

# 1991 Mineralogical Society–Schlumberger Award

**Presentation, by Dr. Paul Henderson, President of the Society,  
to Professor Bernard J. Wood, 17 December 1991  
at University of Wales College of Cardiff**

PRESENTING an award for scientific achievement and promise is a Presidential task that is particularly pleasurable, and is even more so when it is to someone whom you have known for many years. For this reason I have very much looked forward to the occasion today of the presentation of the Mineralogical Society–Schlumberger Medal for 1991 to Professor Bernard J. Wood, since our Council announced the award in November.

Bernie entered the research arena in the late sixties at a time when there was much expectation that the use of thermodynamic principles linked with experimental mineralogy would provide a major step forward for the earth sciences. The field was developing quite rapidly as thermodynamic properties of a wide range of minerals were being determined and compiled. Bernie was an early advocate and he was soon on the path that has led him to become one of the most successful practitioners.

He was well equipped for his journey with a B.Sc. in geology and chemistry, from the University of London in 1967, an M.Sc. in geochemistry from the University of Leeds in the following year, and a Ph.D. (1971) from the University of Newcastle-upon-Tyne on electronic spectra and thermodynamic properties of solid solutions.

Much of his early career was spent at the University of Manchester as a research fellow, lecturer and then reader, but with one year also spent at the Geophysical Laboratory of the Carnegie Institution. During this whole period he worked extensively, among other things, on the thermodynamics of solid solutions, element partitioning between coexisting minerals and on activity-composition relationships of selected minerals. He showed an early and justified enthusiasm for particular mineral groups—the pyroxenes, olivines and garnets, and certain transition elements as well as Mg and Al. These crop up repeatedly throughout his research output such that one of his main contributions has been to improve significantly our understanding of the thermochemical properties of pyroxenes and garnets and their use in solving petrogenetic

problems especially of high-pressure assemblages.

His drive and enthusiasm for working at his subject has been an early hallmark of his career, despite his well-known appearance of being somewhat laid back and his penchant for cricket. I believe that it is the log book for the high-pressure piston-cylinder apparatus at Manchester that has an entry under Bernie's name for a Christmas Day. Unfortunately, no-one else was around at the time to act as a witness on Bernie's presence.

In 1979 Bernie went west, first to the University of Chicago, then as Principal Scientist at Rockwell Handford Operations, Washington, where he worked on a subject which is so much one of our age—that of nuclear waste repositories, and finally in 1982 to be a Professor in the Department of Geological Sciences of Northwestern University where he was also Chairman for three years. With his co-workers he made important advances in numerous topics but which often centred around the thermodynamics of multicomponent systems and which also gave insight into the nature of the upper mantle. Topics such as ordering in spinels, greenschist metamorphism, oxygen fugacity determination, and spinel-garnet-pyroxene equilibria. His approach is to make petrology and geochemistry more quantitative disciplines and with theory related to existing, rather than hypothetical, rock and mineral systems.

Bernie's research output has been prodigious but he has still found time to supervise students, to lecture at international student workshops, to work for academic societies, to sit on research council committees, and to write two books and edit another two. His student text, written with Don Fraser, entitled *Elementary Thermodynamics for Geologists* has done much to make accessible that which is often perceived to be obscure and difficult. This year is the 20th anniversary of his first scientific publication, which has been followed already by more than another 80. In the first three years of his output he averaged two papers a year while in these last three years

(1989–91) he is averaging eight papers a year—a fourfold increase. We look forward with high expectation to his output in 20 years from now!

What Britain had lost in 1979 it got back again ten years later when Bernie reversed the brain drain to be a professor of the Department of Geology at the University of Bristol. He has already established an experimental laboratory, including equipment for high pressure-high temperature studies, and with an active group of geochemists. He and his group are helping to

enhance the international standing of this country's participation in frontier research in the earth sciences especially by extending his interests in the mineralogy of the Earth's mantle. It is, therefore, an added pleasure that we did not have to fly him back from N. America to receive this award today.

And so Bernie, in presenting this silver medal to you today I join with the Society in giving you our heartiest congratulations and wish you every success in your future work.

### Acceptance by Professor Bernard J. Wood

I was absolutely delighted when Paul telephoned to tell me that I was to receive the Society's Schlumberger Medal for 1991. This is a very new award, so no particular pattern has yet been set for acceptance speeches, which makes my task somewhat more difficult than it might otherwise have been. To be frank, I do not think too deeply about the history or philosophy of science, so I can't really burden you with my ideas on the future of mineralogy or of experimental petrology. Instead, it would be much more enjoyable if I told you about the teachers, colleagues and friends who have helped me in my career and of the fun we've had working our way through various scientific problems. So that's what it's going to be.

Together with many others of modest academic ability I was an undergraduate at Northern (now North London) Polytechnic. There, a dedicated staff were trying to turn a collection of misfits and ancient (mature) students into reasonable scientists and generally making an excellent job of it. I became an enthusiastic student largely through their efforts. I would particularly like to acknowledge the inspirational teaching of Stephen Morel (Geology) and of John Charalambous (Chemistry).

From the Poly I went to the M.Sc. course in geochemistry at Leeds which in those days was organised and taught by Peter Harris. The thing which I most appreciated about working with Peter was his emphasis on aiming high and thinking about 'big' questions. Thus, even if one were working on a very small geochemical problem he was very good at casting it in the global context, an approach which I hope I pass on to my students. At that time I was most interested in Crystal Field Theory and its potential applications, so Peter encouraged me to do a Ph.D. with Roger Strens in the Physics department at Newcastle.

As most of you know, Roger Strens' untimely death removed one of the most original minds from the mineralogical community and it is still difficult for me to write objectively about his contribution to my career. Of the many things I learned from him, however, I would like to mention his attempts to bridge the gap (which has now finally been closed) between mineralogy and solid-state physics, and his conviction (25 years ago) that we were just a step away from being able to calculate phase diagrams for very complex systems. This latter area was where I thought that I could find a niche, at the interface between thermodynamics and experimental mineralogy.

In the autumn of 1971 I showed up in Manchester as a very brash NERC post-doc, certain that I could calculate the phase diagram of the universe and only wishing to do experiments for the brief period necessary to prove it. It didn't work as planned, of course, but this was the start of a long and extremely happy eight year association with the Manchester department, first as a post-doc and later as a member of staff. Young members of academic staff need a lot of help and encouragement if they are to succeed in research and I must say that my colleagues at Manchester, particularly William S. MacKenzie, Jack Zussman and Mike Henderson provided a model of how this should be done. Amongst other things they encouraged me to visit the U.S. and I was fortunate enough to spend extended periods at Berkeley (twice), the Geophysical Laboratory and the University of Chicago. At Berkeley I interacted strongly (if that's how one describes one's relationship with a steam-roller) with Ian Carmichael and Harold Helgeson both of whom, in their different ways were (and still are) applying thermodynamics to geochemical problems. My year at Chicago also deserves mention for it was there that I learnt about that most boring and frustrating of all experimental

techniques—solution calorimetry. Although it enhanced my alcohol consumption considerably my work in this area did have the benefit of teaching me patience. It also brought me one year spent working with and learning from Bob Newton, without doubt one of the most accomplished of experimental petrologists.

My next significant move (1982) was a semi-permanent one to Northwestern University, just outside of Chicago. As with most of my career, this turned out to be a happy choice. I spent seven years in a small department, dominated by postgraduate teaching and research, with a group of excellent colleagues. John Walther and Seth Stein were particularly important in making my time there so enjoyable, as was the fact that I was able to winter once or twice in Arizona with John Holloway. Holloway and I wrote what must be one of the most unsuccessful books of all time (remaindered right after publication) but it was worth it to escape from Chicago in January.

The mention of postgraduates at Northwestern brings me to the debt I owe my students. Being now in what I hope is mid-career, I can see the importance of the postgraduate students and post-docs who have worked with and for me. They are the people who collected many of the data and provided many of the ideas for which I am being rewarded by the society. At Manchester my Ph.D. students were Gordon Cressey, Emm Baltatzis, Wendy Harrison and Hugh O'Neill. At Northwestern my students were Craig Bina, Rod Hackler, George Helffrich, Kathleen Johnson, Glen Mattioli, Johan Nell and Alan Woodland. Taras Bryndzia and Sonia Esperanca were post-docs with me at Northwestern and John Brodholt started his Ph.D. at Northwestern and is finishing at Bristol. I hope that some of these young scientists have enjoyed working with me as much as I have with them and I am looking forward to being present when the first of them receives this award.