

in both our tongues? Welfare – with a guaranteed income promised by all political parties? Health – when fear of death has now far outstripped fear of Russians? This route must be one of marginal gains, unless perhaps the towers of Physics and Chemistry can be breached, or the Government be persuaded to trust those outside Government to work on behalf of the people of Canada.

Where will we establish centres of excellence? Who will starve if the pie is no larger than the pizza will go? Who will direct the location of these activities? Some answers are obvious – we would not set up a centre for Precambrian studies in Halifax. But centres of excellence are made of excellent people, and excellent people settle in remarkable places for a variety of reasons. I wonder if it would not be superior policy to fund the best people to do what they want to do, wherever they are? If we do establish centres of excellence, indeed if we massively fund excellent people, who will decide where the axe falls? In the sphere of funding of university research from NRC sources we are now at the point where, through lack of funds, mistakes are being made – inevitably, judgments have to be made – and people who demonstrably deserve support at a modest level at least will receive no funds. Which new young scientist won't we start? How soon must progress be shown? What is progress – refereed papers? a mine? My personal view is that we have no choice but to make harsh judgments, as honestly as we can, provided that a variety of sources of funds exist. It is bureaucratically nice and tidy to channel all national earthy funds through a single earthy committee. It is, however, very dangerous, because inevitably this single committee will reflect a few of many possible sets of biases, and scientists must be protected from them. It is a great shame that the Defence Research Board is to cease funding university activities; it would be better if there were several funding agencies so that the talented are not overlooked in a moment's aberration.

The Canadian Geoscience Council has been courageous and their Report to the scientific community is well worth the effort, by the individual scientists, and by Neale, Wynne-Edwards and Clague. In one sense it is less valuable than the Blais report – there is little data.

But in another sense it is more valuable because nasty questions are asked, and nasty comments are made. I hope that in another report more thought is given to the answers to the questions and that in the Golden Age of the Earth Sciences to come we will need no nasty comments.

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## **Geological Survey of Canada Report of Activities Part A, April to October 1974**

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Edited by R. G. Blackadar and  
P. J. Griffin  
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Twice a year the Geological Survey of Canada provides a summary of its activities. Since 1973 the summary volumes have been produced in an attractive 8 x 11 inch format, illustrated by many high-quality line drawings and photographs.

No single person can do an adequate job of reviewing a volume with as large a technical scope as the *GSC Report of Activities*. Just because of the scope and volume of work reported, however, it seems important that the Report should be drawn to the attention of its potential readership. After some general comments on the purpose and style of the volume, there will follow a few notes on particular contributions that happened to interest this particular reviewer. Hopefully, future volumes will be reviewed by other reviewers whose technical interests will differ greatly from my own.

My first comment is that the value of the Report could be increased if the purpose of the Report was more clearly defined. Who is the Report written for? Certainly not the general public, for this is clearly a technical report. But presumably the report is not written mainly as an internal document, for the information of the GSC's own officers. I take it that the "target" readership is professional geologists at large, and mainly those active in geological studies in Canada, and employed by mining and petroleum companies, provincial departments of natural resources and the universities.

The reports on individual projects have wisely been organized in this volume into several major groups (Appalachian geology, Cordilleran

geology, Geochemistry, Geophysics, Marine Geoscience, Mineral Resource Appraisal, Mineral Deposits, Petrology, Precambrian geology, Quaternary geology - five major groups - Stratigraphy, and General). There is, however, no general statement of the studies being carried out in each of these disciplines. Such a statement, with a few comments on how individual projects fit into overall objectives, would be most useful for many of the potential readers. Some contributors do explain succinctly why the work was undertaken in the first place, but many others do not and few even seem to assume that the reader is familiar with all previous Reports.

Four well written reports describe Operation Saint Elias, begun in 1974 with the main objective being to map a region of the SW Yukon where the geology was mainly unknown: the Tertiary volcanic rocks, described by Souther and Stanciu, are of special interest and illustrated in two spectacular full-page panoramas.

On the east coast, E. H. Owens is studying coastal processes in the Magdalen Islands where there is a contrast between high wave energy on the west coast of the islands and low energy on the east coast: offshore bars are correspondingly much larger on the west than on the east. Macnab and Srivastava report on a regional geophysical survey of the Labrador Sea and, incidentally, illustrate (will a full-page photograph yet!) the loss of their ship, MV Minna, when it went aground in Brewer Bay.

D. F. Sangster remarks that the potential for smithsonite ( $ZnCO_3$ ) deposits increases to the north and west along the Mackenzie Fold Belt, adding that "it therefore behooves the wise prospector to bone up on the physical properties of secondary zinc and lead minerals . . . hitherto considered unimportant in Canada" (p. 237). W. P. Binney and R. V. Kirkham found copper widely but sparsely distributed along the basal Windsor limestone contact in the Maritimes and found the prospect of economic deposits unencouraging. O. R. Eckstrand, looking for nickel in the Prince Albert Group, N.W.T., found spinifex-bearing ultramafic flows (see also a later report by M. Schau): apparently this igneous texture is now regarded as "zone fossil" suggesting an Archaean age for the Prince Albert.

J. B. Henderson reports and figures somewhat more respectable Archaean fossils: stromatolites in Yellowknife Supergroup dolomites of the High Lake area. Also in the District of Mackenzie, P. F. Hoffman and I. Bell describe Aphebian volcanic rocks of the Bear Province in an area that "contains one of the world's great accumulations of . . . welded ash-flow tuff" (p. 331). They found that the mineral deposits at Port Radium and Terra Mine are both located in the western volcanic sequence (of three that have been mapped) at the base of the thicker part of the andesite volcanic pile.

W. H. Fritz proposes a new approach to broad correlations (from Mexico to B.C.) of Lower Cambrian strata, by relating stratigraphic sections to three "grand cycles" (defined by Aitken, 1966, as depositional cycles with an abrupt basal contact, followed by a lower shaly half-cycle overlain gradationally by a carbonate half cycle). W. S. MacKenzie and others describe Oriskany-like sandstone in the Grandview Hills area, on the Mackenzie River, and present some beautiful photographs of thin sections (or peels?) of Middle Devonian corals found in the unit.

Macqueen and others report analyses of Devonian basinal shales in the Pine Point region which show large amounts of zinc and uranium, directly related to the amount of organic carbon. Such rocks are one possible source of the zinc and lead at the Pine Point ore-field. G. C. Taylor and others touch on some other aspects of this problem in a discussion of basin shale to platform carbonate facies changes, and associated breccias and mineralization.

Only two obvious errors jarred my sensibilities as I leafed through the volume: modern intertidal muds in the Avon estuary (p. 162) do *not* contain prolific brachiopods (try pelecypods?) and the beautiful tool marks illustrated on p. 528 should not be labelled "load casts".

In reading through the Report, a reviewer is naturally led to reflect upon the purpose of the GSC and its relative position in the spectrum of geological activities in Canada. The purpose of the GSC as stated in the Introduction to the Report, "is to provide a comprehensive inventory and understanding of the geological framework of Canada interpreted in terms of all national activities that make use of or are

affected by geology". Readers may judge for themselves, but I doubt that this, or the full statement (which goes on for two paragraphs) really provides much enlightenment.

The impression of this reviewer is that 70 to 80 per cent of the activities reported are what would be called research in universities. As reported in the *Annual Report 1972-73, Energy, Mines and Resources Canada* (published in 1974, and the most recent figures available), the GSC expended \$17.6 million and 744 man years in carrying out these activities. Calculations by the reviewer indicate that comparable figures for the geological research activities (only) of all the universities in Canada would be \$12 million and 500 man years. So even allowing for the non-research activities of the GSC it seems that, in sheer volume, the GSC alone is carrying out as much geological research as all the universities in Canada. I doubt that this could be said of many other western countries. It raises interesting questions about the funding and aims of research in geology, some of which are discussed in the Canadian Geoscience Council report discussed in the preceding review by M. J. Keen.

Avoiding the broader issues, these figures emphasize how valuable it is to the geological community in Canada to have volumes like the one under review, which report progress in such a large proportion of the national effort in geological research. A little more attention to the needs of the reader who seeks to discover, not so much the details of any particular project, but what interesting new things the GSC has discovered in the last year, could make the volumes even more valuable. Even so, at \$5 for 602 pages and 160 reports, this volume has got to be a bargain.

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