

# Memorial to William J. McMannis 1924-1973

JOHN MONTAGNE

*Department of Earth Sciences, Montana State University, Bozeman, Montana 59715*



Dr. William J. McMannis, professor of geology at Montana State University, Bozeman, died on December 10, 1973. He was 50 years old and in the prime of his geological career. He is survived by his wife, three children, his parents, his brother, and his sisters.

Dr. McMannis was born in Dillon, Montana, October 13, 1924, and attended several Montana institutions, receiving his B.A. from the University of Montana in 1948. After attending the University of Wyoming for a short time, he accepted the opportunity for a research and teaching assistantship under Professor W. T. Thom at Princeton and received his Ph.D. in geology from that institution in 1952. His thesis, printed essentially in its entirety by The Geo-

logical Society of America (1955), stands as an unchallenged landmark in the structural and stratigraphic relations of the Bridger Range in Montana, and serves as an authoritative regional paper on southwestern Montana.

Dr. McMannis served three years in the U.S. Navy prior to graduate school. His first professional position in geology was that of junior geologist with Carter Oil Company, working on the structural geology of the Rocky Mountain region. He accepted a teaching position at the University of Kansas, Lawrence, in 1952, transferred to Montana School of Mines as assistant professor in 1953, and worked for Shell Oil Company prior to coming to Montana State University in 1957.

At Montana State University, Dr. McMannis rose from assistant professor to professor through the years. He contributed greatly to the success of the earth sciences department at that institution, while serving with distinction on many important institutional committees. His penchant for detail and his native intelligence and ability made him a valuable critic, while his growing authority on geology led to important leadership and consulting services to the geologic profession, both on and off the academic campus. Among his more important professional responsibilities were the vice-chairmanship of the Rocky Mountain Section of GSA in 1968, president of the Montana section of AIPG in 1969, and president of the North-Central section of the NAGT in 1968. He served as councilor and secretary of the Yellowstone-Bighorn Research Association and as cochairman of several field conferences and committees of the Montana Geological Association. In addition, he was a very effective associate editor of the *AAPG Bulletin*.

If there ever was a geologist with his roots in the field, that man was Bill McMannis. He understood the significance of the whole spectrum of geological field relations, and

these many aspects received clever and effective synthesis in productive papers. His work emphasized the structural and stratigraphic relations of the Northern Rocky Mountains. No terrain was too rough for him to negotiate, a fact proven by his considerable mountain climbing experience while on expeditions to the Cordillera Blanca in Peru, to Alaska while working summers for the Geological Survey, and to the Swiss Alps as a member of the select group of individuals in field excursions sponsored by the American Geological Institute. A close associate has recalled a vivid memory of Bill on many societal field trips, when he stoked his pipe at the bottom of a hill and then accelerated up a steep slope, puffing away like a steam engine, at the head of a long column of less hardy fellow geologists falling one by one by the wayside. His relentless search for detailed field evidence is legend. He had a dream of one day establishing a school of geology with close friends, in the Bitterroot Mountains of Montana, in the midst of his geologic ideal. He came close to this dream, in the context of the Gallatin Valley, while serving at Montana State University.

Following his Bridger Range publication, Dr. McMannis turned his attention to the broad aspects of western Montana tectonics, in the "Taylor Thom" fashion. Here he divided the state into a framework of sectors which included the Northwest Montana Overthrust Sector, the Batholithic Sector, and the Osburn "Fault" Zone which separated them. While this discussion was confined to the guidebook to field trips for the twelfth annual meeting of the Rocky Mountain Section, Geological Society of America (1959), McMannis continued this synthesis in subsequent classroom presentations and added to it the Central Montana Intrusive Sector and the Southwestern Montana Shelf Sector. This thinking stimulated his original interest and curiosity in the Beltian rocks and led finally to formal publication of a most useful summary of the coarse facies of the Belt Supergroup (1963).

Dr. McMannis first encountered the coarse Beltian rocks in pursuit of his Bridger Range studies. Here local Precambrian faulting created a trough into which was poured a facies that consists mostly of the classical pink-specked arkose. In his 1963 GSA paper, however, he summarized the more extensive and significant distribution of coarse Beltian rocks in a narrow zone, extending from the Bridger Range on the east to the Highland Mountains on the west. He showed that these rocks were deposited over an extensive time span, and that they were localized just north of a composite uplift, which coincided more or less with the present configuration of the north margin of the Middle Rockies, that is, the Gallatin, Madison, and Tobacco Root Ranges. He took part in many field conferences on Beltian stratigraphy and distribution as a result of his expertise on that subject.

A stimulating influence on Dr. McMannis's professional career was his attachment to the Montana Geological Association. Many annual field conferences of this group challenged his geological curiosity and generated the production of timely papers on the subject at hand. Two of those subjects were the Livingston Group, of Late Cretaceous to Paleocene age, and the complex stratigraphic relations of the Devonian through Mississippian rocks in southwest Montana. Because his Bridger Range work included reference to the upturned edges of the Livingston group along the east flank of the Bridgers, it was natural that he would extend his later studies into the Crazy Mountains Basin directly to the east. Among his unique discoveries was a fossil bird's

nest containing eggs and young about halfway from the base of the 14,000-foot Livingston Group section near Bozeman. In 1962 he accomplished a summary of the Devonian of the Gallatin–Yellowstone Region in an astoundingly rapid fashion to meet an early deadline for the guidebook in which this summary was to appear. He worked effectively with his students, even in heavy snow cover, to achieve a compilation of measured sections and studies of previous works which led to a valuable clarification of reef-associated facies, including the Maywood, Beartooth Butte, Jefferson, Three Forks, Sappington, and Lodgepole Formations. Armored placoderm plates from the Early Devonian Beartooth Butte Formation were particularly interesting and significant in this part of Montana. This work was later augmented by McMannis in a paper co-authored with C.A. Sandberg. They demonstrated that the regional occurrence and local association of Upper and Lower Devonian channel-fill deposits in the same general stratigraphic setting suggest that some valleys, which previously had been inundated by the Early Devonian sea, served to localize and control the southward and eastward transgressions of the Late Devonian sea.

In 1964 Dr. McMannis teamed with R. A. Chadwick to produce an important regional paper on the Gallatin Range of Montana. In addition to the volcanic history throughout the Tertiary, this paper emphasizes that several northwest-trending compressive zones carried through beneath the lavas of the Gallatin Range, and that the relief beneath the present 3,000 feet of lava and laharic breccias totaled 2 miles. The paper could be termed a field research of the traditional and classical type. A spin-off paper was presented to the Billings Geological Society in 1964, describing the change in direction of the prevolcanic Gallatin drainage, which was to the northeast into the Yellowstone, to a more northerly direction into the Missouri along the west edge of the Gallatin Range block.

In his résumé of depositional and structural history of western Montana which appeared in the *AAPG Bulletin* (1965), McMannis again gathered together the miscellaneous observations of the moment, including his own, and produced an excellent synthesis that helped the profession to understand Northern Rocky Mountain geology. In 1968 he contributed a paper on Cretaceous rocks of the western Crazy Mountains Basin which served as the basis for the Rocky Mountain Section GSA Field Trip during the Bozeman meeting of that year.

McMannis had conducted several field courses for Montana State University through the 1960s, and for part of these sessions he chose to work along the front of the North Snowy Block of the Beartooth Range near Livingston, Montana. Within this block a complexly folded and faulted metasedimentary sequence lent itself well to the interpretation of part of the Precambrian history here, and this then became the next object of McMannis's intense research. The work required the cooperation of several colleagues because of its complexity, and to date, it has only been summarized at several meetings in abstract form. The final paper is pending. One reason for the study was to obtain details of Precambrian structure (possibly applicable to the entire Beartooth-Absaroka highlands) but in an area which was not hidden beneath thick lavas or baked beyond recognition by intrusive vents. The team recognized five folding phases in the North Snowy Block, progressively decreasing in metamorphic intensity. Nappelike masses with many miles of offset are proposed, all of which give a surprising view of

the Precambrian realm so often neglected because of the homogeneity of the scene and the difficulty with which a sensible interpretation is worked out. The profession awaits the final paper which will be a tribute to the diversity of interest which Dr. McMannis generated in his career.

Dr. McMannis's teaching career occupied the major part of his professional life for nearly twenty years. He was a very intense teacher who prepared in great detail for each teaching duty. He expected, and usually got, great output from his students. He was more skilled with advanced students than with those in the early phases of geological study. Perhaps the student who benefited most was the one who put as much as McMannis did into his studies and who went with him in the field where intellectual stimulation was joined with a tremendous amount of physical effort in finding geological answers in difficult mountainous places. The subsequent professional success and dedicated tributes of those students who worked closely with McMannis provides ample testimony to the singularity and effectiveness of his work. One of the humorous and true stories around this campus concerns the fate of an elementary geology student who showed up early for a field trip and was anxiously waiting at the assembly point when McMannis came by in his jeep. Bill leaned out to the unsuspecting student and said, "Well, are you coming?" Thinking that this was the intended field trip, and unaware of a previous announcement by McMannis calling for help in measuring a difficult section in the Yellowstone Canyon area, the student hopped in and soon found himself clawing at steep cliffs and scrambling like mad from one section to the next for the remaining daylight hours. The student, still astounded, and hungry, announced in class the following morning that he would make sure not to show up early for future field trips, though he did learn what professional geology is all about in a very short time. That was, perhaps, worth more than the assignment of the intended field trip.

Any résumé of the career of William J. McMannis would hardly escape the strong conclusion that here was a man dedicated to geology—first, last, and always. It is a pity that his career ended so abruptly in the midst of such promise and useful production.

#### SELECTED BIBLIOGRAPHY OF W. J. McMANNIS

- 1955 Geology of the Bridger Range, Montana: *Geol. Soc. America Bull.*, v. 66, p. 1385-1430.
- 1957 The Livingston Formation, *in* Billings *Geol. Soc. Guidebook*, 8th Ann. Field Conf.: Billings, Mont., p. 80-84.
- 1959 Salient tectonic features of western Montana, *in* *Geol. Soc. America Rocky Mtn. Sec. Field Trip, Guidebook*, 12th Ann. Mtg.: p. 71-75.
- 1962 The search for a basic geology curriculum: *Geotimes*, v. 6, no. 8, p. 32-35.
- Devonian stratigraphy between Three Forks, Montana, and Yellowstone Park, *in* Billings *Geol. Soc. Guidebook*, 13th Ann. Field Conf.: Billings, Mont., p. 4-12.
- 1963 LaHood Formation—A coarse facies of the Belt Series in southwestern Montana: *Geol. Soc. America Bull.*, v. 74, p. 407-436.
- 1964 Major drainage changes in the Gallatin-Yellowstone River region, Montana: *Billings Geol. Soc. Spec. Paper No. 10*, 9 p.
- (and Sandberg, C. A.) Occurrence and paleogeographic significance of the Maywood Formation of Late Devonian age in the Gallatin Range, southwestern Montana: *U.S. Geol. Survey Prof. Paper 501-C*, p. C50-C54.
- (and Chadwick, R. A.) Geology of the Garnet Mountain quadrangle, Gallatin County, Montana: *Montana Bur. Mines and Geology Bull.* 43, 47 p.

- 1965 *Résumé of depositional and structural history of Western Montana*: Am. Assoc. Petroleum Geologists Bull., v. 49, p. 1801-1823.
- 1968 (and Roberts, Albert E., and Skipp, Betty) *Cretaceous rocks of the western Crazy Mountains Basin and vicinity, Montana*, Geol. Soc. America Rocky Mtn. Sec. guidebook, 21st Ann. Mtg.: Bozeman, Montana State Univ., 23 p.
- 1971 (and Skipp, Betty) *Geologic map of the Sedan quadrangle, Gallatin and Park Counties, Montana*: U.S. Geol. Survey, Open File Map.
- (and Palmquist, J. C., and Reid, R. R.) *Precambrian geologic history, north Snowy Block, northwestern Beartooth Mountains, Montana*: Geol. Soc. America, Abs. with Programs (Rocky Mountain Sec.), v. 3, no. 6, p. 394-395.
- (and Palmquist, J. C., and Reid, R. R.) *Origin of gneisses in the north Snowy Block, Beartooth Mountains, Montana*: Geol. Soc. America, Abs. with Programs (Rocky Mountain Sec.), v. 3, no. 6, p. 395.
- (and Palmquist, J. C., and Reid, R. R.) *Structural evolution of the north Snowy Block, Beartooth Mountains, Montana*: Geol. Soc. America, Abs. with Programs (Rocky Mountain Sec.), v. 3, no. 6, p. 395-396.