



NEWSLETTER

Geologic Mapping: A Time Honored Value



Historic photo of a geologist's modest field headquarters, informally titled "Camp Frigidus", located near the St. Francois River. (MGS photo archive circa 1860)

A Note from the President

The first information formally collected by geologists in Missouri was done so during the mid-19th century. This data was accurately ushered onto paper to preserve two dimensional depictions of mineral wealth in local and county-wide areas of the state. At the direction of Governor Sterling Price, a geologic survey of the state was begun and the first geologic maps of Missouri lands and waters were published in 1855. That work has continued for over 160 years.

Geologic maps have a considerable economic, societal, and scientific value. Since 1993, the Missouri Geological Survey has participated in the National Cooperative Geologic Mapping Program managed by USGS, producing and publishing state-of-the-art geologic map products. As shown by cost benefit studies, these efforts have the potential for producing nearly \$200 million in economic value for Missouri. The studies show that the value of a geologic map is 25 to 39 times the cost to produce it, and developers and engineers can save about \$50,000 per project when modern geologic mapping is available in their area^{1,2}. You can't find prices this good at your local discount box store!

Though we have learned much about the geology and hydrology of Missouri, we are a long way from a full understanding. It is our child-like desire to know more that keeps us researching to reveal the processes that formed and continue to shape this part of a dynamic planet. We will continue so as to support responsible and sustainable development of our state's mineral, energy, and water resources; safe development and modernization of infrastructure, waste disposal facility siting and design; investigation and remediation of environmentally impacted sites; protection from losses due to geologic or anthropogenic hazards; land use decisions; and the wise use of the state's natural resources for tourism and recreation. One thing is for sure, geologic mapping will continue to play a crucial role in all of these areas and more.

Today's geologic mapping utilizes new technologies in order to increase or maintain high accuracy and produce information that can hopefully be more easily conveyed and used. Tools such as GIS, GPS, LIDAR, remote sensing, and three-dimensional display techniques are employed to create accurate digital images rather than paper ones. These images offer viewing and modeling capabilities that may help increase one's understanding of the geology in an area without even being there. Mapping data can be collected electronically, processed electronically, and disseminated electronically. Like it or not, creating geologic maps in paper is no longer the norm. Even the most historic maps, which contain vital information, have been electronically scanned and are available in a viewable format. But, if you desire to have a paper copy of a geologic map, pick your favorite format and print it out. Otherwise, with your laptop, tablet or smart phone you'll be ready for geology in the 21st century.

Jerry

2013 Annual Meeting

The 60th annual meeting of the Association of Missouri Geologists will be held on September 27th and 28th at the Hilton Garden Inn, 2644 East 32nd Street in Joplin, MO. Friday afternoon the field trip will feature mining and remediation near Joplin. Following the field trip will be the annual business meeting and dinner.

The field trip on Saturday will explore Missouri's Mississippian stratigraphy as exposed along Highway 71 south of Joplin. Please check the website (www.missourigeologists.org) for more information.

AIPG Poster Contest

Don't forget that AIPG will be hosting a poster contest at this fall's AMG banquet! The AIPG—Missouri section will be paying banquet fees for participating students and also award tuition assistance cash prizes to the top three presenters in the amounts of \$600, \$400, and \$200 for first, second and third place respectively. Undergraduate and graduate geoscience students from all Missouri universities and colleges are welcome to participate.

Missouri Geologists' Consortium Formed

The April 2013 issue of the AMG newsletter included information on a proposed measure to eliminate licensure requirements for the practice of geology in Missouri. This was proposed as House Bill 659³, and was introduced by Representative Nick Marshall from the 13th District near Kansas City, MO. At the end of the legislative session the bill had not moved. It was never placed on a House calendar nor scheduled for a hearing.

An interesting outcome of this proposed legislation came through an education effort by members of the geology profession. A June 1st meeting was organized and chaired by Duane Kreuger of Geotechnology, Inc. and attended by 18 other geology professionals that work in the state. One of the products of the meeting was an organization of a new watchdog group known as the Missouri Geologists' Consortium (MGC). The group will be a technical resource for Missouri legislators and will monitor proposed legislation related to geology issues in Missouri. <http://pressreleases.kcstar.com/release/messages/45562/>

A subset of MGC members met with Missouri Department of Natural Resources Director Sarah Parker-Pauley on July 19th. A variety of issues were discussed, including the importance of the geosciences and how they relate to the department's mission. This seems to have been a successful endeavor, and the MGC has been invited to participate as a stakeholder in one of DNR's forums on industry and the environment.

The next meeting of the Missouri Geologists' Consortium will be Saturday, September 21st at 10:00 am. The meeting will be held in Conference Room B of the Boone County Regional Library at 100 West Broadway in Columbia, MO. It will also be possible to connect remotely. For more information, please contact Phyllis Steckel at 636-239-4013 or psteckel@charter.net or Duane Krueger at 314-997-7440 or d_kreuger@geotechnology.com

Geology at a Glance:

The State Dinosaur – *Hypsibema missouriense*



Hypsibema missouriense was first discovered in 1942 when Missouri Geological Survey geologist Dan Stewart was working near the town of Glen Allen in Bollinger County. Dan was investigating clay deposits in the area when a local family told him about clay they had encountered in a recently dug well. When Dan arrived at the location, he was shown several bones that had been found in the clay. These bones were eventually sold to the Smithsonian but it was not until the 1980s that the dinosaur was correctly identified as a hadrosaur or "duck

billed" dinosaur. It was an herbivore with jaws that contained over 1,000 teeth. *H. missouriense* had evolved specialized teeth to handle the tough, fibrous vegetation of the time. *H. missouriense* lived in Missouri during the late Cretaceous period around 75 million years ago and became the state's official dinosaur on July 9, 2004.

Taking the “lime” out of limestone.

Missouri is the number one producer of lime in the US. Missouri industries produce nearly 2.5 million tons of lime each year at a value of around \$237 million. This equates to over 18% of US production. Of more than 60 mineral commodities produced in the US, lime is one of a few that does not need to be imported due to a large domestic production. The US actually exports over 160,000 tons each year.

The most important commercially developed limestone units come from a sequence of Mississippian, Devonian and Middle Ordovician rock strata. These units include, but are not limited to, Plattin Group limestone, Kimmswick Limestone, Pierson Limestone, Burlington-Keokuk limestones, Warsaw Formation limestone, Salem Formation limestone, and St. Louis Limestone. Most of the limestone marketed as “Missouri marble” has come from this sequence.⁴ Lime is developed from very pure deposits of these formations.

There are literally thousands of uses for lime that impact our daily lives. These range from the manufacture of products like paper, plastics, rubber, glass, steel and other metals, to treating and cleaning water, wastewater, and air emissions in the process of using fossil fuels. It serves a myriad of uses in the food industry, including the reduction of carbon dioxide produced by stored fruits and vegetables thereby lengthening their storage time. It is used in the production of milk and milk products such as butter, as a stomach antacid, and in baby food and tooth paste. Interestingly enough, all quality tortillas and corn chips are treated with lime. Next time you have a really good tortilla, remember that lime gave it that special flavor.

See <http://minerals.usgs.gov/minerals/pubs/commodity/lime/lime-1960-2009.pdf> for more information about the history of lime production in the United States.

References Cited

- ¹ Bhagwat, Subhash B. and Viju C. Ipe. (2000). *Economic benefits of detailed geologic mapping to Kentucky* (Special Report 3). Champaign, IL: Illinois State Geological Survey.
- ² United States Geological Survey. (1993). *Societal Value of Geologic Maps* by R.L. Bernknopf, D.S. Brookshire, D.R. Soller, M.J. McKee, J.F. Sutter, J.C. Matti, and R.H. Campbell (U.S. Geological Survey Circular 1111). Washington, D.C.: Government Printing Office.
- ³ H.B. 659, 97th Gen. Assem., Reg. Sess. (MO 2013). Retrieved from <http://www.house.mo.gov/billsummary.aspx?bill=HB659&year=2013>.
- ⁴ Missouri Department of Natural Resources. (n.d.) Missouri Limestone. *Missouri Department of Natural Resources Geological Survey Program*. Retrieved August 13, 2013 from <http://www.dnr.mo.gov/geology/geosrv/imac/limestone.htm>.