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Acceptance of the Mineralogical Society of America Award for 1983

DAVID R. VEBLEN

Department of Earth & Planetary Sciences
The Johns Hopkins University
Baltimore, Maryland 21218

Dear friends and colleagues, President Roedder, Charlie and Charlie, Hans:

It is with great pleasure that I accept the Mineralogical Society of America Award for 1983, and I thank the Society and its individual members for this honor. There are many of you here today with whom I have collaborated or who have shared their ideas with me, and who therefore share in this award.

Perhaps the most valuable consequence of receiving an award such as this is that it humbles the recipient and drives home the fact that one's own accomplishments derive largely from the help, understanding, and labors of others.

Among those responsible for this award, my parents are very important. I was lucky enough to have decided on a career in geology by the time I was five years old, and not only did my mother, Alice, put up with my idiosyncracy of collecting minerals, fossils, and rocks, but she strongly encouraged it. Having minored in geology in college, she had the knowledge and open-mindedness to nurture my earliest scientific endeavors. And, of course, mothers will be mothers. I suspect that she is the only living person other than Paul Ribbe and myself who has read Reviews in Mineralogy volumes 9A and 9B from cover to cover, including references. That would no doubt be enough to seriously maim an ordinary human being.

My father, Paul, was also always supportive of my interests. As a newspaper editor, he was a master of straightforward English, and I hope that some of his editorial and literary sense rubbed off on me. I have vivid memories of him picking up something I had written and with a quick pencil reducing it to half its length without sacrificing the meaning. This is a skill that American Mineralogist authors would do well to cultivate! And I suspect that many of you are now wishing that he had edited this speech for me.

The entire geology department at Harvard deserves most of the credit for my formal scientific education. I do not believe that I could have done better than to have taken courses and learned in other ways from Clifford Frondel, Cornelius Hurlbut, Kase Klein, Jim Hays, Marland Billings, and all the others.

But a very special thanks clearly must go to Charlie Burnham. Simply put, Charlie is the best teacher I ever

had. It was in Charlie's lab and courses that I really learned about diffraction and structure, and this understanding has been the foundation of my work in both X-ray diffraction and transmission electron microscopy. Charlie is a very straightforward person, and he is especially straightforward in his insistence on good and careful science. When I first found the complex chain silicate chesterite in his laboratory, Charlie's natural reaction was not just "that's great." Instead it was "you make damn sure these diffraction patterns aren't the result of twinning." That's the kind of sound advice that has benefitted all of Charlie's students. And I don't think it is an accident that the last two MSA Awardees have been students of Charlie Burnham's.

A second important influence on me has been the imminently creative James Thompson, Jr., the deserving namesake of jimthompsonite and clinojimthompsonite. I think it was probably the orthogonal version of Jim who suggested that I look at the anthophyllite from Chester, Vermont, because he thought that, in this slowly-cooled occurrence, orthoamphibole might exhibit a subgroup

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symmetry of the the usual *Pnma*. To my great surprise, what I found instead was a chain silicate with a 45 ångström **b**-axis. Full of the knowledge that I had found something completely new, of which no one had ever even conceived, I walked into Jim's office and told him I had found a silicate with alternating double and triple chains. Jim looked puzzled for a moment and then said, "You mean you think it's an MPMMP, not an MMMMP?" Not yet knowing what an M or a P was, I looked puzzled in turn, and Jim pulled out of a file four long, unpublished manuscripts, completed years before, that laid out in detail the structural basis for what I had found. I think that's typical of Jim, always working in the future.

Another very important factor in my scientific life is the responsibility of Peter Buseck. Upon completion of my graduate work, Peter brought me to Arizona State University, where I had the opportunity to work in the Facility for High-Resolution Electron Microscopy. I hope all of you are aware of the published fruits of this collaboration, so I won't belabor them here. I will say, however, that working in electron microscopy at Arizona State, with the resources of people like the physicists John Cowley and John Spence, was a turning point in my scientific life. And, as most of you probably realize, the course I set at Arizona State has to a large extent determined my present and future research directions.

Others have also influenced me and helped me over the years. I should mention Jerry Gibbs, Hugh Greenwood, John Brady, Alan Gibbs, Alexandra Navrotsky, John Holloway, Paul Ribbe, the late David Elliott, and of course my colleagues at Johns Hopkins, including the Roebling Medalist, Hans Eugster. In addition to those I have mentioned, there have been many other teachers, scientific friends, and collaborators whom I do not have time to list but who have been important to me. To all of you, thank you, and I hope you take pleasure in your part in this MSA Award.

I would like to take a couple of minutes to reflect on a few random thoughts. First, some MSA Awards have clearly honored specific experimental techniques as well as the individuals receiving them. I hope that you all will see the present award instead as a confirmation of the value of a combination of techniques. I feel strongly, for example, that transmission electron microscopy and X-ray diffraction are not competitive, but rather are complementary methods that need each other. Many problems in modern mineralogy can be addressed best with a combination of several different experimental and theoretical approaches, and not by a single experiment.

Although I am receiving the Mineralogical Society of America Award for scientific contributions, I would be remiss if I were not to say that I believe very strongly that no scientist should be purely a scientist. Other factors influence our lives, and we as scientists must live in the real world. As for myself, I was unalterably changed sixteen years ago by a number of factors, one of which was simply carefully examining a photograph of a Vietnamese child, the victim of a napalm attack. I wish to thank the Canadian earth sciences community for the support they gave me in the ensuing difficult times. I later spent two years working in a hospital as a conscientious objector, ironically as an orderly in the X-ray department. I believe that, as scientists, we must constantly strive also to be humanists, to have other interests, and to try to understand the world in ways that go beyond pure science. It is true that most research has no direct application. Nevertheless, as men and women of science, we are collectively responsible for the immense changes that science and technology have wrought in modern society. I believe that in the modern world we must do whatever we can to assure that our science is used constructively, for the good of all. As earth scientists, it is especially important for us to work also for peace on earth.

A final thought that I have in receiving this "rookie of the year award" is that the Mineralogical Society of America is placing a great deal of trust in me. It is humbling to note that many young scientists do not live up to early expectations. In accepting this award, I also accept the responsibility to continue my work as well as I can. I hope that I can live up to the expectations of the Society and all of you.

I have mentioned a number of people who should share in this award. However, I have not yet mentioned the most important of them to me, my wife, Sarah. In the nearly ten years we have been together, she has been a constant source of support, encouragement, love, and humor. So many times she has seen me gazing silently off into space for long periods and known that I shouldn't be interrupted—she knows that is how I often work. She has seen me hop up in the middle of the night and run off to tend an ion mill or work a late shift on the TEM. She has seen me running off to numerous conferences and invited lectures, leaving her to tend our young child. Yet, she has not complained, but only offered her support. Perhaps most important, Sarah has worked hard to keep my interests broad and to never let me forget the artistic side of life. There is no question in my mind that this award belongs not only to myself and my scientific colleagues, but also in a very large way to Sarah.

In closing, it is a great pleasure and I am very grateful to accept the Mineralogical Society of America Award for 1983. Thank you.