

Montana Geology 2000

January

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The southwest side of Pompeys Pillar.

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November

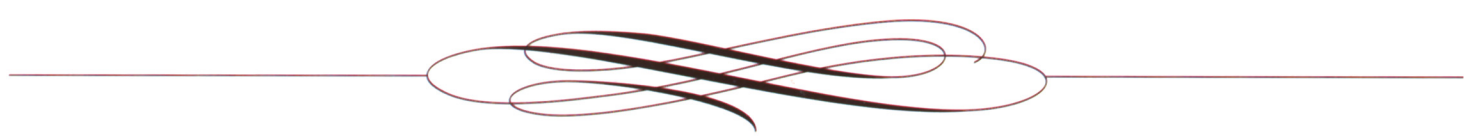
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December

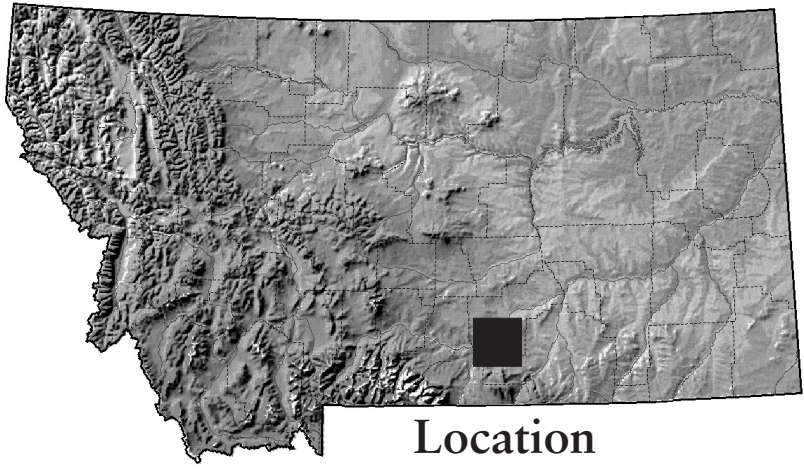
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Montana Bureau of Mines and Geology

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POMPEYS PILLAR



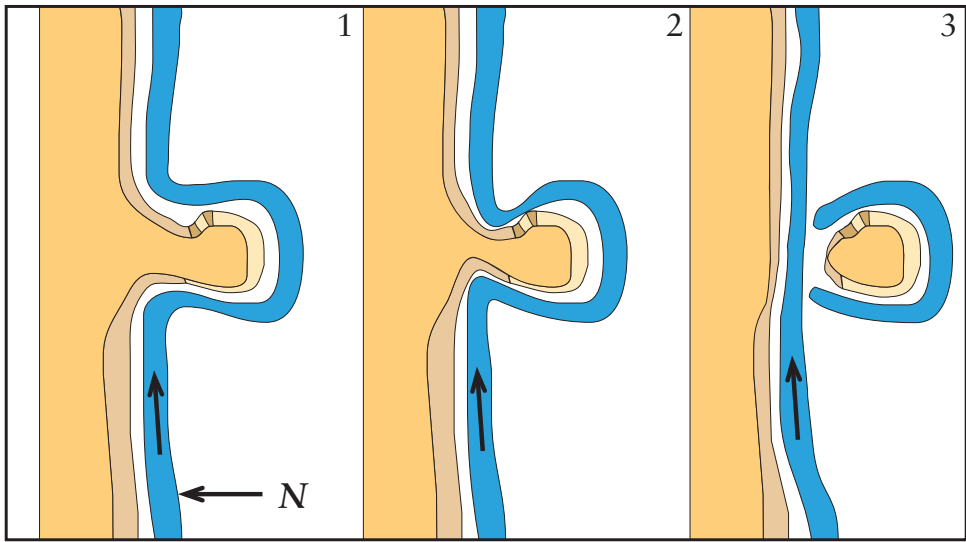
Location

Captain William Clark, on his “float trip” down the Yellowstone River in 1806, provided the first written description of the “remarkable rock” that he called Pompys Tower and that now bears the name Pompeys Pillar. Clark named the rock after the infant son of Sacagawea and Toussaint Charbonneau, Jean Baptiste Charbonneau, whom Clark had nicknamed “Pomp.” Today, trees obscure the view of the pillar from the river, but Clark’s view of its northern rock face was clear and distinct. He wrote: “at 4 PM arrived at a remarkable rock situated in an extensive bottom on the starboard [south] side of the river & 250 paces from it....This rock...is 200 feet high and 400 paces in circumference and only accessible on one side, which is from the northeast, the other parts of it being a perpendicular cliff of lightish colored gritty rock. On the top there is a tolerable soil of about 5 or 6 feet thick covered with short grass”(Moulton 1993).



Photo looking northwest with Pompeys Pillar in the lower right.

Pompeys Pillar, once the core of a river meander, stands as an outlier of the nearly continuous bluffs that rim the north side of the river for many miles upstream and downstream.



Pompeys Pillar became separated from the bluffs on the north side of the river as a river meander gradually cut through the neck of land connecting them.

One of the many rivers flowing from the rising Rocky Mountains during the Late Cretaceous (about 70 million years ago) deposited sand on its flood plain. The flood plain was near the sea shore that once covered this area and that was then receding slowly eastward as the mountains rose to the west. With time, this river sand became the “lightish colored gritty rock”—sandstone—that Clark described. The river also deposited silt and clay that is now found as mudstone underlying, interbedded with, and overlying the thicker sand deposits. Geologists have given the name, Lance Formation, to this sequence of deposits (see chart below). The Lance Formation and the laterally equivalent Hell Creek Formation contain abundant dinosaur bones, which Clark found several miles downstream in this formation. The tops of these formations mark the end of the dinosaur age.

CENOZOIC	PALEOCENE	Fort Union FM non-marine fluvial	Tongue River Member
			Lebo Member
			Tullock Member
MESOZOIC	CRETACEOUS	Lance FM non-marine fluvial	Hell Creek FM non-marine fluvial
		Fox Hills FM marine (nearshore)	
		Bearpaw FM marine (offshore)	

Although rivers have flowed northeastward past this area since the Late Cretaceous, the present Yellowstone River is a fairly “modern” stream. Age dating of *clinker* farther to the east (Hefern *et al.* 1983, Colton *et al.* 1985) suggests that the current valley began to form no more than about 2.5 million years ago. Several depositional terraces flank the modern river; they represent the surface of former flood plains left behind as the river cut downward to a new lower level. Former channels (meander scars) on the flood plain and higher terraces can be seen in aerial photos.



Aerial photo showing traces of channel scars on the flood plain and higher terraces. (U.S. Dept. of Agriculture, ASCS, 1:20,000 scale, photo number ZW-1GG-240, Yellowstone County, Montana)

In addition to the size, shape, and composition of Pompeys Pillar, Clark noted: “The Indians have made 2 piles of stone on top of this tower. The natives have engraved on the face of the rock the figures of animals, etc., near which I marked my name and the day of the month & year [July 25, 1806]”(Moulton 1993).

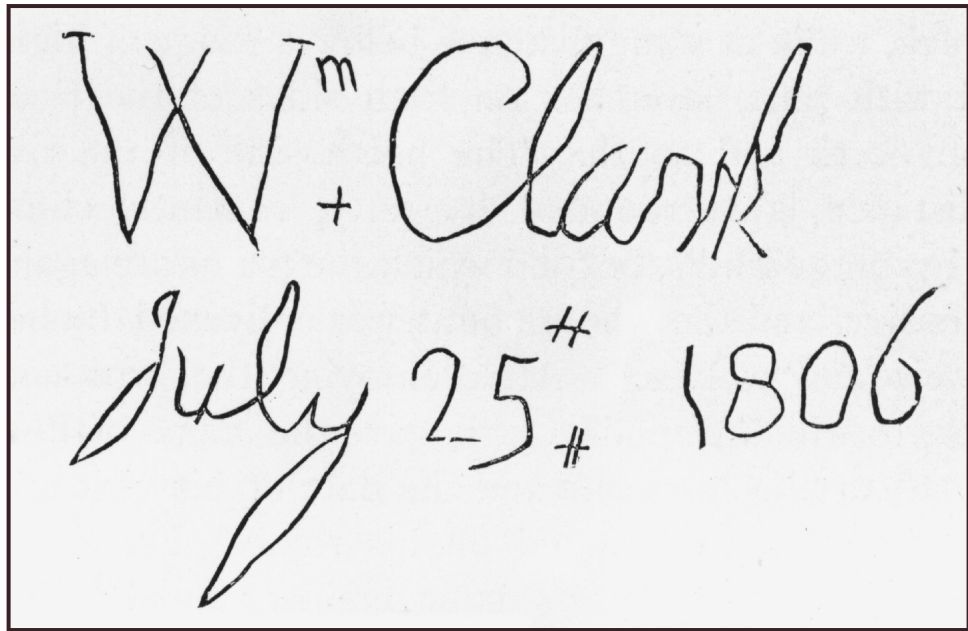


View of Pompeys Pillar from the south.
(Photo courtesy of Teresa Donato)

Evidence of Native American occupation of this area dates to over 5,000 years ago, based on archeological evidence (Taylor 1992). This tower, which provided Clark with such an imposing view of the surrounding area, undoubtedly also provided a lookout point for Native American hunters. The Crow Indians had been one of the principal tribes in this area prior to Captain Clark’s visit. The Crow (Apsaalooke) called Pompeys Pillar *Isibbiammaache*—a name that has been translated as The Mountain Lion’s Lodge, Where the Mountain Lion Preys, and Where the Mountain Lion Died. Dale Old Horn, a professor of Crow studies, recently interpreted the name to mean Where the Mountain Lion Lies (BLM 1994). Clark’s inscription on Pompeys Pillar was thought to be the only remaining physical evidence left by the Lewis and Clark expedition. During the past 50 years, however, additional materials have been discovered but not all of them have been authenticated.



The platform to the right was built in the area of Clark’s inscription.
(Photo courtesy of Teresa Donato)

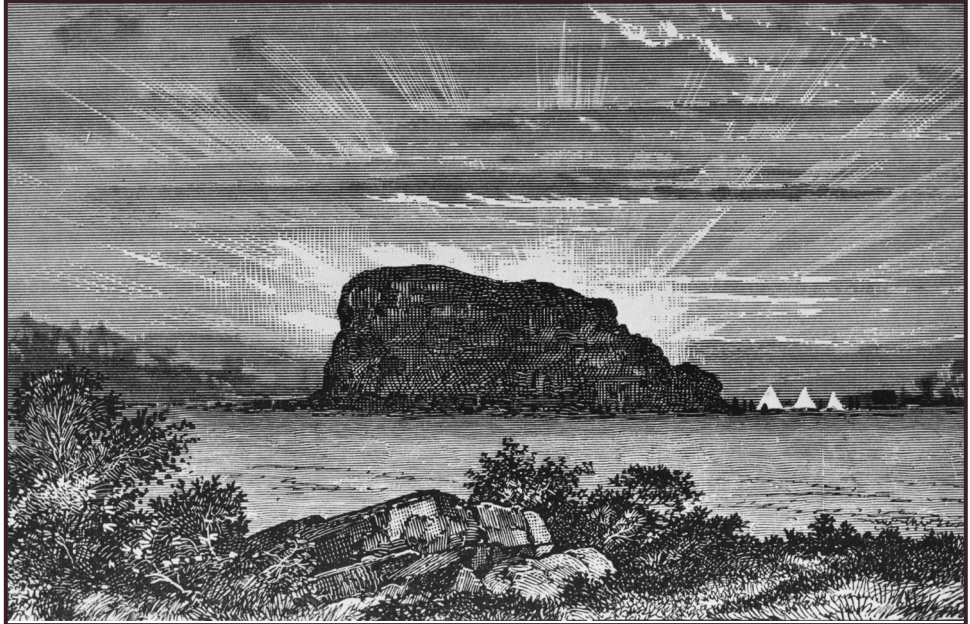


A facsimile of Clark’s inscription.
(From BLM photo files, not for public distribution)

Following Clark’s visit to the pillar, a small stream of Euro-American trappers and traders passed; they trapped mostly beaver until about 1840, then hunted bison after 1860. There were several Army-Indian clashes in eastern Montana from 1865 through 1877 (BLM 1994). The Montana Column out of Fort Ellis (Bozeman), in support of the Terry-Custer campaign, passed the Pillar in June 1876. Lieutenant Bradley, with that column, described the Pillar and told how one of the troopers refused to believe that William Clark had marked his name on it because he thought that no other white man had ever been along the valley before them.

During the campaigns of 1875–77, steamboats often helped supply the troops. The steamboat Josephine was the first to dock at the pillar (June 3, 1875). Other steamboats brought supplies up river past the pillar to communities such as Coulson (Billings) and Benson’s Landing near Livingston.

Surveyors were at work on the route of the Northern Pacific Railroad east of the mountains as early as 1876, but the tracks (from the east) did not reach Pompeys Pillar until 1882 (BLM 1994). After the tracks from the east and west were joined in 1883, travel past the pillar increased significantly. In 1904, U.S. Congress admitted homesteaders to the Crow Reservation. Homesteaders poured in until the mid-1920s; most left during the drought of the 1930s. Irrigated farms in the valley and dryland farms and ranches in the uplands are the current primary land uses and economic base of the area surrounding Pompeys Pillar.



Early pen and ink drawing from “Guide to the Northern Pacific Railroad and its Allied Lines” published in 1886.
(From BLM photo files, not for public distribution)

References

Heffern, E.L., Coates, D.A., and Naeser, C.W., 1983, Distribution and age of clinker in the northern Powder River Basin, Montana: American Association of Petroleum Geologist Bulletin 67, chap. 8, p. 1342.

Colton, R.B., Naeser, N.D., and Naeser, C.W., 1985, Drainage changes in eastern Montana and western North Dakota during late Cenozoic time: Geological Society of America Abstracts with Programs, v. 18, p. 347.

*Moulton, G.E., ed., 1993, The Journals of the Lewis & Clark Expedition: University of Nebraska-Lincoln, vol. 8, 456 p.

Taylor, J.E., 1992, Pompeys Pillar: Snapshots at a Crossroads: Unpublished manuscript, on file with Bureau of Land Management, Billings Field Office.

BLM, 1994, Pompeys Pillar National Historic Landmark, BLM guidebook, 14 p.

*Note: Where grammatically appropriate, Robert Bergantino has modified Clark’s entries to conform to present-day writing standards.

Text by Jon Reiten and Robert N. Bergantino; watercolor by Teresa Donato.
Aerial photos by Juli Reiten; pilot–Skip White.



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Scope and Organization

The Montana Bureau of Mines and Geology (MBMG) was established in 1919 as a public service agency and research entity for the State of Montana, *to conduct and publish investigations of Montana geology, including mineral and fuel resources, geologic mapping, and ground-water quality and quantity.*

In accordance with the enabling act, MBMG conducts research and provides information but has no regulatory functions. To carry out its duties more effectively, MBMG operates in five divisions: Research, Analytical, Information Services, Computer Services, and Administration, while the director holds the position of State Geologist.

Science and Service for Montana

- **Analytical Services**—analyzing the chemical quality of ground water and surface water; analyzing soils and biological tissue for metal content
- **Coal Hydrology**—investigating ground water in coal areas before, during, and after mining
- **Coal Resources**—evaluating effective reserves and establishing regional data bases
- **Computerized Resource Data Storage and Retrieval Systems**—compiling and storing Montana’s coal, water, and mineral resources information
- **Earthquake Studies Research**—monitoring and analyzing seismic activity in Montana
- **Economic Geology**—making detailed studies of Montana’s metalliferous deposits, industrial minerals, and coal and reporting on the activities of Montana’s mineral industry
- **Environmental Sampling and Monitoring**—providing objective analysis of contaminated water and soils
- **Geographic Information Systems**—generating digital maps of geology, minerals, and hydrology
- **Geologic Maps**—field mapping and compilation of bedrock and surficial geology; digital publication of quadrangle maps and other maps at various scales
- **Geothermal Investigations**—mapping and measuring Montana’s natural hot water resources
- **Ground-Water Resources Investigations**—evaluating the quality and the quantity of ground water in Montana
- **Hydrogeological Research**—assessing water-related environmental concerns, including saline seep and mine water drainage
- **Lectures and Public Addresses**—speaking to public groups on MBMG research, and Montana geology and hydrology
- **Mine Hydrology and Mine Waste Disposal**—investigating mine impacts on ground water and surface water
- **Mineral Museum**—displaying over 1,200 high-quality mineral specimens, group tours available
- **Montana Ground-Water Characterization**—monitoring and characterizing the state’s ground-water aquifers
- **Montana State Map**—revising and updating the state geologic map and derivative maps in 1°x2° quadrangles
- **Public Inquiry**—providing information on Montana geology and ground water
- **Publication and Map Sales**—providing documents on bureau research, USGS topographic and geologic maps, derivative maps, and access to federal aerial photos
- **Small Miners Assistance**—providing assistance to operators of small mines and prospectors
- **Statewide Ground-Water Assessment**—systematically evaluating Montana ground water and aquifers
- **Topical Studies in Regional Geology**—conducting investigations of Montana geology
- **Water Supply Evaluation**—evaluating the quality and quantity of water for municipalities and state agencies

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