

## Geoscience and National Defense

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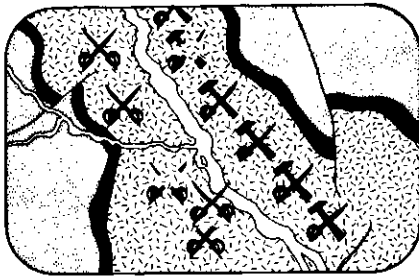
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# Articles



## Geoscience and National Defense

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**Note:** This article is the text of a talk given to the Geoscience Council of Canada in Vancouver on April 27, 1977. The views expressed are those of the author and should not be construed as representing the official policy of DND.

It is a paradox that though the Department of National Defence has few programs in geoscience, (1/2 to 1% of the total \$35M on defence R and D in geoscience), almost every activity of the Department is of interest to geoscientists. Of course, it is difficult to find any activity which has not at some time, in some way, contributed to geoscience. Perhaps that is why geoscience becomes the "final discipline" of the renaissance type man - the synthesisers of whom we have had our share in Canada. I need only mention Sir Charles Wright and Professor Tuzo Wilson to make my point clear to this audience. I suggest it is not an accident that both of these gentlemen have been closely involved with National Defence.

Before I discuss the future, let me remind you of some of the activities of the Department which have contributed to geoscience in the past few decades.

Sir Charles I have already mentioned. His work in geomagnetics, particularly in conjugate point studies, was supported at the Defence Research Establishments at Esquimalt, at Suffield, and at other points in Canada and the southern hemisphere. In the work on crustal studies the large explosions at Suffield helped both as energy sources and as a focus in time, bringing many diverse teams to work in Canada. The program also contributed to upper atmosphere studies and to an understanding of planetary cratering mechanics. Also, the Department has for over a decade supported a standard seismic vault at Suffield, contributing both money and manpower to EMR.

Turning to a different area, I remind you that much of the mapping of Northern Canada was done with Departmental support. The work of Greenaway and Dunbar is so well known that I need not stress that further. The support given to Hattersley Smith and company in the Hazen Lake studies was of particular value, and this type of study is continuing with the current activities in ice-covered waters, the polar ice shelf, and the North Water studies. Recent work has also included studies of the water balance in the Arctic ocean, and on the movement of icebergs off the coast of Labrador.

Less widely known, because of the military sensitivity of the subject, but of profound importance, have been the studies on acoustic transmissions in the oceans, and all the associated development work in sensors, in deep diving, in submersibles and so on. This is still a very active field in which three of our laboratories are involved, to say nothing of military ground, naval and air support.

It would be possible for me to go on listing such past activities, all of which bear upon the geosciences, for quite some time. But the point I want to make is that while there have been successes in the past, our real concern must be to ensure that we do not miss similar opportunities in the future. We shall miss them unless there is a "cooperative awareness" between the geoscience community and the defence community. I feel that there are two quite distinct opportunities available to us. There is the obvious one of ensuring that full benefit is taken of "departmental" studies. We must ensure that the scientific aspects of all our operations are done competently, are supported to the best of our ability despite financial constraint, and that the results are made freely available whenever this does not contravene military security. When possible, we must publish our results quickly, but even when this cannot be done immediately we must ensure that all relevant information does reach the public domain in due course. We must build within the department an awareness that there is a wider, and perhaps more enduring interest in some of our work than the military interest which produced the data. This is a departmental responsibility which often goes unrecognized, but it is an area where we must put our own house in order, not expect outsiders to do it for us.

The second opportunity, however, is I think of even greater importance, and is one in which we must call upon the scientific community for help. Or rather, it is a matter of self-help for the community that is frequently missed. I suggest many of our past contributions have come about almost by accident - the accident of the right man at the right place and time: in other words the old boy net. I do not think that this accidental approach is at all satisfactory. We need to ensure that whenever the military

undertake an activity - and I do not mean only the scientific branch - then thought must be given to collateral interests from a national development point of view.

I am sure that many a geoscientist has ideas that he cannot establish, simply because his employer cannot support him to the tune of half a million dollars. Yet it is quite possible that by the expenditure of a few hundred dollars the data could be obtained by riding on the back of a military operation. The trouble, of course, is that by the time the community hears of the operation, it is either already fully planned or is actually over and done with. The opportunity has been lost. It was nobody's responsibility to find the "add on" experiment, so nobody looked for it.

Let me pose a question:

If the geoscience community could arrange to have several very sophisticated sensor platforms fly at regular intervals, with an input into the sensor suite, the timing and the ground track, what would you do with the chance? The Department will have in the future, a billion dollar investment to do just that. What can you "add on" at minimal cost without in anyway frustrating the prime departmental reasons for these flights?

Consider again that every year recently the department has made troop lodgements in the north and in other places, to train troops in Northern Operations or other areas of our responsibility. At the moment, the selection of the training areas is done for departmental convenience. However, it is possible that such operations could be used by geoscientists in a fairly simple "add on" way, particularly if the training areas were selected on a different basis. In which areas are there valid reasons for wanting to do scientific work, but no hope of getting it done because of the logistic cost?

For a third suggestion, consider the widespread geoscience operations in the past - such as for example the Lake Superior seismic experiments - in which communication was a primary handicap. Could the Department help in such experiments, either through our existing networks or by using the experiment as a sophisticated training vehicle for our communicators?

As you all know, the department is no longer actively supporting research by giving grants to universities. A pity, no doubt, but even at the peak of the

program such finding was miniscule compared with the overall departmental operations and maintenance budget. I think it essential that we get full value out of this enormous budget, and one way of helping to do that is to ensure multiple, cooperative use. In the past the department has been cooperative when the need has been recognized - we have even diverted sovereignty flights to count nesting ducks. But I am certain that much more could have been done, and must be done in the future, and that this can be done at minimal cost and with no unacceptable disruption of the departmental work.

This subject is of course not totally ignored in the department. We do have several interfaces with the scientific community. For example, the Defence Research Board is composed of scientists and industrialists, who are there to advise the Minister on scientific questions. But I think they are also there to ensure that scientific opportunity is recognized. We also have advisory committees for each of our establishments, which act in this more limited sphere as junior versions of the Defence Research Board. Also, of course, we have our own departmental scientists concerned with mission oriented projects, some of which are geoscience oriented.

So what more, you may well ask, needs to be done. Is anything more even required or justified?

Let me answer that by drawing a parallel with society. Over the generations we have built up a social structure, and a legal framework for that structure, which has all kinds of established ways of doing things, and which is capable of self-reform. Yet even so, many western nations, including our own, have found it necessary to appoint Ombudsmen, whose responsibility it is to cut across departmental lines, to find solutions to problems of departmental inflexibility, departmental funding regulations and so on.

I suggest that there is a need for a Scientific Ombudsman, whose responsibility would be to see that excessive departmental exclusiveness, and departmental rigidity in funding, in information exchange, in the freedom of non-members to participate is overcome. It would also be his responsibility to ensure that forthcoming operations are made known to relevant research workers. He should be a point-

of-contact for the scientific community to whom questions of the nature of "what are you doing next year in Baffin Island": may be addressed. He might, for example, be expected to investigate why Geologist Joe has been refused permission to join a sovereignty flight over Axel Heiberg Island. Was there a genuine reason of lack of space, or was it just the department was nervous about insurance coverage or afraid that one reasonable request would open the door to scientific joyriders?

I suppose that all of us in the scientific community must act to some extent as Ombudsmen. But in general our interests are circumscribed by the day to day responsibilities of our office. It is, unfortunately, nobody's responsibility to see that opportunities for cooperation are recognized in time.

If you agree with me that there is such a need, then you should ask for it. No government department is going to volunteer that sort of thing today, when manpower is even shorter than money. But I think that if you ask loudly enough, something of the kind may be given to you which, in the end, will be beneficial to all.

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