

Acceptance of the Mineralogical Society of America Award for 1998

JAMES BRENNAN

Department of Geology, University of Toronto, Toronto M5S 3B1, Canada

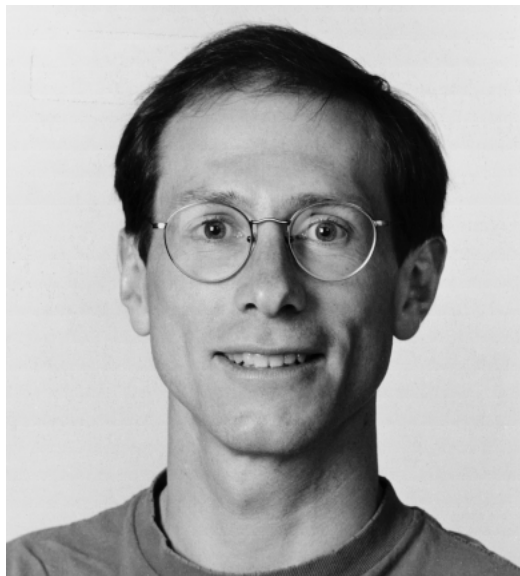
Mr. President, members of the society, and guests:

Thanks very much for the kind words, Bruce, and let me just say that it's a privilege and an honor to be bestowed with this year's MSA Award, especially in my newly adopted home of Toronto where I can share the experience with my family, including my parents, John and Jean, my aunt and uncle, Lois and Pete, and my colleagues at the University of Toronto. Perhaps the most humbling part of this whole experience was to have taken a look at the hit parade of mineralogists and petrologists who have received the Award in the past. I am grateful to the MSA for bestowing me with this award, and I certainly hope that my current and future work will satisfy the high standards set forth by my predecessors.

From my point of view, I suppose the most interesting thing about peer awards is reading the citations and acceptance speeches and finding out a bit about what the major influences were on the recipient to allow he or she to have gotten where they are today. I must admit, that as a young, untenured faculty member, I haven't had a lot of time for such reflection, but for the purposes of this award, I thought I'd give it a little extra thought and share with you some of the important influences on bringing me to the podium today.

In terms of the early, formative years the most important mentors I had were my parents who exposed my brother, my sister, and myself to the natural world, and in the process, were forced to put up with all sorts of strange houseguests and activities, including roundworms in the refrigerator (to feed the newts), several generations of gerbils, multitudes of fish, a dog with a very delicate stomach, homemade napalm in the garage and craters in the table from exothermic reactions gone awry—the list goes on, the influence was profound, and I only hope that I can provide the same sort of patient mentoring when I have children.

As an undergraduate at McGill University, among the first tasks one is faced with is to decide upon a program of study leading to a degree. I was quite unsure as to what was the correct path for me, although I did know that it had to be in science. In retrospect, it's not clear to me why I chose to take an introductory course in geology. However, after completing the course I was hooked, mainly as a result of the inspired teaching of A.E. "Willy" Williams-Jones. My attraction to igneous petrology was initially purely aesthetic in that I found igneous rocks to be beautiful objects (and still do), especially the ones with the striking green-colored mantle xenoliths. Since Don Francis was the geology prof that had the largest number of these beautiful objects, I naturally gravitated to Don's research interests in the mantle. I learned from Don that these rocks are attractive not only for their beauty, but for the challenging sci-



entific questions they pose. I also blame Don for steering me into a career in experimental petrology as a result of two influential acts. First, although I relish field work immensely, Don employed me to work as a field assistant in what is perhaps the most black-fly infested terrain on Earth: central Quebec. It was during that time, while covered from head to toe in a seething mass of bugs, that there was ample opportunity for introspective thought and for me to reconsider a career as a field geologist. Don's second influence came when asked about where to go for graduate studies, he suggested a place called Rensselaer Polytechnic Institute (RPI) and a fellow named Bruce Watson. I was hesitant at first, not knowing anything about experimental petrology and I had just struck up a relationship with a young woman from Trois-Rivieres, Quebec. But, because I was sufficiently intrigued by the interesting Ph.D. projects that Bruce was suggesting, and with the memory of black-fly hordes still fresh in my mind, I moved to Troy.

Now that Bruce has had a chance to say something about me, let me say something about him. Bruce was and still is an excellent mentor to me. Bruce taught me how to do experiments by sharing with me his incredible expertise in the lab, something I could never completely emulate, but could certainly aspire to. Largely as a result of osmosis, Bruce taught me six important lessons for successful experimentation. (1) Never ignore chemistry when designing an experiment: thermodynamics works, and if you're clever, you can make it work for you. (2) Never ignore kinetics: be patient, just because a

result doesn't seem like its changing with time, doesn't mean it isn't. (3) Never throw out a "failed" run: there's always information there and besides, each piston-cylinder assembly costs at least \$35, so you better get something useful out of it. (4) Don't get too enamored by how others have approached experiments before: they may not be right, and there's always room for an alternate approach. (5) Observe and note everything: it's often the most subtle features that contain the greatest amount of information. (6) Be wary of talking yourself out of doing an experiment: sometimes you'll never know a result unless you throw something into a capsule and see what happens. I have found these lessons to be incredibly useful in my own research, and hope to pass them on to my students.

In addition to spending hours in the lab, I also had time to discover that the Geology Department at RPI was an exciting place to be, despite its small size. I had excellent colleagues in the form of fellow graduate students and post-docs; especially people like Diamond Don Baker, Bob Rapp, Matt Kohn, Ray Donelick, John Ayers, Bill Minarik, and Dave Wark who each had their own unique perspective on science and life in general. In terms of faculty, at that time, RPI had just hired a young star named Frank Spear who was willing to share with us graduate students his new techniques for applying thermodynamics to problems in metamorphic petrology. I can also say that I was of the generation of graduate students that learned from the notes that were to eventually become Frank's "Big Blue Book." Across the Hudson, they were still basking in the "Harrison Years" at SUNY Albany, and Bruce sent all of his graduate students over to take Mark's kinetics course. I must admit that most of us were not always sure what Mark was talking about, but he seems to have been thoroughly convinced I understood, mainly because throughout the course of his lectures I would smile and nod knowingly. In retrospect, I'm not sure if I was smiling at the incredible elegance of one of Mark's new applications of $^{40}\text{Ar}/^{39}\text{Ar}$ thermochronology or grimacing at the prospect of one of his detailed mathematical derivations. I must say, however, that I learned a lot from his course, and it is the combined influence of Bruce and Mark that has inspired my long-term interest in diffusion and kinetics.

In the fall of 1990, I obtained my Ph.D. and accepted a post-doc at the Geophysical Lab. For me, however, these were not the most important events of that year. During the time I was a graduate student, I had been commuting between Troy and Montreal about every other weekend to visit my girlfriend Josee. After logging more than 60,000 miles on Interstate 87, I finally proposed to her, and we got married about two days after I submitted my Ph.D. Over the years, Josee has listened patiently to, and put up with, a lot of my worrying and fretting about difficulties in the lab and failed experiments. In terms of influences, I am convinced that I would not be standing here today without her continuous support and encouragement. I can't thank her enough.

As a post-doc at the Geophysical Lab, one is immediately confronted with the challenge of making the most of the freedom thrust upon oneself after emerging from the sheltered cocoon of graduate school. Fortunately, the staff members at the Lab realize how difficult this can be, and I am indebted to Bjorn Mysen, Dave Virgo, and Joe Boyd for helping me to make this transition and to mature as an independent scientist. I consider my time at the Geophysical Lab as very well spent, not only in terms of learning new techniques, and honing my research skills, but I also had a chance to meet and be influenced by an incredibly talented pool of young scientists, such as Gray Bebout, Ed Young, Dave Joyce, Paul Koch, Connie Bertka, and Yengwei Fei.

After spending two years at the Geophysical Lab, Rick Ryerson offered me a post-doc position at Lawrence Livermore National Lab. I have known Rick since he did a sabbatical at RPI in 1986, and perhaps Rick's greatest impact on my scientific development is that he taught me to distill a problem to its barest essentials, and then assess what were the key measurements, i.e., the "silver bullet experiments," required for a satisfying solution. For some time, however, I have had difficulty in actually defining my scientific relationship with Rick. A chance encounter at an AGU meeting in San Francisco solved this problem. Bruce Watson, Don Francis, and myself were having a conversation between sessions when Rick sidled over to say hello. Bruce looked at the three of us, and made the observation that standing around me was more than one generation of those that had contributed to my intellectual upbringing: Don Francis was my intellectual grandfather, Bruce was my immediate intellectual father, and at that point Bruce paused, unsure how to define Rick in this regard. Rick, not missing a beat, quipped "I guess I'm the fun uncle." Thus, in classic Rick fashion, he defined our relationship in a succinct and accurate way.

The success of the research on fluid-mineral partitioning that I did at Livermore is largely the result of having the right people with the right equipment together at one time. I think that the experimental expertise offered by Rick and myself, combined with Henry Shaw's skill as an analyst, along with Doug Phinney and Ian Hutcheon keeping the ion probe running, are the key factors that made these experiments possible.

As a final note, I'd like to take the opportunity to acknowledge my colleagues in the Department of Geology at the University of Toronto. Although I have not been at the University of Toronto for very long, I have been warmly received and have been generously provided with the support and guidance to successfully develop my own research program.

All I can say in closing is that although I am at the podium alone to accept the MSA Award, I do not consider this to be solely my accomplishment, and I gratefully acknowledge all of the aforementioned individuals who have given me the opportunity to achieve this recognition today. Thank you.