The process whereby generally hydrous supracrustal rocks become dominated by anhydrous mineral assemblages during prograde metamorphism is a fundamental geological problem. Previous explanations for the reblages during prograde metamorphism is a fundamental geological problem. The mechanical stability of the rocks could not be maintained under these circumstances, and outgassing would occur. Devolatilization would continue as long as heat is added or until either hydrogen or water in and extraction of a partial melt, and the invasion of the lower crust by carbon dioxide from the upper mantle. Skippen and Marshall, on the other hand, demonstrate that devolatilization would be an expected result of the pressure – temperature – time path typical of the tectonic evolution of the lower crust.

On the basis of homogeneous equilibria among gaseous species, and reasonable mineralogical constraints on the fugacities of hydrogen and oxygen and the activity of carbon, they show that calculated fluid pressure exceeds lithostatic pressure at elevated temperatures. The mechanical stability of the rocks could not be maintained under these circumstances, and outgassing would occur. Devolatilization would continue as long as heat is added or until either hydrogen or...
carbon is entirely consumed. The authors also point out that outgassing from the zone of mechanical instability could promote deformation in overlying zones of ductile deformation and could be implicated in the movement of dissolved metals to higher crustal levels.

George Skippen and Dan Marshall have made a compelling case for the importance of tectonically driven internal processes in the generation of large granulitic terranes. They have presented their argument in a concise and clearly written text, which should be at once provocative for the metamorphic petrologist and understandable to the non-specialist. Their paper is a worthy addition to the roster of outstanding contributions that have been recognized by our Association’s Hawley Award.

Peter L. Roeder
President

Dear fellow mineralogists and colleagues,

It is a very happy experience to appear before you today with my friend, Dan Marshall, to receive the Hawley Medal for our paper on the origin of tectonic granulites. Dan and I understand how fortunate we are to have been selected as the recipients of this award when so many excellent papers appeared in Volume 29. We thank the selection committee for considering our work, and we also thank the Editor of The Canadian Mineralogist, Robert Martin, for his exceptional dedication to the journal and for his patience and perceptiveness in dealing with authors.

This paper had a long gestation period and finally forced its way onto the written page in response to the Symposium in Honor of Hugh Greenwood. I thank Terry Gordon for his efforts in organizing this symposium and provoking Dan and I into organizing our thoughts on those enigmatic but very beautiful rocks, the granulites.

My first serious encounter with granulites came while I was a graduate student at McMaster University and working for the Geological Survey as a field assistant to Ron Emslie in the Grenville Province of
Quebec. I recall one late summer afternoon when Ron, Tony Lecheminant and I emerged from the bush around the Morin Anorthosite to be engulfed in a dust cloud generated by a fast-moving truck with a GSC emblem on the door. At the wheel was Wade Reinhardt, representing the Grenville mapping project led by Hugh Wynne-Edwards. That dusty encounter led to several late evenings of discussion on granulites, charnockites and anorthosites, and also to my respect and friendship for Wade Reinhardt, who patiently taught me about the subtleties of granulite petrology over the following decade.

My interest in granulites was helped by a very fortunate opportunity to work as a doctoral candidate under the supervision of Hans Eugster. Hans showed his students the importance of fluids as a factor in understanding mineral development in metamorphic rocks; his own pioneering work on the oxygen reservoir in the Earth helped David Wones and Bevin French to develop new ideas on the hydrogen and carbon reservoirs.

Dan Marshall and I have used the approach of these earlier workers on mineralogy as an indicator of fluid chemistry. I must tell you, however, of my concern that we have not yet achieved an adequate understanding of the carbon reservoir in petrological processes. The use of graphite as an indicator of carbon chemistry certainly is helpful, but calculations using carbonate–silicate pairs suggest a different pattern of fluid evolution in metamorphic processes. I plan to turn off my computer for a while and to go back to the field to look for insight into the complexities of the carbon reservoir. I hope to look not only at the role of carbon in the form of carbon dioxide at higher metamorphic grade, but also at the possible importance of methane in fluid evolution and metal transport during greenschist-facies metamorphism. As is often the case, I hope that mineral chemistry will be the key to understanding petrology.

I would also like to thank my colleagues at Carleton University and elsewhere for their help and support in my research. I have benefitted from discussions with many of these colleagues, and particularly David Watkinson and Ian Jonasson, both of whom are economic geologists with an interest in minerals that goes beyond metallic luster and the geochemistry of sulfur.

Finally, may I thank the Mineralogical Association of Canada for making it possible for researchers such as Dan and myself to experience such a happy occasion.

George B. Skippen

Ladies and Gentlemen,

I would like to echo some of George's thanks to the MAC; it certainly is a very great honor to receive this award. Furthermore, I would like to thank the Institute of Mineralogy and Petrology at the University of Lausanne in Switzerland for kindly providing the financial support for me to be here today. I also acknowledge Carleton University for providing me with a place to work, the facilities to do so, many good friends and an education along the way.

I would like to quote a few words from the speech of one of the 1986 Hawley Medal winners, Judith Moody. "The innovation in my life related to the Hawley Medal started at least 12 years ago in my Ph.D. defense at McGill University, when I had to respond to the questions raised by the external examiner.... In his questions, why did I do the petrological laboratory experiments that I did, he provided me with a challenge, by stating that if I wanted to continue to do experimental petrology, then I should carry out a very careful experimental design before I started the experiments."

Today I share the Hawley Medal with that external examiner. I certainly have benefitted from similar questions from George during my undergraduate and Masters degrees, at Carleton, very few of which I had the answers to. Therefore, finally I wish to thank my friend and mentor, George B. Skippen, for the opportunity to be here.

Dan Marshall

THE PAST PRESIDENTS’ MEDAL FOR 1992 TO ROBERT W. BOYLE

Bob Boyle’s contributions to the geochemistry and geology of mineral deposits during his 40-year career at the Geological Survey of Canada have made him one of the most widely recognized Canadian geoscientists. On joining the GSC in 1953, Bob started his work on the Keno Hill district of the Yukon, and it was there that his interest in surficial geochemistry blossomed. He was the first to show that geochemistry is a viable tool for exploration in permafrost environments, and this marked the beginning of research in exploration geochemistry at the GSC. The first public-domain regional geochemical surveys in Canada were done in the Maritime Provinces, beginning in 1956, and resulted in a number of important discoveries.