

Wyoming Tribune Eagle of December 7, 2016: "Fossil Butt plethora of Wyo history"

Thousands and thousands of fossil sites exist across the globe. Many of them span eons of geologic time. On such site exists in Wyoming, a tiny portion of which is now a national monument.

An astounding fossil record is preserved within the Green River Formation of Fossil Basin. It dates from the Eocene Epoch; hence some of its the fossils are more than 50 million years old. More than 100 years of collecting has now been undertaken. Fossil fish, reptiles, birds, mammals, insects, and plants have come to light; moreover, discoveries of new fossil species continue to this day. The quality of fossil preservation is extraordinary. Quiet-waters, fine-grained lake sediments, and an absence of scavengers combined to preserve delicate fossils.

Amazingly, I became aquatinted with a cross-section of Green River fossils during travels in Germany.

In 2012, besides visiting extended family as I usually do, I also spent a week with friends in Nuremberg. They took me on an auto tour to Regensburg, a city with a fascinating history of medieval times. On the way we stopped in a small town in the valley of Altmühltal that boasts a well-known museum of gems and minerals. This museum, it turned out, had acquired some calcified fossils of sweetwater fish that were originally found near Green River. A plaque of information in German tells visitors that the fossils are from "one of the most famous finds worldwide." They are estimated to be fifty million years old. "Vertebrate fossils from the Green River Formation in Wyoming, particularly its fish, are some of the best preserved in the world."

Later that year, having returned to Wyoming, I learned that the Fossil Butte National Monument near Kemmerer was created on Oct. 23, 1972. It protects 8,200 acres of the 50-million-year-old lakebed called Fossil Lake, but that's only about 1.5% of the ancient bed in its entirety, which has become one of the richest fossil localities in the entire world. Complete paleoecosystems have been found that span millions of years. Inasmuch as their preservation is unusually complete, the specimen have contributed to detailed studies of changing climates and their effects on biological communities.

This fossil lake, formed during the Eocene Epoch, came about because of an annual rainfall of 30 inches or more. The rains gave rise to this lake along with other lakes in the region. Because the climate of the time was subtropical, it ensured that southwestern Wyoming and surrounding areas of Utah and Colorado became a land of large lakes. The sedimentary Green River Formation and its deposits have preserved some of the best examples of intact fossils ever found. Similar outcrops have occurred in Colorado and Utah.

A variety of life forms thrived in the upper waters of the lake, writes Annette Hein in an award-winning essay. Plankton supported large shoals of herring. Big predator fish, including gars and dogfish, hunted smaller fish, while catfish and freshwater rays fed on crustaceans.

"The lower waters, however, contained a poisonous concentration of hydrogen sulfide that prevented scavenging fish from occupying the lake floor."

From time to time, earthquakes or other seasonal upheavals released the hydrogen sulfide into the upper waters, which caused multitudes of marine life to die simultaneously. These mass die-offs became the fossils we now admire. Lying on the lake bottom, the fish were buried in lime-rich mud, whereafter their fossils got flattened by the weight of sediment into two-dimensional imprints. These imprints often show every tooth, rib and fin. Less common but equally preserved are freshwater rays, water and shore birds, frogs, bats, turtles, even crocodiles. An amazing variety of fossilized plants catches the eye also.

John Fremont and other early explorers of the West knew of the region's fossil-rich geology; however, significant studies of the Green River Formation did not start until the late 1860s. As the Union Pacific Railroad began to cut through the formation near the town of Green River, railroad employees passed fossil finds to paleontologist Edward Drinker Cope, who went on to describe several new species. Soon amateur collectors began quarrying fossils, followed by commercial collectors. Thereafter, specimens from the Green River Formation began to show up in museums all over the world—which may have been how the museum in the Altmühltal valley acquired its treasures. These forays, however, created the impetus to protect the lakebed riches, hence the 1972 legislation.

If you cannot travel to Fossil Butte, an online museum provides fascinating and detailed information. Go to the National Park Service, www.nps.org, and click on the photo gallery, "Green River Formation Fossils." Another site is Fossil Butte's "Aquarium in Stone."