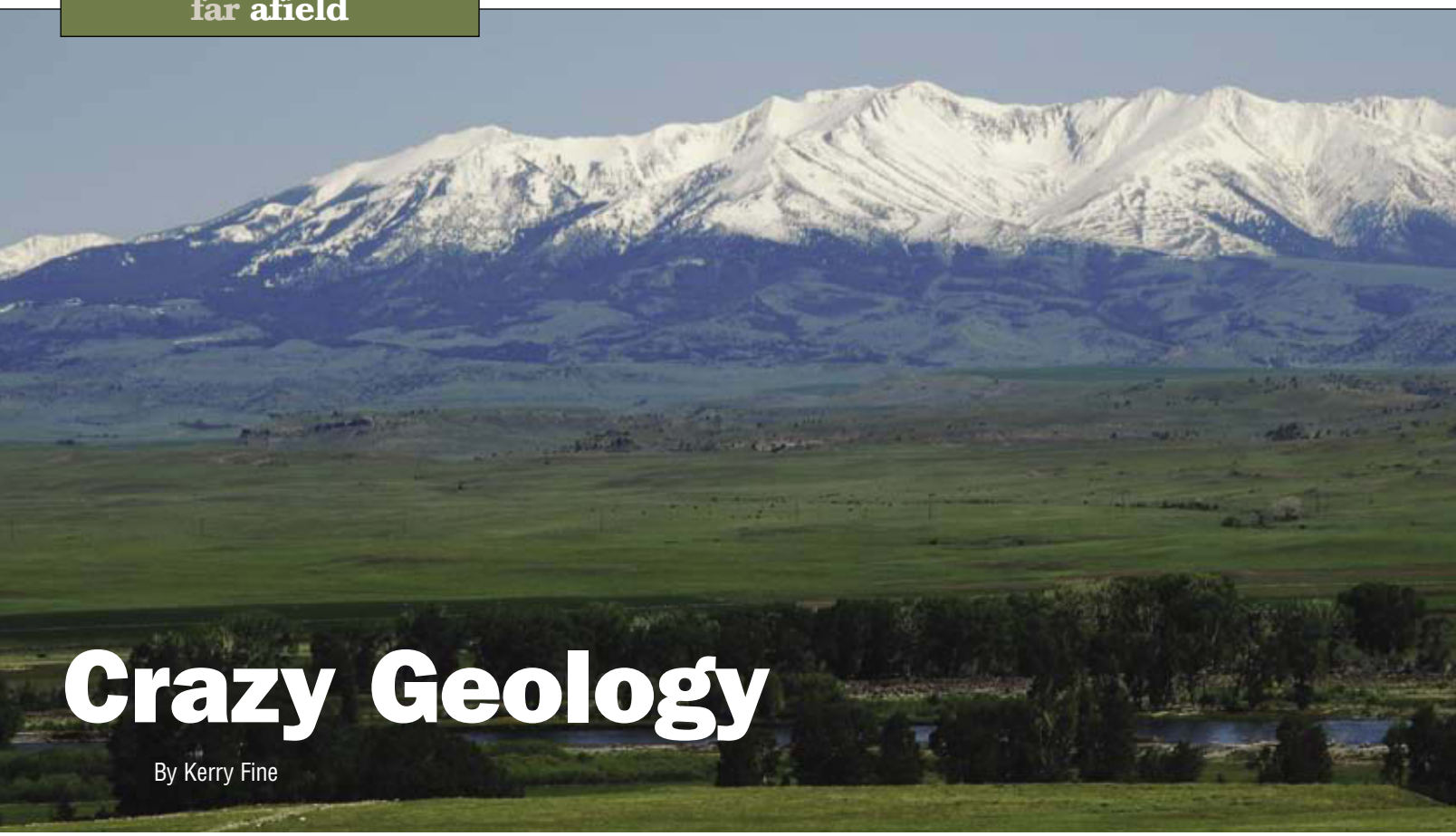


Crazy Geology

By Kerry Fine

I have always been a wayside geologist, curious about formations encountered along roads and trails. Recently, while driving west on I-90, near the town of Big Timber, it occurred to me that the mountains you see rising so dramatically in front you to the north are not part of the Rocky Mountains. In fact, when you look at them in satellite photos, the Crazy Mountains appear to be an island of gray peaks with a ring of green growth, floating on the prairie. And, in fact, the Crazies are a type of formation referred to as an island mountain range.

Because they project so spectacularly from the plains, I had assumed that the Crazy Mountains were part of the great collision of tectonic plates that formed the massive jagged wrinkles of the Rockies. However, the Crazies have a more localized origin. Much like islands in the ocean, island mountain ranges are formed in part by volcanic activity.

The Crazy Mountains rise up like an island on a prairie sea. (BELOW) The area of exposed igneous rock in the Crazies is one of the largest in the world.

Photo by R Robinson,YNP

Between 25 and 50 million years ago, magma seeped upward through the layers of sandstone and soft sediment that covered the area that is now central Montana. The magma never came to the surface but remained trapped below ground, forming an intrusive pocket of igneous rock, referred to as a stock. The stock measures approximately four miles wide and six miles long. In addition to forming the stock, magma spread outward, away from the stock, through fissures in the layers of sandstone and shale, forming radiating

Photo by Donnie Sexton, Travel Montana

Photo by Jim Peaco,YNP

Introduced to the Crazy Mountains in the early 1940s, mountain goats found the habitat greatly to their liking, having a detrimental impact until their population was controlled.

structures called dikes, which resemble rock walls. And in some places the magma was able to spread out in massive sheets that, after they harden, are called sills.

Most likely there were no Vesuvian eruptions, just a slow steady seeping, upwelling and eventual cooling into structures much harder than the sediment and sandstone that surrounded them. Over the long course of time, the slow process of erosion by wind, rain and streams began to shape valleys. During the last ice age, glaciers formed over the area and bulldozed the valleys, eating away about a mile of softer sediment that covered the igneous rock. Because the igneous rock that formed below ground was so much harder than the shale and sandstone surrounding it, the receding glaciers exposed and sculpted the stunning, chaotic-looking structures of the Crazy Mountains that we see today. Indeed, the area of exposed igneous rock in the Crazies is one of the largest in the world. Among the range's many vertical, jagged peaks there are 23 between 10,000 and 11,000 feet. More than a dozen of them are still unnamed. The highest point, Crazy Peak, has an elevation of 11,214 feet.

Glacial erosion may seem unexciting when compared to the tectonic up-thrust formation of the Rockies, yet this slow and steady wearing away created a striking island range in a relatively compact area, covering about 140,000 acres. On a U.S. Geological Survey map of ecoregions, the Crazy Mountains are carefully outlined and graphed as their own unique ecoregion. Because the peaks of the Crazies project into the clouds, they can draw as much as three times the annual precipitation of the prairie foothills and sagebrush steppe that surround them. Like an island of land at sea, the Crazy Mountains are a biotic island, anchored to the plains, supporting flora and fauna unlike that of the surrounding landscape, and greeting west bound travelers with their first glimpse of the immense geological processes that have shaped our area.

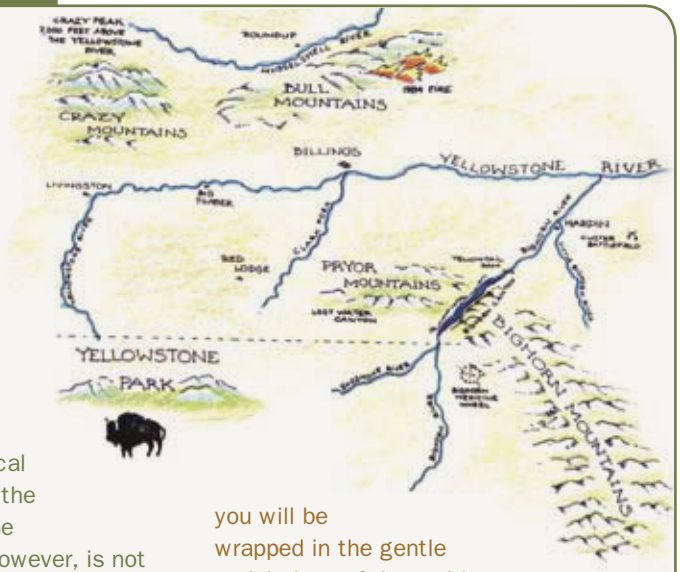
—Kerry Fine is a second-year master's student in the Literature program at the University of Montana and a life-long amateur rock hound.

Other Crazy Info

■ Nowhere else in Montana is the transition from prairie to mountains so dramatic. Over the space of 20 miles, from the low terraces of the Yellowstone River to the top of Crazy Peak, the landscape rises 7,000 feet....

■ Fully half the range is composed of nearly vertical peaks and rock slides at the bases of broken cliffs. The exposed, rocky terrain, however, is not without plentiful water. Alpine basins support lush coverings of vegetation, and 40 high-country lakes...are fed year round by snowfields. Water rushes through cascading streams, forming the headwaters of the Musselshell to the north and the Missouri to the west. The Shields River and Sweetgrass Creek flow from opposite sides of the range to water the Yellowstone.

■ .... [The Crazies] mark the horizon from great distances. Early travelers, in fact, used them to measure their progress up the Yellowstone Valley. Some say the Crazies even got their name by popping up in the craziest places on the central Montana horizon:



you will be wrapped in the gentle undulations of the prairie, then suddenly, this grand bulge of land breaks up from the horizon.

Other tales say that the wall of mountains was named when a woman settler was separated from her wagon train and wandered into the mountains. She could not survive the isolation and the rugged terrain without going mad, so the range was dubbed the Crazy Woman Mountains. The name apparently stuck, though it was later shortened.

—*From* Islands on the Prairie: the Mountains of Eastern Montana, *by Mark Meloy.* Montana Geographic Series, Montana Magazine.