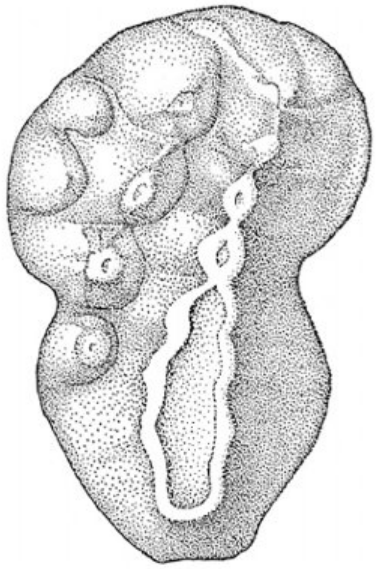

It doesn't look like much to the untrained eye, but a tiny tooth from Utah yielded some big information to researchers from the Alf Museum and The Webb Schools . A five millimeter-long premolar collected on a 2006 Alf Museum expedition turns out to be the first specimen of the rare fossil mammal *Kimbetohia* (pronounced "kim-buh-TOY-uh") from Utah. *Kimbetohia* is an extinct mammal called a multituberculate, and only a handful of specimens are known previously from New Mexico, Montana, and possibly Colorado. Additionally, the fossil helps to more certainly establish the uncertain age of rocks exposed in this part of Utah, to between 65.3 and 64.3 million years ago.

Some ancient animals were just plain weird, and multituberculates are a particularly good example. They superficially resembled rodents such as squirrels and rats, but went extinct over 30 million years ago without leaving any living descendents. Multituberculate teeth were bizarre - the upper molars and premolars were studded with complex lines of bumps (the reason behind the name "multituberculate"), and some lower premolars were modified into blades for slicing and dicing a varied diet. Even though complete skulls of multituberculates are fairly rare, their complex teeth mean that individual species can be identified from a single molar or premolar.

Multituberculates also evolved quite quickly, with each species living for only a (geologically) short period of time. Thus, certain species are characteristic of certain times in Earth's history.

Volcanic ash beds can be precisely dated in a laboratory to determine their age, and are common surrounding many of the rocks that contain multituberculate fossils. Thus, where ash beds and multituberculate fossils are found together, the age of the fossils can be precisely determined. In places without these ash beds (such as parts of Utah), the occurrence of a particular species of a fossil then can be used to infer the age of the rocks.

The new *Kimbetohia* fossil was found in rocks of the North Horn Formation in central Utah. The North Horn Formation spans the time interval before and after the extinction of the dinosaurs (and other organisms) 65 million years ago. Thus, it is important for understanding how Earth recovered after the catastrophe. However, any scientific studies must rely upon precise dating of the rocks - without knowing their age, it is difficult to place the fossils in a global context. The geological complexity and sparse exposures of North Horn Formation have made it difficult to determine the age of the fossils from after the extinction. Fortunately, the new *Kimbetohia* fossil is helpful for answering this question. Because fossils of *Kimbetohia* from elsewhere in North America are found only in rocks of certain ages (between 65.3 and 64.3 million years old, to be precise), parts of the North Horn Formation can tentatively be dated to the same age. Furthermore, because Kimbetohia is so rare, the new fossil provides important information for identifying and interpreting other specimens.

The new study was led by Alf Museum director Dr. Don Lofgren. Several students from The Webb Schools also contributed (including Brianna Gaytan, Michelle Pastrano, Jessica Rice, and Rachel Zheng), through the museum's student research program. Fossils in this study were collected under permit from the United States Forest Service, and the research was funded in part by the David B. Jones Foundation and Mary Stuart Rogers Foundation. The work appears in the latest issue of Journal of Vertebrate Paleontology.

Citation:

Lofgren, D. L., B. M. Gaytan, M. Pastrano, J. E. Rice, and R. L. Zheng. 2012. First record of *Kimbetohia campi* (Mammalia, Multituberculata) from the Paleocene part of the North Horn Formation, Utah. *Journal of Vertebrate Paleontology* 32:1214–1217. [direct link to journal - subscription required] [email for copy of PDF]

Northcloud Tooth Kitchen by Atout Fayette from Sanders, published in Lofgren et al. 2012 ; image of