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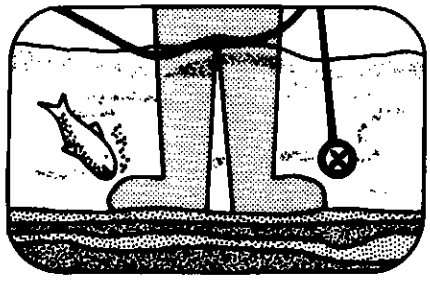

Geological Education

Earth Scientists and the Science Teachers Association of Ontario Conference

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Three nationally known earth scientists addressed sessions at the Science Teachers Association of Ontario (STAO) Annual Conference, held November 3-5th, 1988, at the Skyline Hotel in Toronto. The Department of Earth Sciences at the University of Waterloo was able to bring the three speakers to the STAO Conference through a generous grant from the Canadian Geological Foundation. The object of the geological contribution, which hopefully will be expanded in future STAO meetings, was to alert the Science Teachers of Ontario, and through them, their students and the public, of the importance of the Earth Sciences. The theme of the 1988 STAO Conference was "Expanding Horizons" and the Conference was attended by about 3,000 delegates.

The Earth Sciences are often ignored by traditional science teachers in Ontario. As the youngest of the science quartet (Chemistry, Physics, Biology and Geology/Earth Sciences) it is a hybrid, split between the "pure" and "life" aspects of the discipline. It often seems to nestle between the environmental, geographical and traditional science interests of the teachers that do venture into this part of the school curriculum. In our changing world it is essential to understand the messages of the past, because they give us further insight into processes currently being experienced, and to be experienced, by our species. Often these messages are unpleasant, but we ignore them at the risk to ourselves, our children and future generations. Therefore it is essential that our children fully appreciate, and understand, earth processes and the legacy hidden in the geological record of this planet.

The three speakers addressed aspects of future, present, and past conditions with examples from different disciplines of the Earth Sciences.

Professor W. (Bill) Fyfe, Dean of Science at the University of Western Ontario, gave a stimulating lecture to some 300 participants on the multiple facets of global change. He pointed out that mankind is altering the natural systems of this planet in ways which affect the atmosphere, the lithosphere and the biosphere. The planet has some unique features with oceans of water occupied by micro-organisms for at least 3.8 billion years in a system which has never boiled nor completely frozen. The major forcing factors which have driven the planet are the sun, internal energy (exemplified by convection and plate tectonics), and the biosphere. One type of biological process, mankind, is now introducing a fourth (anthropogenic) forcing factor. In the course of the following 50 minutes, Bill introduced the topic of the International Geosphere/Biosphere Programme, and took the audience from the outer fringes of the atmosphere to black smokers, the Himalayas (and the origins of the Monsoon), and onto the Antarctic. The attending members were introduced to NASA images of population centres in China, and to the deforestation of Amazonia. They saw the "last" tree of the Sahel, and were told of rainfall in Sao Paulo (pH 2.2)! They were informed of fission and fusion research and the prospects of unabated growth in conventional hydrocarbon use. Bill dealt with deep sea cores and the CO_2 fluctuations of Isotope Stages 6 to present, and then went on to the observed increases in CO_2 and the potential of the greenhouse effect. The talk progressed to food production, population growth, and the future of our and other species on the planet.

There was a great deal of appreciation from the audience. The informal question and answer session continued for 30 minutes after the lecture ended, and words such as "outstanding" and "inspirational" were being used by teachers many hours later.

The second lecture was given by Professor Gwilym Roberts of the Department of Earth Sciences, University of Waterloo. Gwilym dealt with a current geological topic of importance to the economies of both Ontario and Canada and described aspects of the mineral sector in Ontario, with a special emphasis on the deposition of sulphide ores and gold deposits. Gwilym reviewed the status of Cu, Ni, Zn, Pb, Fe, U, Au and Ag deposits as percentage contributions from Canada to the world total and the Ontario ranking within Canada. He provided a review of the historical development of the gold mining industry in Ontario and pointed out the emphasis which has been given to gold (rather than base metals) in the period 1980-1988. The audience was given a quick overview of concentration factors needed for ore deposits, high-grade ore depletion, a description of the Superior Province of the Shield, and a summary of the producing greenstone belts of Ontario and adjacent Québec. Special emphasis was given to the Timmins volcanic belt and the petrogenesis of the sulphide ores, both in terms of their emplacement, and also in terms of their structural position. The new Hemlo finds of the Marathon district of northern Ontario were also mentioned in this talk.

A small, but enthusiastic, audience questioned Dr. Roberts on a number of points and expressed interest in many aspects of the presentation.

Dr. Emlyn Koster, Director of the Tyrrell Museum of Palaeontology at Drumheller, Alberta, gave the third talk on an aspect of "geology past". His lecture was entitled "Dinosaurs, the Ageless Quarry", and in it he described the status of knowledge on the dinosaurs, the reptiles that ruled the planet 65 and more million years ago. In his talk Emlyn summarized the geological time scale, and the breakup of the late Paleozoic

supercontinent. He went on to explain that dinosaurs occupied many different environmental niches of the Mesozoic, and illustrated some of these with examples (and reconstructions of environments) from Alberta and the Gobi. He told the audience of taphonomic research, and of the differences between attritional and catastrophic bone accumulations, following this with explanations on the state of bone preservation. He explained in some detail the workings of the Tyrrell Museum, and its field and research programmes, and the UNESCO World Heritage Site (with associated Field Station of the Tyrrell Museum) at Dinosaur Provincial Park. Finally, members of the audience were treated to views of the Gobi Desert in China, and some of the exciting discoveries made by the joint China-Canada-Alberta-Ex Terra Dinosaur Project. A few highlights included the skeletal remains of a mother with four infants buried in a late Mesozoic sandstorm, and the recovery of complete dinosaur eggs.

A vigorous discussion followed the lecture, ranging from asteroid impacts and the possibility of a "Nemesis Star" for potential causes of dinosaur extinction, to how to deal with creationism in a classroom setting. It even went on to whether the Museum's policy of only taking volunteer field assistants up to age 55 was constitutional or not!

In my view, this first attempt at bringing a concerted geological focus to STAO was a success. Over 500 persons (teachers from grades 1 to 13) attended the three lectures, and many of these questioned all three speakers at some length. The process of bringing a geological awareness to STAO cannot be accomplished in a single annual meeting; more areas of the earth sciences will have to be addressed in future years. Nevertheless a good start was made in 1988 thanks principally to the three speakers outlined above, and thanks, of course to the Canadian Geological Foundation, without whose assistance none of the above would have been possible.

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