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# X MARKS THE SPOT # 14

By Lorraine A. Manz

Yet another of North Dakota's linear geomorphic features is the subject of competition # 14. Just for a change, this one is depicted on a digital shaded relief map. Anyone who has driven along I-94 between Bismarck and Fargo has crossed the curvilinear ridge-like landform marked by the Xs. The distance between the two Xs is approximately 28 miles but the landform itself extends southwards as an unbroken unit for several more miles before terminating not far from a well-known state park. It also continues to the north for another 40-or-so miles, passing through the village after which it is named and eventually merging into an almost statewide complex of similar landforms. When you have identified this feature submit your name, mailing address, phone number or e-mail address, and answers to the following questions.

- 1) What type of landform is marked by the Xs?
- 2) What name does this landform share with the village closest to its type area?

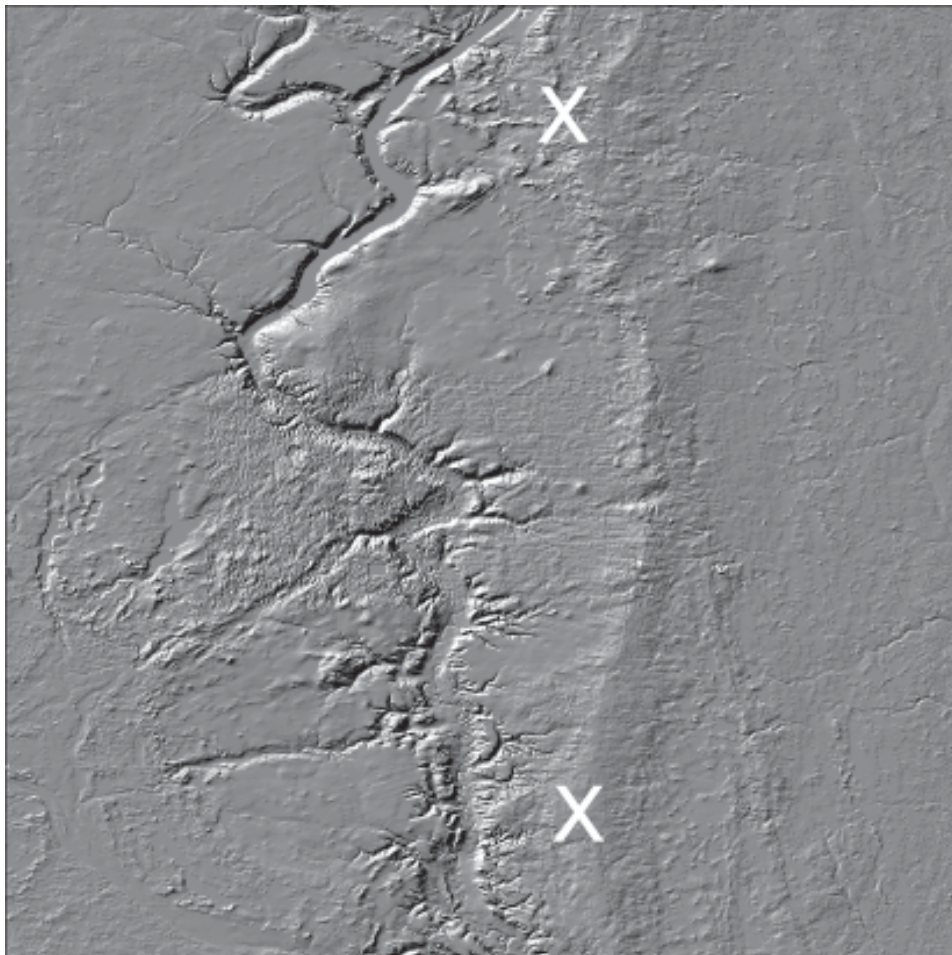
Respondents who provide the correct answers to these questions will be eligible for prizes. Two names will be randomly drawn from a winners' pool by DMR staff. Each respondent will receive a copy of "Dinosaurs, Sharks, and Woolly Mammoths" (see page 6).

Please submit responses by March 31, 2008. Winners of our drawing and the correct answers will appear on our web site shortly thereafter and in the next issue of the *DMR Newsletter*.

Answers submitted by mail should be sent to:

Editor, *DMR Newsletter*  
Attn: Spot Contest  
North Dakota Geological Survey  
600 E. Boulevard Ave.  
Bismarck, ND 58505-0840

Answers submitted by e-mail should be sent to:  
[ndgspubs@state.nd.us](mailto:ndgspubs@state.nd.us).



## Answer to X Marks the Spot # 13



Figure 1. Coffin Buttes, view is to the east.

The three landforms marked by Xs in competition # 13 are known collectively as Coffin Buttes. Located about 12 miles south of the town of New Leipzig in Grant County they are clearly visible on the eastern horizon from State Highway 49 (fig. 1).

The upper slopes of Coffin Buttes comprise sedimentary rocks of the Tertiary-age White River Group (Chadron and Brule Formations), and the Arikaree Formation. Fossil vertebrates, mostly mammals, occur in all three formations particularly in the Brule, but with the exception of a few fragments tentatively identified as rhinoceros, none have been found at Coffin Buttes. However, of the more than 140 fossil vertebrate taxa found at similar localities in western North Dakota, at least 120 are mammals.

Administrative Assistant Linda Johnson drew Bill Kirk and John Mrozla as the competition winners. Both winners will receive a copy of *Dinosaurs, Sharks, and Woolly Mammoths*. Congratulations to the winners, honorable mentions to all the folks who gave the right answer, and thanks to everyone who participated in the competition.

Correct answers were submitted by:

Ron Bosch	Wheatland, WY
Alan Castoreno	Grand Forks
Bob Christensen	Bismarck
Ken Gardner	Drayton
<b>Bill Kirk</b>	<b>Beulah</b>
<b>John Mrozla</b>	<b>Harwood</b>
Terrance Zich	Sanford, FL

Buttes are the erosional remnants of former land surfaces. The buttes in southwestern North Dakota are the scattered remains of an Eocene/Oligocene/Miocene landscape that was formed between about 40 and 10 million years ago. At this time, western North Dakota was undergoing a profound climate change due, in part, to regional uplift associated with the rising Rocky Mountains to the west and the Black Hills to the south. Contributing to this change was a slowly deteriorating global climate, with glaciers already beginning to form in Antarctica: harbingers of the Great Ice Age still

more than 7 million years in the future. By the late Eocene, western North Dakota was a very different place to the subtropical world it had been for so long. Gone were the Cretaceous seas and the steaming coal swamps of the Paleocene. In their place was open woodland which, as the climate continued to cool and dry, gradually gave way to an almost treeless savannah.

This rather featureless landscape was dotted with lakes and crossed by sediment-laden rivers flowing out of the ancestral Rockies and Black Hills. Over a period of about 30 million years, these sediments were deposited as the sands, gravels, silts, and muds of the Chadron, Brule, and Arikaree Formations. At times, their deposition was interrupted by ash falls from erupting volcanoes in what are now parts of Wyoming and Montana. By about 10 million years ago this pile of stream and volcanic sediment was more than 650 feet thick. Then, between 5 and 10 million years ago a major cycle of erosion began, which removed almost all of this material leaving, in North Dakota, only isolated remains on the tops of a scattering of buttes in its southwestern corner (fig. 2).

An astonishingly rich assortment of fossils has been preserved in the rocks of the Chadron, Brule and Arikaree Formations: a silent testament to the diversity of fauna that lived on North Dakota's Tertiary savannahs. Vertebrate fossils, including mammals, are particularly abundant, especially in the lower portion of the Brule Formation. Many of these animals were members of families that still exist today. Herds of *Mesohippus*, ancestral horses about the size of a greyhound, shared the grasslands with the forerunners of other mammals including dogs (*Hesperocyon*), rabbits (*Palaeolagus*), squirrels (*Ischyromys*), sheep (*Merycoidodon*), pigs (*Perchoerus* and *Archaeotherium*), camels (*Poebrotherium*), and rhinoceros (*Hyracodon*, *Subhracodon*, and the gigantic *Brontotherium*). The lakes and streams were populated by a variety of fish, amphibians, turtles, and several invertebrate species including snails and ostracodes. Giant tortoises, some as large as those found on the modern Galapagos Islands, roamed the riverbanks and while their fossil remains are rare, there were birds as well to complete the tableau. (Murphy and others, 1993)

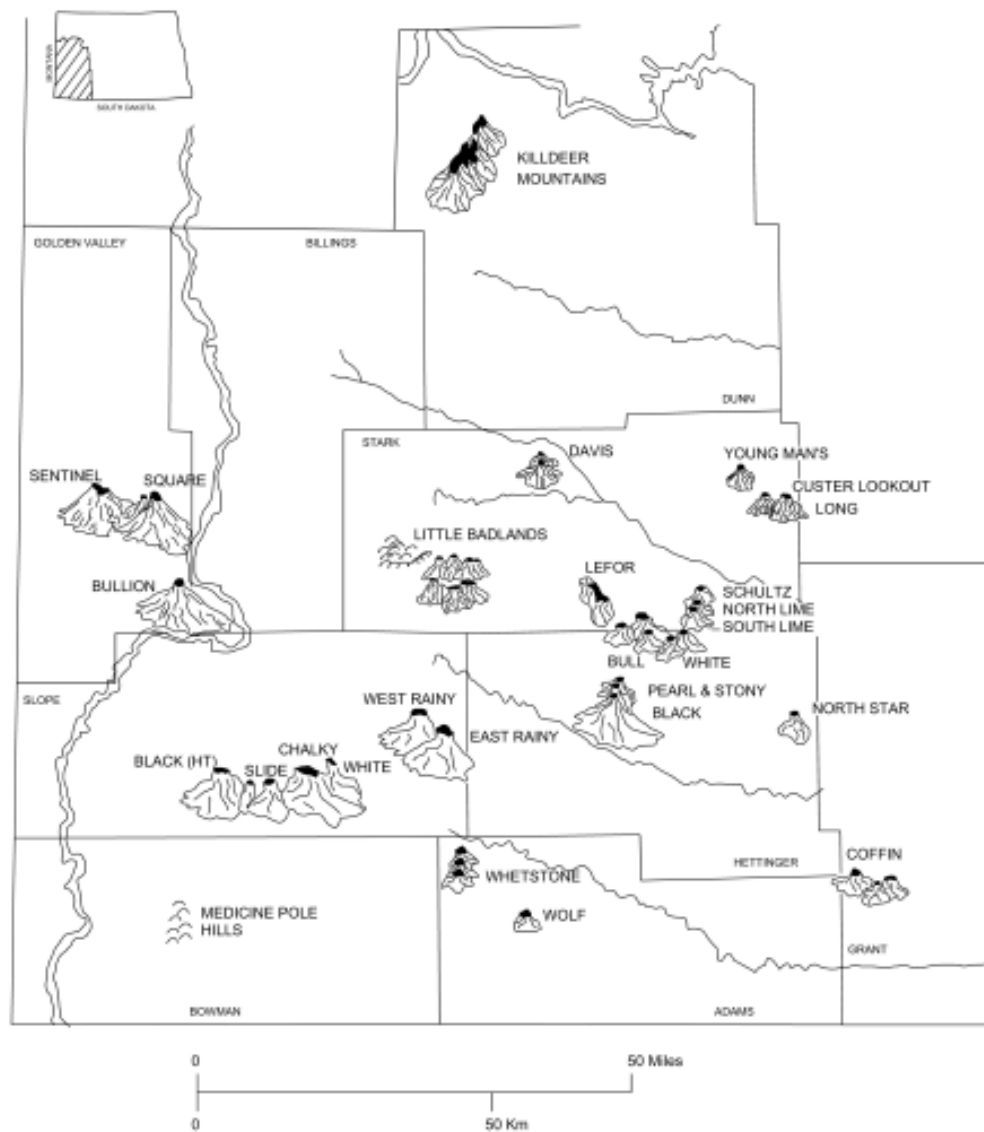


Figure 2. Buttes containing White River and/or Arikaree strata in southwestern North Dakota (Murphy and others, 1993).

Returning to Coffin Buttes and the 21<sup>st</sup> century, one might wonder how they came by their gloomy moniker. Local historian and long-time Grant County resident Roger Harmon very kindly agreed to research this little mystery for me. The popular opinion appears to be that they were named for their shape, which was said to resemble a coffin or coffins. A glance at figure 1 and aerial photographs of the buttes, however, soon dispels this notion. In my most recent conversation with Mr Harmon, he informed me that he had visited with an elderly lady near New Leipzig who told him that the buttes were named after a bachelor named Coffin who used to live in the area. Although county records cannot confirm this, a 1917 copy of the Morton and Grant County Directory does include an entry for Otto E. Coffman who lived near Fleak, about 5 miles north of the buttes. The legal description of his property actually suggests that Mr. Coffman lived some seven miles south of Fleak and within about two miles of the southernmost butte. Near, of course, is a relative

term and in the wide open spaces of southwestern North Dakota it seems to me that “near” could easily mean several miles. It may be, then, that Mr. Coffin and Mr. Coffman were one and the same but whether or not that is the case, I think the eponym fits.

My grateful thanks to Mr. Harmon for all his hard work and entertaining conversations on the subject.

#### Further reading

Edward C. Murphy, John W. Hoganson, and Nels F. Forsman, 1993, The Chadron, Brule, and Arikaree Formations in North Dakota - The Buttes of Southwestern North Dakota: North Dakota Geological Survey Report of Investigation no. 96, 144 p., 7 pl. (1:24,000).