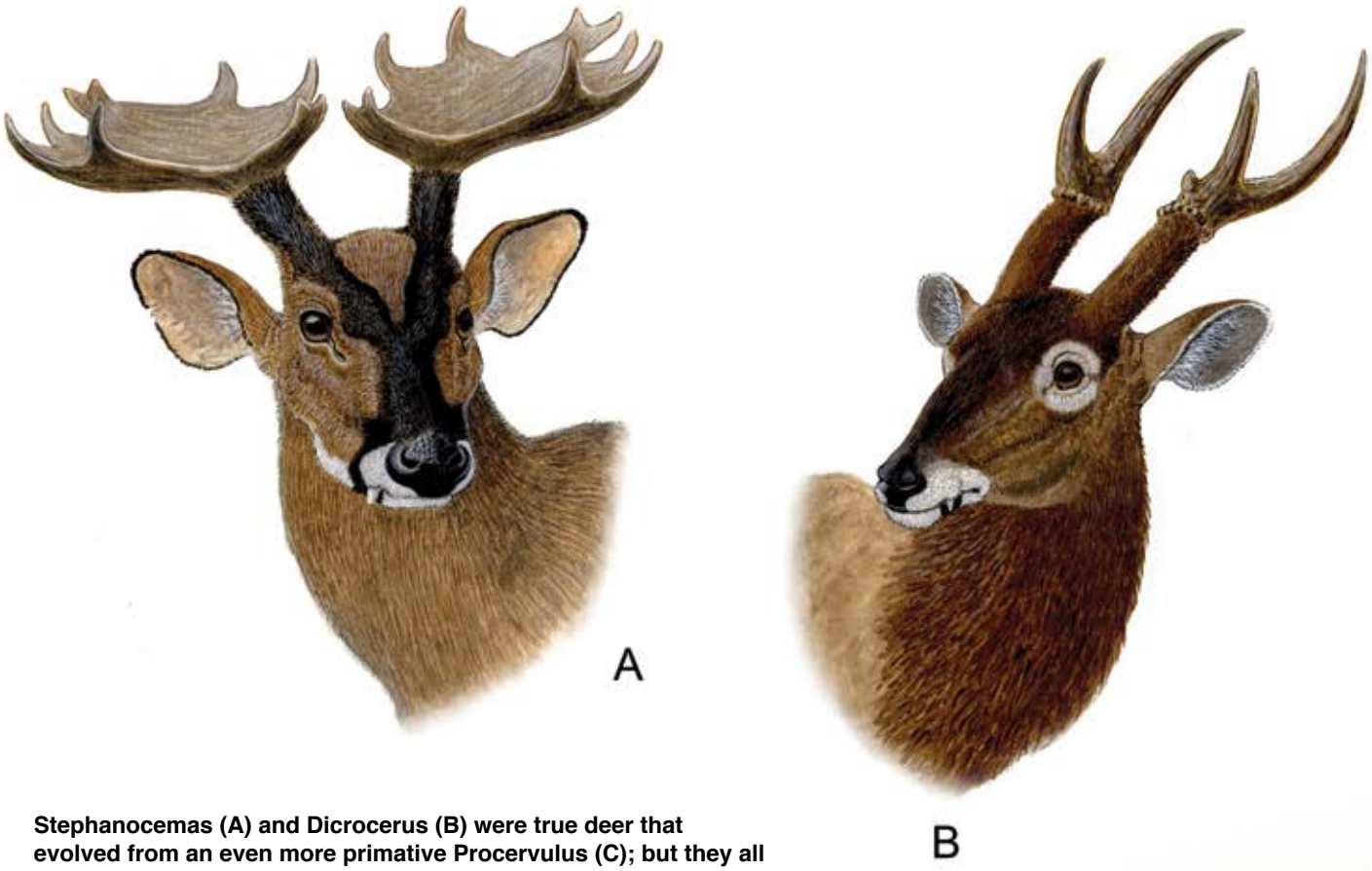
Erik Adamsson Photo

The Siberian musk deer is an example of a living fossil and the only survivor of a group called "Moschids" that lived millions of years ago.

DEER FANGS: PAST AND PRESENT

BY JIM HEFFELFINGER



Stephanocemas (A) and Dicrocerus (B) were true deer that evolved from an even more primative Procervulus (C); but they all had prominent canine fangs. Randy Babb illustrations.

Mule deer and white-tailed deer have an odd arrangement of teeth for animals that make a living out of biting off plant parts. They do not have upper incisors. In fact, they have no upper teeth in front at all. This confuses some people who look in the mouth of a deer and wonder what happened to the upper teeth.

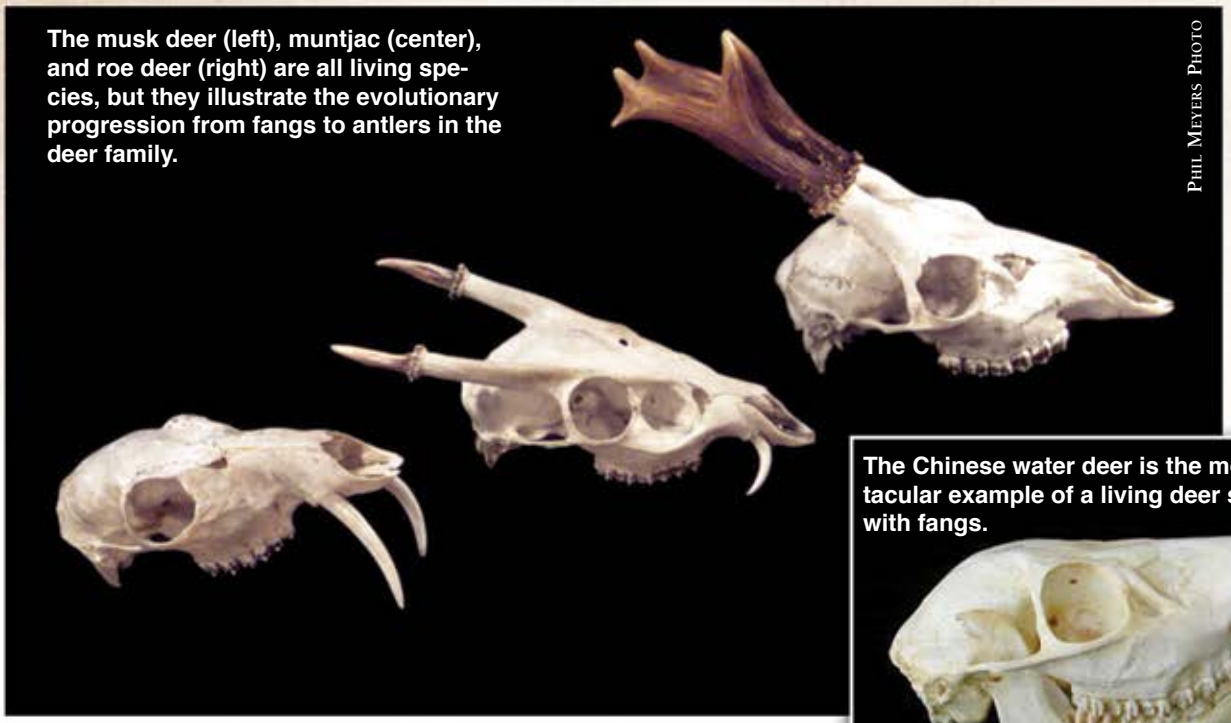
This toothless grin is shared by other hoofed animals as well, such as cattle, bison, pronghorn, and bighorn sheep. They do have eight lower incisor-like teeth in front that are pressed against a hard upper pad, or palate, to pinch and tear off plant parts. Six of the eight lower front teeth are true incisors, but the outermost teeth are actually lower canines that, throughout evolution, have shifted forward to function as incisors. Once they snip off plant parts, they use their three premolars and three molars on the lower jaw that match with their upper counterparts, to grind food for digestion.

Fawns are born with all eight lower front teeth, three premolars, and a molar on each side. All incisors, canines, and premolars are replaced with adult teeth before the age of two years. This lack of upper teeth in front was not always the case in the deer family, but we have to travel pretty far back to see deer with fangs.

FANGS OF DINO DEER

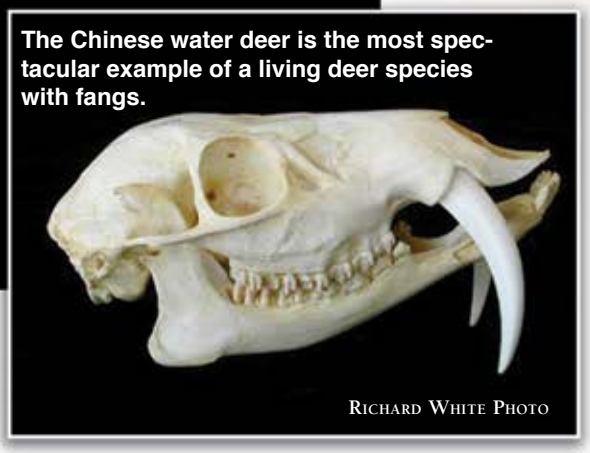
If we could get in a time machine and set the dial to the Oligocene Epoch 24-34 million years ago, we would see some hoofed animals called Moschids running around. These primitive deer-like mammals had no antlers but had exaggerated tusk-like canines. A form of these ancient saber-toothed deer, such as *Dremotherium*, is the most probable ancestor to all deer alive today. Moschids disappeared completely, with the exception of one type, the musk deer eastern Asia.

Later forms developed that provide the probable missing links to modern deer. For example, *Procervulus* possessed large canine tusks and forked antlers that were shed, although probably not every year. Later primitive forms were unmistakably members of the deer family with *Stephanocemas* and *Dicrocerus* having tusk-like canines and antlers. The antlers of these early deer were shed annually from long antler bases much like the present-day muntjac of Asia. With the evolutionary development of increasingly elaborate



The musk deer (left), muntjac (center), and roe deer (right) are all living species, but they illustrate the evolutionary progression from fangs to antlers in the deer family.

Phil Meyers Photo



The Chinese water deer is the most spectacular example of a living deer species with fangs.

Richard White Photo

antlers, tusk-like canines became much smaller in the deer family and disappeared completely in many species.

TODAY'S FANGED DEER

Sharp canine tusks are not normally associated with the deer family today, but there are many examples of deer with some form of fangs. Elk have a pair of upper canine teeth that are sometimes called "buglers" or "ivories." They are teeth just like the tusks of an elephant, but whether they are "ivory" or not is a matter of semantics, because all teeth can be considered ivory.

The Chinese water deer provides the most dramatic example because it lacks antlers and possesses large canines similar to fossil deer. The muntjac and tufted deer of Asia are in between with small antlers and small canines. Maybe we shouldn't consider this such an unusual condition since more than half of the 40 species of deer on the planet—red deer, wapiti, sika, sambar, rusa, Pére David, muntjac, tufted deer, Chinese water deer, huemuls, taruca, caribou, and reindeer—have fangs.

THROWBACK FANGS IN WHITETAILS, MULE DEER

Upper canines are unusual from a North American perspective because they are not normally found in mule deer and white-tailed deer. Occasionally they get noticed by a hunter, or more often a taxidermist, when they boil their whitetail skull to make a freedom mount (skull and antlers only). When these upper canine teeth are present, they are not large, but generally tiny peg-like teeth just breaking the gum line. There are many cases where canines are present, but they were too small to break through the gums and are not visible by simply looking in the mouth. Researchers reported that 53% (26/49) of the canines they discovered did not poke through the gum tissue and were only discovered after cleaning the skull – undoubtedly there are a lot going undetected. The upper canines grow out of the maxillary bones of the skull, sometimes called "maxillary canines," and remind us of the evolutionary path that produced the deer we pursue today.

Just how common these canines are is difficult to say. But estimates of 0–18% of the population have been reported in white-tailed deer from Central America to Canada. In a large sample of 25,729 deer inspected at check stations in New York, only 36 had canine teeth. Other researchers have found none out of 10,000 deer (Wisconsin), six out of 360 (Michigan), four out of 95 (Florida) and 13 out of 1,225 deer in various other areas. If you pool all these samples together, that would be 59 out of 37,409 deer possessing canines (about 1.6 out of 1,000 deer, or 0.16%).

The available data indicates maxillary canines may be more common in southern latitudes (7.3–18%) compared to estimates from northern North America (0–4.2%). A fairly large sample of South American whitetails showed that canines were more common in females than males. When they occur, they can be on both sides or just one side and range from so small they remain hidden under the gum tissue to ⅜ inch of exposed tooth out of the gum.

Chinese water deer have a black spot on the side of their chin that provides a background to accentuate the size and whiteness of their large fangs. Others have pointed out that this same black spot is present in white-tailed deer and mule deer and may be a relic of the past when they used canines as part of their social display for dominance.

Conducting an internet search for "vampire deer" will yield a lot of examples of our North American deer with rare canines. We would see more reports of these if everyone actively looked for them in their own deer. We associate large fangs with predators, not their prey which makes a deer with fangs very intriguing. The idea that these deer with canines represent some Jurassic Park-like breakthrough from the Miocene Epoch is enough to get any deer enthusiast's attention. It amuses me that the most-studied species on the planet is still so mysterious.