

## Conference on Rock-water Interaction at McGill

R. F. Martin

Volume 1, numéro 3, august 1974

URI : [https://id.erudit.org/iderudit/geocan1\\_3con05](https://id.erudit.org/iderudit/geocan1_3con05)

[Aller au sommaire du numéro](#)

### Éditeur(s)

The Geological Association of Canada

### ISSN

0315-0941 (imprimé)

1911-4850 (numérique)

[Découvrir la revue](#)

### Citer cet article

Martin, R. F. (1974). Conference on Rock-water Interaction at McGill. *Geoscience Canada*, 1(3), 67–68.

pointed out that the lack of a tectonic fabric in many 'burial' metamorphic rocks may be due to rock physics, not due to lack of deformation. In other words, rocks which have been deformed at low temperatures need not show schistosity.

Dr. Zen pointed out an example of presumably metastable preservation of burial metamorphic mineral assemblages in Chile. Here there appeared to be episodic burial metamorphism, separated by unconformities, in a rock section 28 km thick. An alternative interpretation is that the "unconformities" are post-metamorphic thrust-faults.

Low grade regional metamorphism, not characterized by the development of schistosity, is obviously of far greater importance in Canada than has been emphasized in previous work. Many rocks which have been previously treated as "unmetamorphosed" have mineral assemblages characteristic of the zeolite, prehnite pumpellyite or lower greenschist facies. Some points which I jotted down during the day's papers and discussion include: 1) the possibility of recognizing relict low-grade textures in high grade metamorphic rocks; 2) the importance of fluid composition, particularly  $\text{CO}_2$  content, in the appearance or non-appearance of minerals such as laumontite; 3) the potential for transfer of copious quantities of metals by the hot fluids passing through rocks at low to moderate load pressures; 4) the intense local metasomatism involved in the transformation of many volcanic rocks and volcanic sediments to low-grade metamorphic rocks; 5) the fact that, although metastability and incomplete reactions are common, systematic patterns in the distribution of mineral assemblages in space and time are recognized.

The symposium was a successful one and the organizers are to be congratulated. Most of the papers presented at the symposium will be published in a special volume of the *Canadian Mineralogist* in the Fall of 1974.

MS received, June 7, 1974.



## Conference on Rock-water Interaction at McGill

R. F. Martin  
*Department of Geological Sciences  
McGill University  
Montreal, Quebec H3C 3G1*

An informal conference on experimental petrology, mineralogy, and economic geology is held each year in an eastern Canadian university. The conference was first held at the University of Western Ontario eight years ago, and became established as a traditional rite of spring as it moved eastward. This year's conference was held at McGill University on February 28 and March 1st, 1974, and attracted a large turnout of university-, government-, and industry-based geoscientists from points as far east as St. John's, Newfoundland and as far west as Saskatoon.

This year's theme was "Rock-water interaction". The two guest speakers we invited are both at the forefront of integrated field- and laboratory-oriented research projects in the field of rock-water interaction: Professors H. D. Holland, of Harvard University, and H. P. Taylor, Jr., of California Institute of Technology.

Professor Holland's address, entitled "The interaction of basalt and sea-water", covered different aspects of the significant chemical adjustments in basalts, and particularly in their  $\text{K}_2\text{O}$  and  $\text{MgO}$  content, as a result of interaction with sea-water. Most comments pertained to phenomena in areas of high heat flow near mid-ocean ridges, where sea-water may circulate downward to depths of *five km* through the highly

fractured oceanic crust. Mass balance arguments were based in part on analyses of major constituents of altered basalts and surface waters from hot springs of the Reykjanes Peninsula, Iceland.

Professor Taylor's approach to the question of rock-water alteration involves the analysis of oxygen and hydrogen isotopic ratios in rocks and component minerals. He stressed the widespread nature of rock interaction with meteoric water around epizonal stocks, and correlated these profound exchanges with subtle yet clear mineralogical changes such as alkali exchange in the feldspars and chloritization of early-formed mafic minerals. He illustrated the systematics of rock-water interaction as applied to the question of serpentinization of ultramafic rocks and to the development of alteration halos accompanying porphyry copper mineralization in calc-alkaline epizonal stocks. Taylor also demonstrated the extensive exchange of oxygen isotopes in the upper half of the Skaergaard complex, and showed that exchange proceeded in the roof zone while gravitational settling was still going on below. Both guest lectures were very well received and followed by spirited discussion.

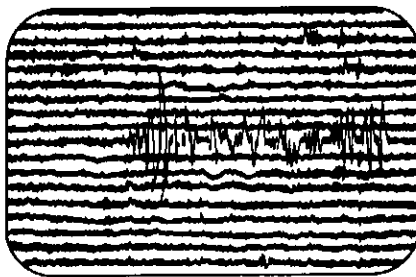
Out of the 28 papers presented, more than half pertained to various aspects of rock-water interaction. This response, combined with the forthcoming NATO Advanced Study Institute on "Volatiles in metamorphism" and the International Symposium on water-rock interaction co-sponsored by the International Association of Geochemistry and Cosmochemistry and the Geological Survey of Czechoslovakia, show that the theme selected was a timely one. It can be counted on to play an increasingly central role in debates on topics as divergent as the differentiation of the entire sial from the mantle and the mechanism of metamorphic re-adjustments of rocks on a hand-specimen scale.

The yearly conference was originally designed as a forum for discussion of new experimental techniques and results, but the organizers this year chose to broaden the scope of the conference. We

wanted to include field-oriented earth scientists and crystallographers who could provide critical tests of experiments already done or point out gaps in present knowledge that could be filled by experiments yet to be attempted. One session on the second day, chaired by Professor Gabrielle Donnay of McGill was a regular meeting of Krystallos, an informal association of crystallographers from the Montreal area.

This year's conference at McGill marks the end of eastward migration of conference sites; next year's conference will again be held at the University of Western Ontario. We trust that in the coming cycle, as in the past, the conference will continue to cultivate existing communication channels and to create new ones among earth scientists involved in mineralogy, petrology, and economic geology.

MS received, May 6, 1974.



## Geophysics Canada – An Informative Update

---

A. B. McNeely  
*Mobil Oil Canada Ltd.*  
*Calgary, Alberta T2P 2J7*

### Summary

The annual CSEG convention, which was held this year at the Calgary Inn Calgary, Alberta, April 17th to 19th, 1974 has evolved over the last few years to the point where it has been regarded as the foremost meeting of geophysical exploration expertise in Canada.

This annual conference was designed to be technical in format and its prime purpose has been to promote the exchange and dissemination of technical data through all branches of the geophysical profession in Canada.

While the 1974 convention was ostensibly oriented toward technical content, the dominant overtones implicit in many of the papers were in fact political. This was of course predictable because of the uncertain future presently facing the resource industries (and consequently the geophysical industry) in Canada as a result of recent federal policy statements.

The 1974 convention attracted 750 registrants, a decrease of roughly eight per cent from the previous year. Papers at the conference were grouped under four general subdivisions: 1. data acquisition, 2. data processing, 3. interpretation, 4. general topics, with a considerable overlap between these classifications.

### Data Acquisition

Papers in this category covered a rather diverse field of geophysical subjects ranging from seismic energy sources, through integrated field recording-processing modules, to the design of entire crews for Arctic marine and surface-ice operation. A number of the techniques represented field-tested applications of relatively recent vintage, a few concerned newer concepts presently in the testing stage and some covered somewhat more esoteric subjects.

The small crew concept in surface-ice Arctic operations was graphically demonstrated in a well-photographed and well-edited film entitled "Break-through". This crew design was pioneered by Phoenix Ventures, Limited, a Calgary-based seismic contractor. When originally announced a couple of years ago, the idea was received with scepticism by the more conservative element of the local geophysical fraternity. Problems of safety, logistics, and personnel maintenance appeared to be potential areas of difficulty, but the completion of three successful seasons with the small crew would indicate that it can handle Arctic-ice assignments as capably as its more cumbersome conventional counterparts.

Seismic energy sources were discussed in two presentations, one dealing with *Vibroseis*<sup>®</sup> recording and data processing parameters, and the other with the use of long vertical column-charges for under ice shooting. While neither of these topics really break any new ground, both papers were thorough in analysis and made their points clearly.

Interestingly, while the authors of the *Vibroseis*<sup>®</sup> study stressed the need for precise analysis of vibrator recording parameters tailored to each specific geographic area and its local surface conditions, the writer of another paper, presented later in the meeting and dealing with a similar subject, came to conclusions that were somewhat at variance. This author contends that, provided a wide sweep band is used and vibrator unit synchronization is maintained, recording parameters can be generalized and are less sensitive than commonly supposed to changes