

## Acceptance of the Roebling Medal of the Mineralogical Society of America for 1994

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President Evans, Dave Mao, members, and guests:

I am deeply honored to receive the Roebling Medal. I especially want to thank you, Dave, for your generous remarks.

There have been many individuals who have influenced me over the years. I would just like to mention a few. Paul Kerr, who was my thesis advisor, offered me opportunity, freedom, and encouragement in large doses. Ollie Schaeffer, with whom I was a postdoc, introduced me to isotope geochemistry. Taro Takahashi, who was my colleague for more than ten years, introduced me to high-pressure research. My wife, Jane, who was a student in my first mineralogy course, has been my constant companion since I married her 32 years ago. I am especially grateful to my graduate students, from Dave Mao, my first student, to Terry Wu, who is currently writing his Ph.D. thesis, and all the others in between. Much of what I know I learned from them.

I could go on to say much more about my background and how I became intrigued with the diamond-anvil cell, that little gadget that has taken on so many forms and accomplished so many feats. Instead, I would like to digress and take this opportunity to tell you about another of my interests; that is, talking to children. If you are like me, you have no doubt been asked from time to time to talk to a grade-school class or show some Cub Scouts around your lab. Over the years I have assembled a collection of specimens consisting of geodes, crystals, petrified wood, lava, meteorites, and even some soil melted by a downed power line. These are great conversation starters. Put some of these in the hands of kids and their eyes light up and the questions begin to flow. In a few minutes you can offset the effect of hours of passive television watching. The insidious thing about television is that you can think you're learning when you're not. Kids watching even the very best science shows are rarely challenged. They aren't asked to try things or design experiments or answer questions. They can't succeed; they can't fail. And if they can't succeed or fail, they are probably not thinking. Unfortunately, the same seems to be true of many of their classes. It is a tragedy. But put some specimens in the hands of those kids and right away they have to do something with them. They'll ask questions like "did someone polish this?" "You mean this is how it comes out of the ground?" "How did it get flat faces?" Well, here is a perfect opportunity to introduce the concept of atoms. Much of what we do as scientists is to deal with atoms too small to see or events too long ago or too



deep in the Earth's interior to observe directly. In other words, we deal with abstractions. We do a disservice to children if we think they are interested only in the here and now. They are able to handle abstract concepts, in fact, they are often eager to learn about abstract concepts. Gently encouraging them to do so is one of the most important ways to start them thinking as scientists.

For the past ten years I have worked with a group in Ithaca, New York, to establish a hands-on science museum called the Sciencenter. We started in a borrowed storefront that had only one electric outlet and are now in our own building with lots of hands-on exhibits as well as outreach programs. Over the years we have witnessed a fascinating phenomenon. Parents will say to their kids, "Let's go to the Sciencenter today," and the kids will say, "Do we have to? Science is boring, science is yucky." Can you imagine! But that is actually how a lot of kids feel about science. They go anyway, and two hours later the same parents say to the same kids, "Time to go," and the kids say, "Do we have to go? Can't we stay longer?" Well, a minor miracle has occurred. In just two hours we have redefined science for those kids (and maybe their parents

also) from some weird activity done by freaky people behind closed doors in mysterious labs to a pursuit of their own curiosity about their own everyday experiences.

You can perform this same miracle by putting mineral specimens in kids' hands and starting a conversation. All you have to do is be willing to listen to them and answer their questions and share their enthusiasm. I hope the

next time you are asked to do something like this, you will take it as seriously as preparing a talk for a national meeting. I assure you that you will be rewarded by questions that are every bit as penetrating and thought provoking; maybe even more so. If you haven't tried this, I strongly recommend it. In the process, you might have a profound impact on the future of science.