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Acceptance of the Mineralogical Society of America Award for 1992

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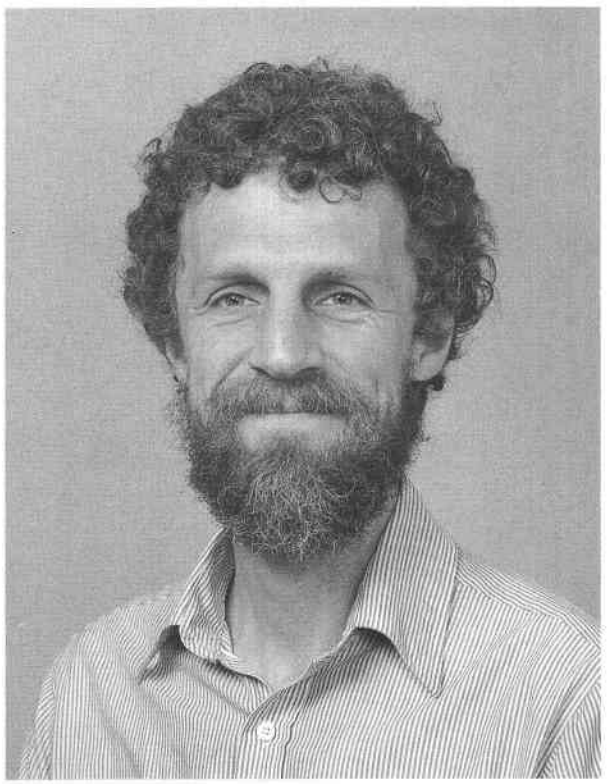
Thank you, Mike, and thanks to you, Gordon. I am genuinely honored to receive the MSA Award and would first like to thank the Society for such consideration. For me, perhaps the best thing about the award is that it gives me the chance to stand up here and express my gratitude to at least a few of those who have helped, led, inspired, and educated me through my career.



When I started college at Harvard I declared a chemistry major but soon thereafter decided to switch to geology to avoid spending my life in a lab. (Many of you know how long that lasted.) One major influence in changing my direction was a course called Nat Sci 10, taught in part by the unusual combination of Steve Gould and Dave Walker. To this day I remember Dave's lecture on silicate melt structure, which was presented, no less, to a bunch of freshmen and sophomores seeking a distribution requirement.

My first official research project was with Dick Holland, who gave me the chance to work on analyzing metalliferous sediments from the mid-Atlantic ridge. The time and energy that Dick gave to me provided the best of beginnings in research. At Harvard I learned about petrology, mineralogy, and thermodynamics from Charlie Burnham, Jim Thompson, Alan Thompson, and Jim Hayes. We also had an informal seminar called a sophomore tutorial, and Jim Hayes's presentation was especially memorable, being about, of all things, government funding and writing research grants.

By good fortune, Harvard didn't have enough microscopes to go around in the petrology lab, so we had to double up. My lab partner was Jessica Donovan, who eventually became my wife. I won't take the usual approach and wait to the end of this speech to say thank you to her for all the years of support and friendship and love. Without her I doubt that I'd be standing at this podium today.

During a summer fellowship at Wood's Hole, I had the opportunity to work with Geoff Thompson. Geoff taught me the care it takes to do accurate analytical geochemistry, as well as confirming my interest in igneous rocks. After graduation I wasn't too keen on starting in on graduate school right away and headed off for a few months on a CNRS petrology expedition to the Himalayas and half a year at the CRPG in Nancy, France. Both experiences were extraordinary, once again because of the efforts of Dick Holland and those of CNRS researcher Patrick LeFort.

In graduate school at Berkeley, I started off in Hal Helgeson's thermodynamics classes and Ian Carmichael's petrology class. Hal taught me what rigorous equations are all about, but my love of hands-on experimental science prevailed. Ian enticed me into a "little" summer project on drop calorimetry of molten silicates in the albite-anorthite-diopside system, which was part of a collaboration with Dan Weill and Alex Navrotsky. That little project led me into almost four years of work that eventually resulted in a Ph.D. thesis.

While at Berkeley, I gave one more try at being a field geologist by running off to central Mexico with Jim Luhr for a quarter. At that time Ian Carmichael's field contingent each seemed to have his own volcano, and mine was perhaps to be Volcán Tequila, which, not surprisingly, is next to the town where they invented the stuff. Well, I guess there was too much jungle for me to be inspired by the outcrops, and I couldn't stand the local refreshments anyway, so I stuck with the joys of calorimetry.

I don't have nearly enough time to express my gratitude for all that Ian has done for me. Simply put, from him I learned what doing good science is all about. Ian

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has always been a great research adviser, always putting the best interests of his students first. Their successes say much about his care and skill as a scientific mentor.

While working on the calorimetry I was able to spend a few weeks at Arizona State, working in Alex Navrotsky's lab. She immediately became a major source of inspiration to me, with her clear view of which measurements were important to the big problems in petrology and geophysics and how to make those measurements well enough to be useful for years or even for decades. We've been friends and colleagues ever since, and I owe a great deal of thanks to her as well.

After I finished my Ph.D., I stayed on at Berkeley as a postdoc. About the same time, Ian had the foresight to hire a recent graduate from Alex Pines's group in NMR spectroscopy, whose name was Jim Murdoch. Jim started doing NMR on silicate minerals and on glasses that I'd made, and a great collaboration began. Ian suggested we had to do something different and distinctive from the rest of the world (which consisted at the time of only two or three other groups working in this field) and presented the challenge of doing in situ high-temperature work on melts. When we started getting results, I realized that this approach provided the perhaps unique key for getting at the dynamical, as well as the structural, details that connect atoms and bonding to macroscopic properties of silicate melts. So this was the ultimate in scientific serendipity. Alex Pines was very supportive right from the start, even when we first suggested putting a furnace capable of 1400 °C inside of one of his cryomagnets.

During grad school and my postdoctoral work, among the papers on silicate glass structure that I found most interesting and insightful were those of Gordon Brown and his students. It was thus a real thrill to be invited down to Stanford to give a research seminar. They were even open minded enough to offer me a job. Gordon has become a close friend in the ensuing years, as well as continuing to educate me about the mysteries of structure and bonding. I thank him for all the support and help, and look forward to many years of shared experiences and ideas.

The progress that we have made in using NMR to understand silicate liquid structure and dynamics would have been impossible without the expertise of a couple of physical chemists who have been research associates in my group. Shang-bin Liu and later Ian Farnan have kept us honest about the realities of NMR physics and NMR instruments and have had major influences in the direction of the work. Ian Farnan's skills were especially critical in the breakthrough of quantifying the relationship between exchange rates observed by NMR and the calculation of the bulk viscosity of a melt.

I also owe great thanks to my other colleagues, friends, and scientific collaborators. Most of my work has been in collaboration with others, a style of doing things that I enjoy tremendously for the friendships and interchanges that it produces. The last group I would like to mention, though, is the students that I've worked with. They all teach us professors a great deal, even though we're the ones getting paid for the job. So I close by thanking my students for continuing to provide me with an education, as well as for their boundless energy, enthusiasm, and new ideas. And thanks to you all.