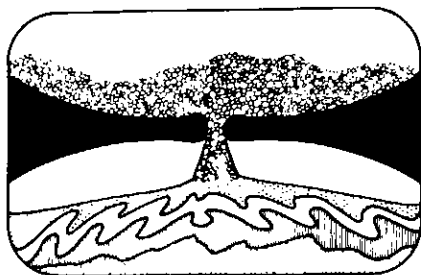


# Features



## Earth Science in Pre-university Schools: Changes in a Decade

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In the mid-1960s the solid earth sciences were probed in depth through government, university and industry to determine where they had been and where they should go. The final report appeared as Earth Sciences Serving the Nation, Science Council of Canada, Special Study No. 13, 1971. The Geological Association of Canada presented a brief to the SES study group in which some of the following recommendations and conclusions were given:

- 1) The student should be exposed to the facts and concepts of earth science as soon as possible. Elementary school students can recognize different rocks and are fascinated by dinosaurs. By encountering earth science in high school, the young mind could discover at an earlier age than university how to handle the complex interacting variables of earth systems, where laboratory evaluation and proof is not necessarily available.
- 2) A modern up-to-date stimulating school curriculum should be introduced. (At the time the American ESCP was

recommended but subsequent evaluation suggests a traditional approach is more appropriate in Canada).

- 3) Summer institutes for qualified teachers selected from all provinces should be organized to upgrade knowledge and teaching skills. An energetic and enthusiastic teacher can be instrumental in introducing the subject into schools.

- 4) Provincial departments of education should be requested to make earth science "more readily available" in the secondary schools. (There is little evidence to indicate that education departments have taken action. A recent comment by a teacher in Ontario suggests that as basic subjects become mandatory, earth sciences will be placed in a more difficult position).

A subsequent study on the basis of a country wide survey for the GAC recommended that a text book was not needed but individual lessons and practical exercises should be developed. A general opinion was developed that the teachers are the key individuals who can implement and foster development provided their initiative has the support of a sympathetic principal. The scientific approach could be incorporated in laboratory exercises not labelled as science.

In 1970, the first earth science workshop for teachers was held at the University of Western Ontario. The objective was (and is) to promote and improve the quality of earth science teaching across Canada. During the first two years, the American ESCP program was presented but opinion was developed that a more traditional course should be pursued. The present program stresses methodology of teaching, techniques and curriculum content. The selected participants must be associated with an earth science course or have an advisory position whereby curriculum can be influenced. The 20 candidates each year come from as many provinces and territories as possible, provided a candidate has suitable qualifications.

The candidates have varied from a university professor, teachers with industrial experience and several years of teaching, teachers who have never had a formal course in earth science, and a couple fresh from teachers college who had been informed by their principal they would be responsible for earth science the following year. The participants are required to live in residence for the month long workshop so that exposure is comparable to that of a language submersion course.

Since 1970, 165 teachers have attended. The teachers pay no tuition, and receive return rail travel from their home, accommodation, meals, field equipment, specimens, illustrative material, field trips and an abundance of lesson and lab outlines and publications. In the first year, financial support came from the Canadian Geological Foundation, and INCO, and one year in an emergency it came from the Geological Survey of Canada. Since 1973 the workshop has been funded by Shell Canada and the contract has just been extended until 1980.

The Canadian Geoscience Council has established a policy of fostering pre-university education. Since 1975, a notable part of the Council's budget has been made available for week-end workshops entitled EdGEO. (It is puzzling but the budget has not been entirely spent because professionals committed to organize a workshop could not be located.) The suggested program, generally, consists of a Friday evening ice-breaker, hands-on instruction on Saturday and a field trip on Sunday. The reaction of participants has been - when will another one occur?! Successful sessions have been held in Calgary, Saskatoon, Winnipeg, Toronto and Wolfville with a total of about 170 teachers attending. Future workshops are set for Fredricton, Winnipeg and possibly Calgary.

The greatest influence of these activities seems to have been in Manitoba where the EdGEO programs have been used and a Western workshop participant has played a role in developing a curriculum. In a recent science fair for high school students, 120 of 600 entries had a earth science theme – an indication of the degree of influence.

Some other factors which undoubtedly have and will have an influence are resources documents by the CGC and GAC, an earth science film catalogue from the Canadian Film Institute, and a continuous effort by the CIM over many years. The latest CIM program is described in a Pamphlet entitled *How Canadian School Children Can Identify with Mineral Resources*. A new text book for the high schools by Bob Janes entitled *Geology and the New Global Tectonics* has an appeal which attracts students. The faculty of UBC has a member who divides his time between geology and education along with a course designed for high schools.

This author has suggested on occasion a rather biased view (although it is received enthusiastically if the audience is equally biased) that science in high school should be taught as earth science supported by mathematics, physics, chemistry and biology. The continued fostering and improvement of earth science in Canada depends in large measure on a greater number of professionals being willing to become involved. Canada will remain a supplier of mineral commodities for many years. We need keen minds to continue the search for deposits that are increasingly more difficult and more expensive to find. But we also need keen minds to pursue pure research. If such individuals are identified early, guided by professionals and teachers, and channelled through earth science departments, we can be assured of a continuous flow of significant discoveries. If we over-produce students, then a greater proportion of the population will have a core of citizens who have an appreciation of the nature of the ground below their feet. Our country will maintain its high standard of living.

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## Pyroclasts

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Ward Neale

### Controversial Volunteers Needed

In the first of these columns, published in November 1975, it was firmly stated that I would rely on contributions from geoscientists across the country, particularly those who would link their names to their views and opinions. The response has been virtually zilch with one notable exception: Jim Aitken took over the column in the June, 1977 issue and bravely wrote about the evils of publishing (and talking) too much. That column has elicited scholarly letters from critical readers and vice versa and Jim has been properly ostracized by old friends and kicked and beaten in bars by new enemies. A terrific response. We need more such fresh, vital controversial approaches to the issues of our times and they have to come from you out there. How about a page or two of typescript for the next issue – before these cooling pyroclasts run completely out of fire. We don't want to end with a whimper.

### Prejudice – No Not Here!

There has been for over 20 years now a sprinkling of non-whites in government geoscience at both provincial and federal levels. Proportionally there have been many less in industry and the universities. In fact, non-whites are as poorly represented as women on geoscience faculties. This is in contrast to physics, chemistry, maths and engineering where there is a much broader spectrum. I hadn't thought about it much until a few months ago when talking with a couple of non-white graduates of Canadian universities who are now gainfully and productively employed in the U. S. A. They told me disconcerting stories of rank discrimination, of being refused interviews because "the posi-

tion was now filled" whereas their white classmates would receive invitations to be interviewed or even to apply from the same employer in the days that followed. Maybe it is time to expand our modestly successful Status of Women Committee into a broader Equal Opportunities group.

### Another Infringement of Human Rights?

The Canadian Human Rights Act (Bill C-25) has an initial strong appeal to many of the more liberal among us. Part IV of the Act states that the privacy of individuals and their right to access of government records containing information concerning them should be protected. This means that if you suspect that the Mounties have a secret file on you which is preventing your advancement, you can demand to see that file in person and deny its implications if you can. All very fair.

However, justice can sometimes be carried too far and there are some fears at time of writing that this Act could impinge on the refereeing records of the Canadian Journals of Research and the granting records of the NRC Awards Office and its successor granting councils. Where, then, would be the rights of volunteer referees to the anonymity that protects them from personal hassles with disgruntled authors and disappointed grant applicants? It probably won't be too difficult for the Journals of Research to circumvent the Act – after all, they are run by volunteer editors out of offices donated by universities and companies. Surely their files of assessments by volunteer editors cannot ultimately be considered government data banks. It could be more serious for research grant referees who provide in-depth reviews of applicants' published work. One way to preserve the anonymity of reviewers is to eliminate government-solicited written reviews and to rely on poor, overworked volunteer selection committee members phoning poor, overworked volunteer reviewers. Alternatively, we may have to work for changes – one good act deserves another!

### Yes, You Can Tell Them Apart

Geoscientists seem to move around much more easily than they once did between industry, government and the universities. This leads one to wonder if the differences between employees in