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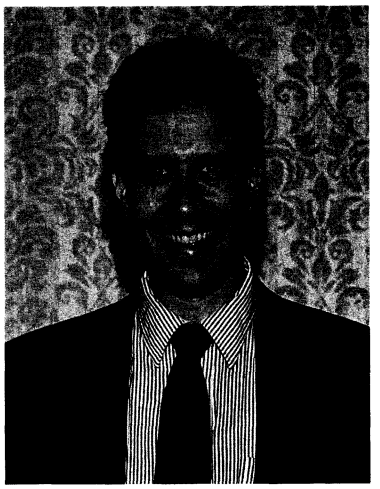
Acceptance of the Mineralogical Society of America Award for 1994

Ronald E. Cohen
Geophysical Laboratory, Carnegie Institution of Washington, 5251 Broad Branch Road NW, Washington, DC 20015, U.S.A.

Thank you Bernard and thank you Alex. One gets very few opportunities to thank those who have been formative influences on one's career, and I appreciate the chance to do so. From the beginning my parents encouraged learning and an academic career. My father gave me an early lift into science, and I probably entered the inorganic realm largely to do something different than he did; he was a microbiologist. I also entered geology because I wanted to stay as far from computers as possible and to do my work in the field, but Indiana University field camp cured me of that illusion. At Indiana University I was taken under the wing of Case Klein, who taught me to finish what I started and got me excited about minerals.

My years at Harvard had an inauspicious start when on my first day Fred Allen was introduced to Martin Buerger as Ron Cohen, and I was never able to introduce myself to him. But things improved after that day. Harvard University gave me the opportunity to explore different fields before settling down, and I spent much time fluctuating between metamorphic and igneous petrology, meteoritics, mineralogy, and crystallography. Harvard was in a time of flux then. The moon room still existed, and there were only two geophysics students when I arrived. I got real excited about meteorites after taking John Wood's solar system class, where I also met Kathy, my future wife. I immensely enjoyed working with John Wood, and I'm not sure how I avoided becoming a meteoriticist. Perhaps I knew too many unemployed cosmochemists!

The mystique of J.B. Thompson, Jr. attracted me, and I ended up doing my thesis with J.B.T., Charlie Burnham, and Jim Fred Hays. I embarked on a largely experimental program on short-range order in aluminous pyroxenes. I was told by some that the problem had been solved long ago. If only I could tell all graduate students never to believe anyone when they say that—a solved problem is one that hasn't been worked on hard enough! Anyway, I made some progress in spite of Jim Hays and Dave Walker's leaving, but finally realized that to get a Ph.D. I would have to become a theorist. There was another draw to theory. Rus Hemley was my next door neighbor during my first year at Harvard. Our common scientific ground was in the area of mineral physics, and I learned much about Roy Gordon's electron gas theory from him. Charlie Burnham had much interest in this area as well. I'll never forget a certain discussion with J.B.T. "I don't want to worry about electrons!" I told him, explaining that



there were limits to how deep I wanted to go into my thesis problem. But he replied, "You may have to worry about the electrons," and I've been worrying about the electrons ever since. My office mate, Leslie Sonder, also got me interested in computational geophysics, which seemed like the wave of the future.

I learned about Larry Boyer, the Naval Research Laboratory, and the NRL-NRC Research Associateships from Rus, and moved to Washington, DC, for a two-year postdoc at NRL. I learned so much at NRL that I almost became another person. It quickly became obvious to me that theoretical work was a cornerstone of solid state physics and would become just as important in materials physics and mineral physics. The idea that properties of complex materials could be reliably calculated starting with only the basic physics of electrons and nuclei was and still is earthshaking to me. I worked with Larry Boyer on ab initio models and learned self-consistent methods from Warren Pickett, Mike Mehl, and Henry Krakauer. I also learned much about lattice dynamics from Larry, and much, including how to do careful science, from Joe Feldman. I became very interested in high-pressure physics, again because of Rus Hemley's influence and because it was apparent that theory was particularly useful and competitive at high pressures. At high pressures a poor theorist has some chance of publishing his prediction before it is tested by an experimentalist! On the other hand, Dave Mao and Rus Hemley's research group are hard to keep up with, let alone get ahead.

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I joined the staff at NRL as a research physicist and was happy there, although I wasn't sure how easy it would be to keep in touch with earth science. I got involved with ferroelectrics with Larry Boyer and Henry Krakauer, and first-principles studies have now blossomed into a major field. Barry Klein, my branch head, was a pleasure to work with and have as a boss.

Because of my interest in minerals I became adept at the electronic structure of oxides, and I found myself doing the right thing at the right place at the right time. I'm referring to high-temperature superconductors. Since I was already used to working on complicated oxides I quickly got involved in high-T_c oxides with Warren Pickett, Henry Krakauer, and David Singh. Our *Science* article on the electronic structure of high-temperature superconductors was translated into Japanese and published in Japan, and more recently was translated into Arabic and published in Syria. I guess we're doing our part for peace.

When I got a job offer from the Geophysical Laboratory it was like a dream come true. I was happy and productive at NRL, but I had always longed to be at the Geophysical Lab. Charlie Prewitt gave me the chance to be the theorist in a world-class experimental laboratory. Going to the Geophysical Lab let me get back to my roots a little. So here I am.

I want to thank all of my colleagues, without whom I would have many fewer papers, especially Lars Stixrude and Don Isaak, who have worked with me for some years. I also must thank Larry Finger, without whose help the computers would be in worse shape than they are, with some exceptions, and I would probably be using the wrong space group or be in the wrong coordinate system. I thank Charlie Prewitt and the Carnegie Institution of Washington for supporting my work, and NSF and ONR for supporting my research.

Finally, I must thank my wife, Kathy, and my three children, Daniel, Jacob, and Rebecca, for putting up with me and my schedule.