

Anthropological Observations on Science in the North: The Role of the Scientist in Human Development in the Northwest Territories

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ABSTRACT. The social context of research provides the background for assessing present and potential roles scientists may play in the Northwest Territories. This context includes diverse cultural and interest groups and an ever-quickening pace of social change. Increasing scholarly and ethical demands are being placed on the scientific community for academic accountability, public participation, education, and cross-cultural exchange of knowledge. These demands affect us, our disciplines, and our ability to carry on research.

The Northern Cultural Heritage Project, an applied anthropology and archaeology program, serves as a case study illustrating the integration of research with the northern social context. Additional potential roles for researchers are discussed, including increasing information return, education through exposure to field science work, research ethics and social context awareness for novice professionals, and policy participation. It is concluded that the contemporary social context of the north has practical and perhaps theoretical implications for the conduct of science.

Key words: anthropology, heritage, education, method, theory, policy, human resources, social context

RÉSUMÉ. Le contexte social de la recherche fournit la base pour l'évaluation des rôles actuels et possibles que peuvent jouer les scientifiques dans les Territoires du Nord-Ouest. Ce contexte comprend les divers groupes culturels et à intérêts particuliers et tient compte de l'allure constamment en accélération des changements sociaux. La communauté scientifique fait face à un nombre croissant d'exigences érudites et éthiques quant à la responsabilité envers les gens du Nord, la participation du public, l'éducation et l'échange de connaissances entre cultures. Ces exigences nous affectent non seulement personnellement mais touchent aussi nos disciplines et notre capacité de continuer notre recherche.

Le Northern Cultural Heritage Project, un programme d'archéologie et d'anthropologie appliquées, sert d'étude de cas illustrant l'intégration de la recherche au contexte social du nord. D'autres rôles possibles pour les chercheurs sont discutés, y compris le retour de l'information aux gens du Nord, l'éducation au moyen de la participation au travail scientifique sur le terrain, l'éthique de la recherche et la conscience du contexte social chez les nouveaux professionnels et la participation aux politiques. Il est conclu que le contexte social contemporain du nord comporte des implications pratiques et peut-être aussi théoriques pour la conduite de la science.

Mots clés: anthropologie, héritage, éducation, méthode, politique, ressources humaines, contexte social

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INTRODUCTION

In combining basic research with human resource development, the scientist encounters theoretical and practical concerns which are not specific to a particular discipline. Science policy for the Canadian north will benefit if these concerns are addressed from many disciplinary perspectives. My intent in this paper is to present data on the social context of science in the Northwest Territories for the contemplation of present and future northern scientists. Both the philosophy and the practice of science are affected by the context in which we work.

The basis for this paper is experience as a participant-observer in the practice of northern science. The data are limited in comparability between groups of people involved, but come from work with students (Inuit, Dene, Metis, and Caucasian), academic peers, non-resident northern workers in several spheres, and work with 20 primarily native communities since 1975. Much experience, but not all, has been gained with an applied anthropology and archaeology project, which serves as a case study to illustrate the problems and possible solutions discussed herein.

The direction of this research is towards an anthropological perspective on modern northern culture, and application of results to social and scientific problems. My current premises include recognition of a "colonial" view of northern Canada. This includes the fact that the Northwest Territories lacks locally-generated revenue and thus lacks the power of self-

determination within Canada (see, for example, Paine, 1977; *Etudes/Inuit/Studies* 1979:3(1,2); Dacks, 1981:208-211). A second premise is that northern society comprises groups with different interests and different cultures engaged in dominant-subordinate cross-cultural interaction. The theory which provides some, albeit imperfect, explanation of the data is one of human adaptation to change, perhaps most simply termed cultural evolution.

THE SOCIAL CONTEXT OF SCIENCE IN THE NORTHWEST TERRITORIES

Northward Looking: A Strategy and Science Policy for Northern Development was released by the Science Council of Canada in 1977. A 1979 review of the report noted the failure of the Council to recognize the primary role of political, social, and economic factors in scientific and technological activities (de la Barre, 1979). Later, in 1981 the Canadian Social Sciences and Humanities Research Council (SSHRC) established a new strategic grants program called "The Human Context of Science and Technology" (SSHRC, 1982).

Historically, however, the sparseness and diversity of the Northwest Territories population (43 000 people of four major cultural origins scattered over one-third of Canada) have encouraged the isolation of researchers based elsewhere from the people of the Territories and their concerns. Furthermore, field scientists are often not sufficiently familiar with the social

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context of their work to be knowledgeable about the impact of their presence. Both the movement of aboriginal people towards self-determination and the pace and pressure of development mean that scientists are increasingly forced to face the concerns of residents and other interest groups in the Territories.

Gurston Dacks's recent political science study of northern Canada (Dacks, 1981) stratifies the Northwest Territories social structure into four major groups: native people, non-native northern residents, the government (both territorial and federal), and multinational corporations. Notably, the former groups consist of individuals while the latter are institutions whose members will not live in the north except in relatively small numbers and for the most part temporarily. Scientists working in the Northwest Territories are participants in its social context, but it is significant that they have no year-round base here. Thus they share with industry and the federal government the characteristic of doing work which affects the people of the Northwest Territories but primarily serves the interests of the dominant southern Canadian society. The isolation of scientists from the social impacts of their presence has sustained the treatment of the Northwest Territories as a research preserve for the outside academic community.

Two examples serve to illustrate some of the concerns northerners are expressing about science. The first is Recommendation 41 from the 1982 Northwest Territories Legislative Assembly Report: *Learning: Tradition and Change*. Education, seen as the means both to preserve the past and to control the future, was the subject of exhaustive community review, and major systemic changes may be implemented within the next few years. Recommendation 41 reads, in part: "Post-school programmes of the (proposed) Arctic College shall consist of activities currently undertaken by the Science Advisory Board; and the licensing of scientists for research in the Northwest Territories". This recommendation may merit little concern, but it serves to illustrate the interest northerners have in science, particularly as part of education.

The second example is that of Inuit concerns for archaeological research which have been published, presented before professional associations, and included in proposals for native cultural institutions (Swinton, 1976; Weetaluktuk, 1979; Inuit Cultural Institute, 1981). These include the need for Inuit involvement at all stages of research, including: selection of research problems; work on field programmes "not as labourers only" (Weetaluktuk, 1979); return of information in a format accessible to local people; consultation with regional and local people throughout a research project; and training and education in archaeology for northerners. Repatriation of Inuit artifacts to the north is also an Inuit Cultural Institute concern.

In contrast, the concerns of the scientific community might be summarized as: 1) continued access to data; 2) effective, conservationist management of data; and 3) research freedom.

The conflicting interests of N.W.T. society and institutions to the south yield a volatile context in which the researcher may be forced to respond to ethical and human concerns as well as to his or her own research problems. The practical

problem today, for the scientist of any discipline, is that northerners are no longer complacent in accepting the dominant society which controls so many aspects of their lives. While they are subordinate both cross-culturally and economically, their quest to improve the quality of their lives affects the conduct of science.

Furthermore, the expressed needs of northerners conflict with prevailing norms for academic behaviour. We scientists, who have traditionally not been accountable to northerners for work done in the north, have not yet assimilated two facts. One is that we are ignorant of the skills necessary to participate in cross-cultural contexts, particularly so when technical information is communicated. The second fact, perhaps more important for this discussion, is that the changing social context of science may affect the practice of our disciplines, and perhaps even the theoretical foundations of our scientific interpretations, at least in the social sciences. How, then, do we participate in, learn from, and contribute to northern science which responds to human needs as well as to the needs of our own scientific quest for knowledge?

THE NORTHERN CULTURAL HERITAGE PROJECT (NCHP)

The NCHP embodies the objectives of mutual education for the people of the north and for scientists, educators, and other interest groups, to the advantage of all parties (Cole and Bielawski, 1981). The project, which is a heritage education field school for Northwest Territories residents, incorporates archaeology and scientific skills training. It works towards two immediate goals: heritage resource conservation, and human resource development.

Begun five years ago (by the author and Sally Cole, Department of Anthropology, University of Toronto), the NCHP has had 37 participants (7 - 9 each summer, mostly Inuit but including whites and one Metis). Paleoeskimo materials have been excavated from one large, exceedingly complex site and one smaller site on Somerset Island in the Central Arctic. Working for four weeks as excavators, mappers, photographers — that is, as archaeological field assistants — during the day, students attend a brief technical lecture each morning and classes or lab four nights weekly. Students are responsible for field notes, readings, and laboratory projects. The staff (three archaeologists and one cook/camp manager) is responsible for research, monitoring data collection, teaching on-site and in the classroom, informal counselling and teaching, and field crew and camp maintenance.

The curriculum covers standard field and lab methods, arctic prehistory and anthropology, and heritage. Modern northern society is discussed in the context of past and present human adaptations to environment and to other cultural groups. Students receive academic education, vocational training, and English and arithmetic upgrading. Most importantly, as field assistants they participate directly in research and work closely with scientists as role models. There is a strong "hidden" curriculum, based on the premise that a secure sense of one's heritage gives each individual a stronger, more adaptively successful sense of self in today's world (see also

Cole, 1981). Thus we emphasize heritage education, and conservation of those aspects of culture which can be maintained within the context of the dominant society, such as language and values.

Most NCHP students have come from the small arctic communities of the N.W.T. They are recruited through regional schools and local contacts, and currently there is no requirement that they be enrolled in school. Through the recruitment process and the logistics of getting students to the field camp, many community people have become aware of and involved in the annual operation of the field school. Its indirect effects thus go well beyond the field site. Its broadly-based support has been slowly garnered piece by piece from the territorial government, the private sector, private family foundations, and certain federal government agencies such as the Polar Continental Shelf Project. This in itself furthers the project goals by involving many people and agencies from all sectors of scientific research, which is also done with and for northern people.

The project seeks the highest quality in research, education, and training, and a balanced integration of all three. Unfortunately, because funding has been minimal, the analysis of archaeological materials and the follow-up evaluation of participants have only begun. Directions for the future have been identified as: 1) placing skilled students as seasonal employees with field parties; 2) providing direction and support for those who may wish to pursue archaeology or other science studies; and 3) placing scientists and students interested in working together in contact with each other. The southern-based scientist and the northern student may have difficulty finding each other because few mechanisms exist for "local hire" at the community level, even when mutual interest exists. This may be mitigated through direct communication between researchers and community councils prior to the field season. A council, or another interested local agency such as the hunters and trappers association or a heritage society, could suggest potential field assistants. The scientist could hire field assistants when travelling through the community.

Three additional programs which involve northerners in science are currently in operation. One is the N.W.T. Science Advisory Board summer student program, which places individual students with field scientists who express a willingness to expose northern students to scientific work. The second is the Renewable Resources Technology Programme at Thebacha College, Fort Smith, N.W.T. It includes a rigorous two-year curriculum with field and classroom components, which exposes students to several disciplines. Third, the Prince of Wales Northern Heritage Centre included a training component in a Mackenzie Delta archaeological project begun in 1983.

OPTIONAL PUBLIC WORK FOR RESEARCHERS

Policies and guidelines for northern research consistently stress the need for local, particularly native, involvement in scientific activities (Science Council of Canada, 1977; Social Science and Humanities Research Council, 1981; Department of Indian and Northern Affairs, 1981). Yet, experience with

NCHP shows that despite objectives of mutual education for the public and scientist, the results of the project have been felt largely by individual students and their communities.

Several other means exist through which researchers could respond to the northern social context. Pursuit of the following options would allow researchers to become more active in the cross-cultural research and education process.

1. *Non-technical, graphic, and translated information* is required, information which reaches people and with which they are comfortable. While in no community in the world do we expect the average person to be aware of the latest scientific advances, in small native communities the impact of the researcher's presence is much greater than in cities. Hence, information return is more important. An indirect approach through increased northern science training for teachers (including adult educators) and through upper-level curriculum materials is potentially fruitful. Teaching units on scientific projects done in the area may return more research results to communities than does deposition of untranslated reports with local councils. The latter works for formal interaction but seems to do little to inform most people. Mounted photographs with brief, general, translatable captions, designed for display in community centers, are very useful.

Conferences held in regional centers, where every effort is made to encourage public involvement, are also an excellent means through which to transmit information to the public. Local residents participated in a recent heritage conference in Haines Junction, Yukon, and in public historical presentations at the meetings of the American Association for the Advancement of Science (Arctic Division) in Fairbanks and Whitehorse. Conversely, the annual Elders' Conference organized by the Inuit Cultural Institute of Eskimo Point, N.W.T., invites workshop participation from northern researchers.

Problems faced include: a lack of skilled translators; the fact that research grant allocations do not include a commitment of funds for production and translation of non-technical, graphic materials; and the lack of an effective means of distribution to the public.

2. *Role models* for work other than in settlement maintenance are needed in communities. Because field science takes place "on the land", in a context with which local people are familiar, scientists can contribute greatly to broadening the horizons of northern residents. With role models, and job incentives for at least seasonal work with field parties, reinforcement from one's home culture for such work may grow. Work as a field assistant also provides employment which may merge with other cultural needs, such as the part-time maintenance of a traditional subsistence life-style.

A scientist-in-residence program in rural Alaska is providing role models for students both at their high schools and in a summer student intern program similar to that of the N.W.T. Science Advisory Board. University of Alaska scientists spend one week at a rural high school working with students and teachers, using "culturally and environmentally relevant materials" (McDiarmid *et al.*, 1982:79). This program is aimed at "increased academic performance by students in the sciences and increased minority representation

in the scientific professions.”

3. *Education for the novice scientist* is required. University student field assistants often travel directly from their universities to field sites. This route lacks physical or intellectual exposure to any northern context save that of science with, by, and for scientists. Thus, future northern scientists are not encouraged to become familiar with the complexity of influences on science, nor with the relationship of science to northern people. In order to introduce the issues surrounding management of data bases, and access to data, universities might consider offering research context, or even ethics, seminars as part of the graduate curriculum. Such seminars could cross disciplines and consider land use and research permit systems, legislation, community contact, information return, and cross-cultural perceptions of science. Students of one discipline could also study the north in comparison with other world areas posing similar contexts for scientists. Both the researcher and northern residents should benefit, the scientist having facilitated his or her work through prior knowledge of the issues and systems which affect it; northerners, through sensitively conducted and successfully applied research.

4. *Participation in policy development* is required. In the Northwest Territories, political evolution will probably result in governing bodies more culturally cohesive than the present structure. An Inuit-dominated eastern territory, and a western territory in which Dene, Metis, and non-native permanent residents are the controlling forces within government, may mean more territorial control of scientific activities and pressure for research which serves northern interests. The current activity being devoted to development and implementation of arctic and Alaska science policy is a process which northern Canadian researchers could do well to follow and study. As a group with special interests, we need to participate in the evolving management and legislative structures of the Territories.

Such participation first requires accepting the fact that we are not conducting research in a vacuum. Discussions of the social context and its implications for northern research could be included in professional conferences (e.g., see Bielawski, 1982a, 1982b; Janes and Arnold, 1983). Professional associations could address the impact of scientific work and scientists' presence in northern communities and on the land. Information on the allotment of research funds for educational components for northerners, and for writing, translation, and distribution of general research results to the public should also be circulated within the scientific community.

Advocacy committees within professional associations or institutions such as the Arctic Institute could work to make policy decisions affecting researchers known to the scientific community. Scientists, in turn, could collectively work with government management agencies to ensure that the needs of the scientific community continue to be met within the changing political structure.

PROBLEMS WITH OPTIONS FOR RESEARCHERS

The researcher and the public face several problems in bridging the gulf between cultures, and that between aca-

demics and the public. There is no tradition of cross-cultural communication between academic institutions and communities. Hence the skills, procedures, and positive reinforcement for it are in short supply. Currently such communication occurs on an individual basis, and slowly, and there is much frustration on both sides.

Two problems predominate. In the local community, there are relatively few skilled and experienced individuals to deal with the overwhelming burden of projects and agencies demanding their attention. Concern with community health, employment, education, political evolution, and large-scale development projects is greater than concern over relatively small-scale field research, although research may be done to advance knowledge of these concerns.

For researchers, the single largest problem faced is that there is little, if any, professional incentive to address the social context of their work in the north. This means that scientists perceive a lack of time to pursue any of the options described earlier, such as overseeing the translation and distribution of non-technical reports or photo stories. It takes a commitment of the scientist's time to select appropriate research results and make them available to curriculum developers or museum education departments, so that school materials can be produced. It takes time for the scientist to volunteer (as did University of Alaska researchers) to spend several days in a rural Alaskan high school. It takes time and patience to explain scientific research to a lay audience in person and in correspondence, and even more time to do this for a native community. Because this work does not fall into the major categories of research endeavour — publishing technical papers and reviews, university teaching, administrative duties for the scientist's institution, and participation in professional associations — which are the academic measure of a researcher's work, addressing research results to northerners has been a low priority for most researchers.

To summarize these problems, even when scientists and northerners seek to exchange interests and information, neither group perceives immediate benefit from doing so. Both groups find obstacles to developing communication.

Yet, since the NCHP began in 1979, all of the options described above have been pursued by workers on the project. Photo stories and translated accounts of the work have been distributed to Resolute Bay, to participants, and to other interested individuals and communities. A story line using an archaeological dig to introduce general science concepts was produced under contract for the N.W.T. Department of Education's curriculum section. Community visits, including several slide shows, were an annual feature in Resolute Bay during the project, and preliminary laboratory analysis was conducted there for six weeks in fall 1980. By working closely with students in the field, training them as assistants, and carrying out analysis in view of the community, NCHP workers have tried to present role models for northern students. The NCHP has also encouraged novice scientists to become familiar with the northern social context through hiring staff demonstrating ability and interest in working within the NCHP's cross-cultural research setting; through extensive

correspondence with senior undergraduates and graduate students in various disciplines; and through seminar presentations in graduate departments. Finally, in policy development, the NCHP has worked to raise northerners' concerns about archaeology within the profession (see Bielawski, 1982b).

THEORETICAL IMPLICATIONS FOR SOCIAL SCIENCE

I conclude with the possibility that cross-cultural approaches to research might have theoretical implications for social science. This is suggested and supported in Daniel Miller's thought-provoking discussion of archaeology in a developing country. Miller (1980:710) emphasizes that archaeology is a product of industrialized cultures and the European scientific tradition: "there is nothing in most traditional societies that in any way parallels it...its methodology, paradigms and context are all unprecedented...". Because archaeology is both a collection of concepts derived from a contemporary scientific world view; and a discipline which seeks to understand the past of diverse cultures, "in order to become meaningful it must become an integral part of the developing system...and cross the boundary to become identified with many important aspects of traditional life and outlook" (Miller, 1980:710).

Miller's experience and analysis clearly demonstrate that research in the European scientific tradition is alien to aboriginal, developing cultures. He suggests that cross-cultural archaeological research incorporate the concept of dualism, which recognizes the existence and validity of both traditional and contemporary social and economic systems in developing countries. Only through integration with traditional world views will archaeology — and thus preservation of archaeological resources and knowledge about past ways of life — take root and grow within developing cultures.

McGhee (1980:720), in commenting on Miller's synthesis of pragmatic and theoretical issues, expresses concern that opening the traditional stance of archaeology to research designed in the context of other cultures may lead to uncontrolled excavation and overly subjective interpretation. On an empirical level this is a valid concern. Archaeologists and other scientists must continue to develop and adhere to sound principles of data conservation and management.

On a theoretical level, however, the existence of emic and etic perceptions recognized in anthropological views of other cultures supports Miller's conclusions. Simply summarized, emic categories of knowledge are those defined within the reality of the other native cultures; etic categories are meaningful to the researcher in terms of our culture's scientific theory. Miller's description of the discipline of archaeology as separate from the cultures within which it is often conducted holds true for many sciences. Researchers in the social sciences, however, are beginning to respond on a theoretical level to the accumulation of data collected over the past century from aboriginal cultures. While an empirical response has been evident in the applied branches of science (technology, medicine, social services) only recently have we begun to see the flow of observation and interpretation from native cultures into the dominant scientific world view.

This flow is evident in Miller's synthesis of academic and

cultural concerns and experience; on which he bases his argument for incorporating dualist world views in archaeological research. In northern studies, it is very evident in the recent spate of published comments on the integration of academic and applied science concerns, particularly in Kemp and Brooks's "A New Approach to Northern Science" (1983); (see also Harrison, 1983; Upton, 1983; and Dr. W. Taylor, Jr.'s comments on assuming the presidency of the Social Sciences and Humanities Research Council of Canada (Anon., 1983).

This integration of cross-cultural perspectives with modern science cannot help but engender a shift in the direction of the pursuit of knowledge. It may see changes at the empirical level regarding what constitutes observation and data, while on the theoretical level it could reveal new foundations for analysis and explanation. Although, as the above-cited comments demonstrate, such a shift is occurring, the implications of this shift will take some time to become evident.

The crucial concerns, of course, are the nature of reality, truth, understanding, and knowledge, and the validity of multiple cultures' definitions of these. The following question might be considered by workers attempting to disseminate concepts and results of scientific research, and by native groups; the relative success or failure of data access and management may prove the measure of our response.

If a concept or world view provides explanation for observed phenomena, is it not valid and true according to the criteria of modern science? Thus, if an interpretation provides explanation about observable phenomena in the environment to members of a native culture, is it not true? Though the answer is yes, it must be qualified: perhaps it is only true within the terms of reference of that culture. However, if the explanation can contribute to explaining phenomena observed beyond that culture, it is a contribution to human knowledge. As such, it must be considered an addition to the sources of general scientific explanation and incorporated into the body of scientifically researched truth as we presently understand it.

Finally, as the people of the world become more and more integrated into a global cultural system based on at least some shared knowledge of events, environments, and phenomena, all cultural definitions of science and truth become raw data from which human knowledge continues to emerge. Furthermore, all culturally defined, but not culture-bound, paths to the explanation of phenomena observed around us — that is, culturally different methods of research — might be considered equally valid until proven to yield fallacious results or no results at all.

SUMMARY AND CONCLUSIONS

As scientists in a cross-cultural context, our practical roles are twofold: 1) to seek knowledge; and 2) to impart knowledge and expertise to those who wish to know that we have learned, in a manner which effectively crosses cultural boundaries.

In so doing, we can facilitate both science and education by meeting needs for academic and vocational study, employment, and role models. We also uphold our responsibility to science through pursuing knowledge and ensuring access to

data and research freedom. Finally, we must meet the ethical responsibility to the public embodied in applied science.

Research might be defined, most simply, as problem definition and the search for solutions. Let us, in applying social science, consider this question: in cross-cultural human resource development, is there a need for research which utilizes fundamental concepts defined in the terms of subordinate as well as dominant cultures? Considering the diversity of human cultural knowledge, if we accept the broad evolutionary concept that generality is more adaptively successful than specificity, we might consider incorporating the richness of cross-cultural perceptions into the advancement of science.

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