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## Contributions to Paleontology by an Early Montana Physician

### Abstract

Dr. J. C. F. Siegfriedt was a physician in Montana from 1904 to 1940, a politician (mayor and state senator), an indefatigable booster of his community, and an enthusiastic naturalist with substantial scientific accomplishments. He made the first discovery and participated in the subsequent study of a unique faunal assemblage (Bearcreek) from the early Paleocene. The assemblage contained primates and insectivores, one of which bears his name (*Entomolestes siegfriedti*). He was an early supporter of the Yellowstone Bighorn Research Association, which has been a distinguished teaching institution.

John Charles Fredrich Siegfriedt was born in Davenport, Iowa, on 25 June 1879. He graduated from the College of Physicians and Surgeons, University of Illinois, in 1902, and came to Bearcreek, Montana, in 1904. He practiced there and in Red Lodge. He served as State Senator from 1920-1924 and was mayor of his town when he died in 1940. Throughout his life he was an enthusiastic student of geology and paleontology. His duties as a mine physician gave him opportunity to become a serious investigator, and his work led to significant discoveries. He initiated the formal scientific delineation of the coal measures of Carbon County and the description of a unique Paleocene faunal assemblage, one species of which bears his name. He suggested and helped to establish the Yellowstone Bighorn Research Association, an institution of research and teaching which has grown to be a permanent part of Montana's academic resources. It is today a thriving teaching facility of solid reputation, with faculty drawn from several American universities and summer classes of about sixty students from the United States and abroad.

Geologic interest in Bearcreek began with the examination of sedimentary strata formed in the early Cretaceous. In that Period a vast geosyncline extended from the Gulf of Mexico to the arctic. Into the lakes and seas which intermittently filled this trough were deposited sediments which eventually measured tens of thousands of feet in thickness and contained marine, lacustrine, and lagoonal fossils. Most of the Montana coal was deposited during this era, and at the end of it, these enormous layers were slowly upthrust, folded, faulted, arched, and overthrust. Thus, a prominent mountain system along the old north-south axis was built. During the thirty million years of Paleocene, and Eocene which followed, erosion smoothed this contorted mass; by the Miocene, twenty-five million years ago, these Ancient Rockies were worn down into a continental plain, the mountain roots and cores buried in their own debris, and the rivers were taking new directions along new planes. In the nine million years of the Pliocene, and in the Pleistocene, uplifting and folding created the present Rocky Mountain chain. South of Red Lodge, in related vulcanism, the Absaroka Mountains were being built. The Mesozoic faunas (predominantly reptilian) were succeeded in the Paleocene by increasing numbers of primitive birds and mammals, and by the in-

creasing dominance of flowering plants, many of these similar to today's genera. The Paleocene is represented in southern Montana and northern Wyoming by the enormous thickness of the Fort Union formation, and in it, by the distinctive Bearcreek mammals.

On 5 November 1926, Dr. J. C. F. Siegfriedt examined a piece of carbonaceous shale on the top of a loaded coal car at the pit-head and saw exposed a blackish tooth which looked very much like a recently extracted molar. Siegfriedt was in equal parts a scientist and a civic booster. He spoke in a serious way to his paleontological colleagues and with fervid enthusiasm to the press. This two-pronged approach to matters was repeatedly expressed in his life and nowhere more vividly than in this instance. The tooth specimen was photographed in Red Lodge by William Lewis and appeared in the Carbon County *News* as "evidence of early man, millions of years old." The tooth, now lost, was in due course accurately identified as belonging to a condylarth (possibly *Phenacodus*), a group ancestral to the hoofed mammals of today: It was the first of an extensive collection of teeth and bone fragments found in a dark-colored, bituminous clay-like layer just above Seam 3 in the Eagle Mine, Bearcreek.

Dr. Siegfriedt wrote to Henry Fairfield Osborn in September 1927 about this material, and later sent his collections to the American Museum of Natural History. Dr. Barnum Brown visited the site in September 1927; with Siegfriedt, Brown made further collections of fragments and matrix. The fossiliferous stratum was described as about 1500 feet above the base of the Fort Union formation, and from it scholars have since drawn rich materials. George Gaylord Simpson (1928) published on this new Paleocene mammalian fauna, describing a new mammalian family, four new genera, and five new species, including *Leipsanolestes siegfriedti*, a primitive insectivore. The new genus and species was later revised to *Leptocodon siegfriedti* and is now known as *Entomolestes siegfriedti*.

Revisions of and additions to this unique assemblage continued (Simpson, 1929 a, b) with thirty species of vertebrates ultimately being described, including a new rodent (Jepson, 1937), arboreal insectivores, small lemur-like primates, precanids and other predaceous carnivores, herbivores, and others (Van Valen and Sloan, 1966; Delson, 1971). All of the Bearcreek fauna dates to the early Paleocene. David C. Parris, Curator at the New Jersey State Museum, is presently engaged in a comprehensive study of all these forms and describes them (1980, pers. comm.) as "inhabitants of a terminal swamp, that is, the final stages in the sediment-filling of a sizeable lake in the basin . . . it is one of the earliest localities that contain fossil rodents (a few nearby rodent localities are about the same age)." In addition to the mammals there are crocodiles, turtles, a salamander, and a *champsosaurus* (a small, long-snouted amphibious dinosaur), all characteristic of a coal-forming swamp or bog near forests. In this fauna, 30 species of vertebrates are now known.

In the summer of 1930, members of the Scott Fund Expeditions, Princeton University, found dinosaur egg shell fragments on Dry Creek, the first to be reported from North America. The locality is on a ridge south of the old Ohio Oil Company camp, now a small community about eight and one-half miles northeast of Red Lodge. The press had given intemperate coverage to the Mongolian discoveries of dinosaur eggs by Roy Chapman Andrews a short time before, and the enthusiasm of newspaper reporters over the egg shell fossils of the American great reptiles must have annoyed the scientists. In the following January, Dr. Glenn L. Jepsen (1931) published a

factual description of the material, prefaced by extended acerbic remarks about exaggerations, distortions, fantasies, and "mystic reports" which had already appeared in the lay press. Dr. Jepsen and E. J. Moles, Jr. (of the Princeton staff) had spent part of that summer of 1930 near Red Lodge at the invitation of Dr. Siegfried on a practical, commercially important effort to define, as a guide to gas and coal development, the lower limits of the Fort Union formation. The stratigraphic elements and boundaries had been studied in nearby Wyoming where a Lower Fort Union fauna had been found just above the dinosaur-bearing Lance (Cretaceous) shales. As a logical extension of these studies toward the coal measures and gas-oil exploration of Red Lodge and Bearcreek, the sandstone and shale exposures near the Ohio Oil Company camp on Dry Creek promised further information. Dinosaur fossils were subsequently found associated with a mammal tooth (mammals being rare in the Lance). Further investigation disclosed small bits of dark brown egg shell, slightly curved, and perforated with numerous fine pores. They were comparable to the Mongolian dinosaur egg shells (which were more nearly intact) in micro-structure and gross appearance, and different from turtle, crocodilian, or bird embryo-containers. Intact eggs were not found, and have not yet been found, but stories still current describe Siegfried's delight over elaborate practical jokes he arranged for the misdirection and discomfiture of rival investigators and reporters. In July 1977, John Horner discovered a fragment of a dinosaur egg (Princeton University Natural History Museum No. PU 22236) in the Two Medicine Formation, Powder County, Montana, a discovery which awaits further elucidation.

The liveliest description of Siegfried by a contemporary was given by Dr. Jepsen in a letter to Dr. Erling Dorf read at a Princeton University Conference on the Central and Northern Rocky Mountains in August 1974, honoring Dr. Dorf. The letter, published in a memorial to Dr. Jepsen by the Department of Geological and Geophysical Science, Princeton University, 4 March 1975, is quoted below:

Remember the "Paleontologist at Large," the self-appointed President of apocryphal Beartooth University, Dr. J. C. F. Siegfried? He regarded the study of any geology except fossils and oil fields as a complete waste of time. To him, isostasy, a big deal in those days, was a perversion of effort, and he was very vocal about it. Planks in his platform when he ran for Mayor of Red Lodge in 1937 were "bring in twenty more slot machines" and "start some new houses of pleasure." He won.

His efforts were principally responsible for the construction of the highway through the Beartooths where, in accord with his wish, his ashes were scattered after his sudden death in his office, hat and satchel in hand, in 1940.

His ecstasy was explosive and uncontrollable when Ted Moles (swimmer and student) and I found fragments of the first dinosaur eggs to be recovered in the Western Hemisphere, at Dry Creek, a few miles east of Red Lodge. He published a picture of a small hill, several miles away, as the "original site" and, through binoculars, watched with complete pleasure as the members of the group he had thus baited spent several torrid days with heavy machinery digging for more. "That fixed the sons of bitches" he gloated as the story spread.

His discovery of the first fossil vertebrate, a tooth, from the Fort Union coal mines at Bear Creek was the event that triggered his delight with paleontology. He claimed that the tooth was human and that Bear Creek was the Garden of Eden. Most of the hundreds of recovered fossil bones came from a thin bed of "gob" (shaly coal or coaly shale) above the main coal seam, and this two-inch layer of late Paleocene history revealed a unique ecologic setting with an assemblage of vertebrates (a "faunule") unknown anywhere else in the world. It has become an internationally famous challenge to interpretation, a treasury of geobiologic unorthodoxy. Some kinds of Early Tertiary mammals that should be there are not, although they have been found by Princeton students by the thousands in the rocks of similar age around nearby Polecat Bench.

Princeton University studies in the Bighorn Basin were fundamental in delineating the stratigraphy and relationship between the reptilian (dinosaur) fossils of the Cretaceous and the abundant (about one hundred genera in North America) mammals of

the Paleocene. At the other nearby sites, as at Bearcreek, teeth and jaws of primitive primates, which lived about sixty million years ago, were abundant. The studies at Rock Bench Quarry, Polecat Bench, Dry Creek, and elsewhere helped toward the establishment of the Yellowstone Bighorn Research Association, first in tents at Siegfriedt's "Piney Dell" above Red Lodge in 1930, later with permanent buildings. Regular summer geology courses for university credit were offered in field techniques, mapping, and structural geology. Although the work of many went into the establishment of the Research Association, Dr. Siegfriedt characteristically supplied his full measure of enthusiasm. The group, according to the Red Lodge *Pickett-Journal* of 12 June 1930, was sponsored by Princeton University, the University of Montana, and the Montana Bureau of Mines. Dr. William T. Thom, Jr. (Princeton) and Dr. J. P. Rowe (University of Montana), the chief administrators, were assisted by Dr. R. M. Field and Dr. Erling Dorf (Princeton). Guest scientists were expected for the opening sessions, from Cambridge University, University of Freiburg, Institute of Aachen, and Charles University of Prague. Local supporters were J. F. Brophy, O. J. Rice, William Freakes, and Dr. J. C. F. Siegfriedt; assistance by the Northern Pacific Railroad Company and Senator Thomas J. Walsh was acknowledged. A *Pickett-Journal* article on 26 June 1930 gave a somewhat different table of organization and announced an International Congress of Geology and Paleontology for 1932. The Carbon County *News* had articles on Siegfriedt's camp in 9 April, 11 June, and 18 June 1931, and on 22 June 1932.

A history of the organizational and scientific development of the Yellowstone Bighorn Research Association has been written by Michael Kennedy (1979). Unfortunately, Siegfriedt himself never published.

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