

Memorial of Jeffrey A. Grambling 1953–1993

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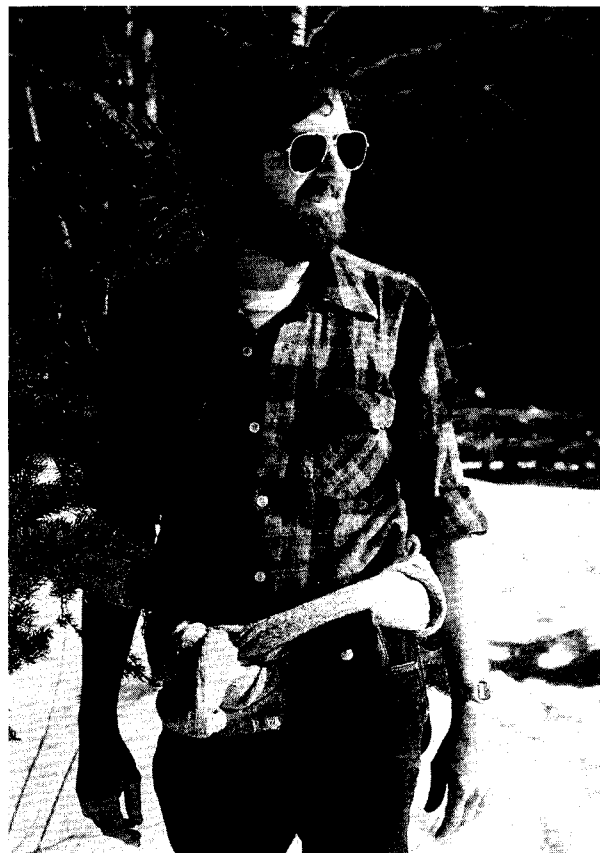
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Jeffrey A. Grambling died on August 2, 1993, from a brain tumor. He was 40 years old. Jeff's youth comes as a surprise to many who knew him only by his worldwide reputation and his numerous publications. For more than a decade, Jeff Grambling was at the center of Precambrian research in New Mexico and on the cutting edge of many theoretical aspects of metamorphic petrology. He was a superb teacher, writer, researcher, colleague, and friend.

Jeff Grambling was born in Milwaukee, Wisconsin, on April 1, 1953. His family moved to New Jersey, Pennsylvania, and Oklahoma before Jeff was eight years old. When he was 16, his family moved to Binghamton, New York, where they still live. Jeff attended Colgate University. He started out in mathematics, discovered geology, and finished with a double major in math and geology. After college, Jeff married Gail Johnston, his high-school sweetheart. They moved to Princeton, where, under the direction of Lincoln Hollister, Jeff completed his Ph.D. only four years after graduating from Colgate.

Jeff's Ph.D. research in northern New Mexico, begun in the Santa Fe Range and ultimately settling in the Truchas Range, gave him his first contact with the Proterozoic rocks of the southwestern United States and his first contact with the diverse culture of New Mexico. Neither association would ever be broken. In the Truchas Range, Jeff found the opportunity to combine high-country backpacking, complex geology, metamorphic petrology, and especially the aluminum silicate polymorphs: kyanite, andalusite, and sillimanite. Jeff's research provided a classic example of metamorphic petrology as a field science. He mapped metamorphic isograds and metamorphic equilibrium as a function of topography and structure, and he made the Truchas Range one of the classic metamorphic localities in the world. In any discussion of the significance of three-polymorph, triple-point localities, the Truchas Range and Jeff Grambling are prime references.

Jeff Grambling went to the University of New Mexico after one year as an assistant professor at the University of Oklahoma. The move allowed him to surround himself with the rocks he loved, and for both Gail and him to immerse themselves in the culture they loved. Jeff could now conveniently incorporate field trips and field research into his teaching, and he could begin to develop his lively graduate program focusing on all aspects of the largely unstudied Precambrian terranes of northern New Mexico. It was at this time that Jeff fought his first battle



with cancer, but few would have guessed it from his high spirits, his productivity, or his enthusiasm for his research and his students.

Jeff set a pattern during his Ph.D. research that he continued throughout his career. He studied the rocks in order to understand the history and significance of this important geologic region, but, in addition, he found ways to use the extraordinary rocks he discovered to illustrate and clarify theoretical aspects of metamorphic petrology. Those successes brought Jeff his worldwide reputation. He was always aware of new techniques and new ideas and was generally among the first to use them as tools in his own research, but he also used his field relations as a tool to evaluate the importance of the new ideas. Jeff's early papers remain topical today, and several are so widely quoted that they are properly called classics. He

was one of the first petrologists to use the Gibbs Method in a broad range of applications, including constraining fluid equilibria in the Truchas Range, clarifying aluminum silicate equilibria, and developing a variety of new quantitative petrologic tools for thermobarometry, fluid equilibria, and O barometry.

Jeff's recent research kept him at the heart of controversies concerning the tectonic significance of the Proterozoic terranes of northern New Mexico. Just when most workers seemed to be converging on a simple, straightforward model for the Proterozoic history (involving one major event of plate collision, deformation, and metamorphism), a model which he himself helped to develop, Jeff threw a wrench into the works. He suggested that the metamorphism may not have happened during collision at all, but during extension, and that much of the tectonism occurred not at 1.7 Ga but at 1.4 Ga or even during the Grenville orogeny. This was typical of Jeff's style. First, he would stubbornly cling to an idea or model until he recognized its flaws, and then he could abandon it in an instant without regret. He could critically examine even his own models and revelations and cleanly change directions when the need arose. Although Jeff's younger deformation and metamorphism in New Mexico has been analyzed and refined, its importance is only now being fully appreciated. The various roles and effects of 1.7- and 1.4-Ga tectonism are a central theme of current research on the Proterozoic terranes of the southwestern United States.

Back-country hiking and camping were an integral part of Jeff Grambling's research, teaching, and personal life. It seems that each of Jeff's colleagues and each of his students can tell a different story of talus slope field trips, 5000-ft. climbs with heavy packs, huddling in tents during week-long deluges, trout fishing, dogs with backpacks, snow on tents, elaborate one-pot meals, floods, and most of all, spectacular structures, isograds, and huge porphyroblasts. It wasn't Jeff's style to reveal what should be seen at a particular field trip stop or how the rocks fit into one model or another. Instead, he led the way to the outcrop and then stood back, allowing people to see for themselves. Only later would the seemingly unrelated stops merge into a subtle, carefully thought-out hypothesis. Memories of debating and sketching and talking and walking and laughing in the field with Jeff Grambling will forever be cherished by all of Jeff's colleagues and students.

Jeff Grambling was as successful a teacher as he was a researcher, perhaps because his research and teaching were so thoroughly integrated. He was careful, complete, and demanding in his undergraduate courses, but his graduate courses were truly inspirational. Jeff managed to incorporate the newest techniques and ideas into his courses to a remarkable degree. His problem sets involved calculations based on rocks that the class had seen, using methods they had studied in the most current literature. In the end, he created an atmosphere of ongoing research with the excitement of unknown results worked into con-

tinuously evolving class exercises. Perhaps the ultimate testament to this dynamic teaching style is that many of these exercises became abstracts, theses, or papers. As an advisor, Jeff was at once demanding, frustrating, supportive, encouraging, discouraging, and, most of all, successful. All his students have had the excruciating experience of trying to gain his approval on a thesis or paper and feeling that, after the tenth draft, perhaps Jeff should have simply written it himself. Jeff taught and demonstrated a care in writing, bordering on perfectionism, which is now emulated and taught by his students and their students. Jeff requested and respected the contributions of his students, and he shared his enthusiasm over new discoveries and successful experiments. His graduate program was a training ground for professional collaboration, and his students have been successful in a wide range of pursuits from industry to academia. Three of Jeff's Ph.D. students are now in teaching positions trying to convey the same love of science and commitment to excellence that they inherited from Jeff. Like all great teachers, Jeff will affect many future generations of students.

There were no barriers between Jeff's work and family life. His students all were welcomed into his family, and his devotion to his real and extended family was obvious to everyone. Gail shared Jeff's love of backpacking, camping, chili, and New Mexico. She was his field assistant of choice until their children, Lara and Tyler, were born, and it would have been only a few more years before Lara and Tyler would have volunteered for the field effort. Perhaps because of their love of the field and the mountains, Gail, Lara, and Tyler (and canine assistants Bask, Bart, and Ripley) were part of the geologic collaboration and also a refreshing relief from it. Back home, Jeff liked baseball and softball, the Albuquerque Dukes, gardening, Mexican food, and talking and talking about geology.

Jeff Grambling had a profound effect on the lives of his students, his colleagues, his friends, and his science. We celebrate his extraordinary life in our lives. His influence will live and grow in our research and teaching and in that of our students.

SELECTED BIBLIOGRAPHY OF JEFFREY A. GRAMBLING¹

- (1979) Precambrian geology of the Truchas Peaks region, north-central New Mexico, and some regional implications. *New Mexico Geological Society Guidebook*, 30, 135–143.

Note: This memorial was significantly improved by the comments and suggestions of Paul Bauer, Chris Daniel, Lincoln Hollister, Karl Karlstrom, Rodney Metcalf, Jane Pedrick, Jamie Robertson, Amy Thompson, and Chris White.

¹ A complete bibliography of Jeffrey A. Grambling is available as Document AM-95-579 from the Business Office, Mineralogical Society of America, 1015 Eighteenth Street NW, Suite 601, Washington, DC 20036, U.S.A. Please remit \$5.00 in advance for the microfiche.

- (1981) Kyanite, andalusite, sillimanite, and related mineral assemblages in the Truchas Peaks region, New Mexico. *American Mineralogist*, 66, 702-722.
- (1981) Pressures and temperatures in Precambrian metamorphic rocks. *Earth and Planetary Science Letters*, 53, 63-68.
- (1982) with Coddling, D.B. Stratigraphic and structural relationships of multiply deformed Precambrian metamorphic rocks in the Rio Mora area, New Mexico. *Geological Society of America Bulletin*, 93, 127-137.
- (1983) Reversals in Fe-Mg partitioning between chloritoid and staurolite. *American Mineralogist*, 68, 373-388.
- (1984) Coexisting paragonite and quartz in sillimanitic rocks from New Mexico. *American Mineralogist*, 69, 79-87.
- (1985) with Williams, M.L. The effects of Fe³⁺ and Mn²⁺ on aluminum silicate phase relations in north-central New Mexico, U.S.A. *Journal of Petrology*, 26, 324-354.
- (1986) Crustal thickening during Proterozoic metamorphism and deformation in New Mexico. *Geology*, 14, 149-152.
- (1986) A regional gradient in the composition of metamorphic fluids in pelitic schist, Pecos Baldy, New Mexico. *Contributions to Mineralogy and Petrology*, 94, 149-164.
- (1988) with Williams, M.L., and Mawer, C.K. Proterozoic tectonic assembly of New Mexico. *Geology*, 16, 724-727.
- (1988) with Moench, R.H., and Robertson, J.M. Geologic map of the Pecos Wilderness, Santa Fe, San Miguel, Mora, Rio Arriba, and Taos counties, New Mexico. U.S. Geological Survey, Miscellaneous Field Studies Map MF-1921-B.
- (1988) A summary of Proterozoic metamorphism in northern and central New Mexico; the regional development of 520°C, 4kb rocks. In W.G. Ernst, Ed., *Metamorphism and crustal evolution of the western United States*, p. 446-465. Prentice Hall, Englewood Cliffs, New Jersey.
- (1989) with Williams, M.L., Smith, R.F., and Mawer, C.K. The role of crustal extension in the metamorphism of Proterozoic rocks in northern New Mexico. In J.A. Grambling and B.J. Tewksbury, Eds., *Proterozoic geology of the Southern Rocky Mountains*, p. 87-110. Geological Society of America, Special Paper 235.
- (1989) with Williams, M.L., Mawer, C.K., and Smith, R.F. Metamorphic evolution of Proterozoic rocks in New Mexico. In J. Daly, R.A. Cliff, and B.W.D. Yardley, Eds., *Evolution of metamorphic belts. Proceedings of the 1987 joint meeting of the Metamorphic Studies Group and IGCP project 235*. University College, Dublin, Ireland. Geological Society Special Publication 43, 461-467.
- (1993) with Dallmeyer, R.D. Tectonic evolution of Proterozoic rocks in the Cimarron Mountains, northern New Mexico, USA. *Journal of Metamorphic Geology*, 11, 739-755.