Some Points for Consideration in Discussions on The Need For, Feasibility, and Possible Role of an International Arctic Science Committee

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The following comments present a number of points that may be pertinent to discussions on the feasibility of establishing some sort of a forum or organization to facilitate co-operation and develop greater scientific momentum and control by arctic nations in arctic research. These comments are based on correspondence between Roots and Rogne in July, September and December 1986. They state the personal opinions of the authors only, and do not represent policy or negotiating positions of either of our countries. There is no attempt in these notes to propose a final solution or to recommend what action should be taken; we wish only to draw the attention of all concerned to some of the background to these complicated and long-standing questions, and to point out some of the important factors that should be considered before a decision is made to create a new international structure, or alternatively not to create a new structure but to find some other way to improve international contact and co-operation.

General caution

In the light of the varied responses to the idea of re-opening discussions on international arctic science co-operation, and the recent experiences and difficulties of some existing international arctic organizations, we should be quite careful about deciding too quickly what kind of new organization is needed or what it should do. Many sincere and experienced people have tried hard at different times to establish a body or a committee to do the same things that were agreed at the informal meeting at San Diego in 1986 to be desireable, and yet for one reason or another a really effective mechanism has not resulted.

The attempts to form an international body to co-ordinate and encourage international arctic science go back of course to the International Polar Commission created in 1879 in connection with the International Polar Year. In the modern context, there have been serious discussions on this theme at least since 1957, when at the ICSU Executive Meeting in Bruxelles it was carefully debated whether ICSU could support a SCAAR - a Scientific Committee on Arctic and Antarctic Research -, and, even in the light of the then very friendly co-operation of the International Geophysical Year, it was realized that chances were better for a SCAR, a committee for Antarctic Research. Canada at that time was in favour of a SCAAR, at least in principle, but there were real doubts whether many governments would support it. How much different is the situation today?

This does not mean that we should not try again. We should. But we must not be too simplistic, and we hope that at the first meetings the participants do not come with an expectation that another committee will by itself solve the problems where previous committees or attempts to form an international organization have failed. It is true that at the preliminary discussions in San Diego there was a quick review of existing international arctic-related organizations as they exist today, and the members present concluded that the existing organizations and structures did not meet present needs. However, there was no in-depth examination of what were the intended purposes or objectives of these organizations, and no real discussion on why they failed to meet today's needs or how they got off the track. In several cases at least the organizations that were felt to be inadequate or which had lost credibility had objectives very similar to those which at San Diego were agreed to be desireable. If we are together to try to do something new or more effective, but to meet many of the same objectives, we should look carefully at what the recent history of similar bodies has shown us.

The following are some points that should be taken into consideration.

1. Domestic vs international priorities

There is little doubt that there would be benefits to each country and to science from the presence of an active arctic science organization that can provide closer contact between countries in the planning and operation of arctic research programmes.

In each northern or arctic country the main scientific effort has to be directed toward domestic priorities and justified as serving nationalistic purposes. The scope and the resources that arctic countries have for engaging in international arctic activities or non-national purely scientific studies is correspondingly limited. However, the established arctic science agencies of arctic countries do have logisics capabilities, continuity of arctic expertise and knowledge, and basic data and information about the arctic which is essential to important arctic science in nearly every field.

Non-arctic countries with polar interests often do not have domestic arctic responsibilities which have first call on their arctic scientific resources. Their focus can therefore be more easily directed toward important unsolved scientific problems in the arctic; and for policy as well as scientific reasons they can easily view much of their arctic science in terms of international programmes. This paradoxical situation is becoming increasingly true as more and more of the leading science in arctic regions - and in the polar regions as a whole - is a part of global or world-wide studies, and is simply the high-latitude component of

studies such as the World Climate Research Programme or the International Geosphere-Biosphere Programme. Thus, to an increasing extent, the incentive and strong push for sophisticated international science programmes in the arctic is coming from non-arctic countries, or, in the U.S. from scientific groups that do not have to allocate scientific resources to domestic arctic (i.e. Alaskan) priorities. This situation causes problems for many arctic countries (Nordic countries and Canada) who would have much to gain from such researches, who would like to participate in international programmes, who often are active in planning but whose scientific resources must be dedicated largely to domestic arctic priorities.

An important aspect for each country to consider is, if an international body is formed, how it will relate its science to solve national problems to the presumably broader issues that will be the main concern of the international body. The interest of each arctic country in taking part in international studies will depend often on the range of scales of problems involved. For example, Norway may have an important research problem in the study of the circulation in a fiord in Svalbard. Canada has a similar high-priority science problem with regard to the circulation in Lancaster Sound in its Arctic. It is clear that the understanding of what happens in Kongsfjorden and in Lancaster Sound would be aided by a better understanding of Arctic Ocean circulation and ice drift. Presumably, an Arctic Science Committee could help the Svalbard scientists or the Canadian oceanographers bring their problems to the attention of those interested in studying the Arctic Ocean, so that the large-scale and small-scale studies could be designed to benefit each other. But Norway, with only limited resources for arctic oceanography, would then have to decide whether to take part in the Arctic Ocean study and delay the Svalbard study, or go ahead in Svalbard and be dependent on the activities of other countries for the information it needs. Canadian scientists have a similar problem. Our task here is to consider what would be the value, if any, of an international arctic science organization in situations such as this.

Two areas where the potential role of an international arctic science committee needs careful consideration in relating domestic to international activities are with respect to industrial development and protection of the environment. Each country has its own approach to encouragement and regulation of industry - these are purely domestic matters. But much of the science and technology connected with resource development, transportation technology, etc., is genuinely international, and it may be useful to consider seriously the role that an international body could play in exchange and development of basic information and technologies. In a similar way, each country has its own national approach to environmental protection, but no country can obtain within its borders all the scientific information and knowledge

needed to protect its own environment and manage its resources wisely. As much of the information needed is circumpolar, the role of an international arctic science body in obtaining such information in a more effective, co-ordinated and economical manner, and exchanging it between all interested countries, could be important.

The questions to be considered are many:-

- Would a scientific organization of arctic nations help arctic countries meet both their domestic priorities and their international scientific interests? How would it do this?
- Would the linkage of domestic and international science priorities be better achieved through a "club" of arctic countries only, or through some neutral and strictly scientific body like ICSU?
- Would an international organization of countries interested in arctic science help arctic countries to carry out the science most important to them, or would it provide a vehicle to increase the tendency of non-arctic countries to dominate the forefront of significant new research on many arctic phenomena? Would it mean that arctic countries lose control of their own science priorities?
- Would the existence of an international committee or organization to facilitate international co-operation in northern sciences cause in some countries a division in their own arctic science community - between the science that is done for domestic or development reasons and the science that is somehow international in nature? For some arctic countries who are having a difficult time maintaining national support for their present level of arctic science activities, or co-ordinating it between increasingly narrow agency objectives, such a division may be unfortunate.
- What role could an international committee play in facilitating research and exchanging information in connection with background studies related to industrial development, or environmental protection?

2. Government vs non-government science

One question that is sure to arise in discussions of an international science committee for arctic research is whether it should be a body that is international in the sense of being sanctioned or supported by governments, or a body that is deliberately non-governmental and is international only to the extent that scientists from several different countries are represented. In some countries, these distinctions are more important than they are in other countries.

ICSU, for example, is a non-governmental international institution, in which the members and officers serve in their private capacities and not as representatives of their respective governments; yet each country has a National Committee or representation on ICSU. In some countries the National Committee is appointed by a government authority, while in others it is much more informal and chosen by a body of senior scientists. MAB, on the other hand, is an intergovernmental science organization, and the national representatives speak for their respective countries. Each system has advantages and each has drawbacks.

Because of the high cost of scientific activities in arctic regions and the need for scientific information directly related to many policy questions, the degree of government involvement in research is probably as high in the arctic as it is in any other part of the world. Except for some studies undertaken for oil and transportation companies, - an amount that seems to be declining today - virtually all arctic research is supported ultimately by government or public funds. What is important to some is whether the research is carried out directly by government agencies, by scientists employed by government, or by academic or other non-government scientists who receive government support for research on subjects of their choice. Others feel that an international science organization should be able to put these "political" problems to the side, and concentrate on co-operation to increase our collective knowledge of arctic regions. These different points of view need careful examination.

There clearly is a difference in general between government science in the arctic:- data-gathering, surveys, research on questions related to policy and socioeconomic development, etc., and science carried out mostly by universities on fundamental, theoretical or process questions that add to our understanding of nature but which are not necessarily directed toward providing specific answers to economic or policy questions. Many arctic problems need both approaches, and good planning and administration of arctic science involves achieving a constructive mixture of government and academic researchers. The PRO MARE study of the Barents Sea ecosystem is a good example of using this approach in a specific subject area; the Polar Continental Shelf Project in the Canadian arctic is another example in a more general field. The question we have to consider is whether an international arctic science committee will serve both government and non-government science, and help to link them together in constructive ways, in an international context. A related question is:- how "official", in terms of being sanctioned or recognized by government authority, should such a committee be, to be most useful?

3. At what level of science or authority should co-operation be organized?

Perhaps the problem that has caused the most difficulties in achieving mechanisms of international co-operation in the arctic since the IGY, and which is a main reason why the international bodies or committees that have been created have not been fully successful, is that it has been unclear at what level of authority or responsibility the international organization should operate. Should it be a body for contact and co-operation at the purely scientific level, where scientists communicate freely on the basis of their personal expertise, exchange their ideas and plans, and as far as possible discuss questions of arctic knowledge and research without bringing national positions and international politics into the picture? Or should it be at the level of science support and decision-making, where representatives of various countries can discuss the possibilities of co-operation and support, and bring their respective national priorities for arctic science into international research planning?

It is not easy to answer these questions. A committee at the scientific level is of course easier to organize and it can lead to very good scientific idea exchange and program planning, but the scientists soon want the organization to be an "action" organization which can influence funding or support decisions in the various countries, and we have seen that they become less interested in a purely communications role for the organization. But to go beyond communication soon brings politics, especially in the arctic.

If, on the other hand, the committee or organization is composed not of research scientists but of representatives of various countries at the support or decision-making level, it will have less trouble with decisions on support or the means of international co-operation because national positions and policies are already built in; but it may soon become out of touch with science. It can be a good vehicle for making international co-operation happen when the politics and economics are right, but not be a good body for promoting useful international exchange of scientific knowledge or developing the best scientific plans.

In the Antarctic, these dilemmas are largely avoided because both levels for discussion of science and cooperation are fortunately present. SCAR can act as a scientific forum and be a vehicle for international discussion and co-operation on a purely scientific basis. It works best when it is as independent from national and international politics as possible. It can do this because the Consultative Parties to the Antarctic Treaty provide the international communication at the international political level. It does not require much reflection, or memory of the occasional crises in the past twenty years to come to the conclusion that SCAR would not be very effective as a body to achieve co-ordination of scientific programs in Antarctica if there was not at the same time the separate and independent Antarctic Treaty and the various Treaty mechanisms to

deal with the political aspects. With the increasing involvement of scientific research in politically-related problems in Antarctica (as, for example, with respect to mineral exploration, or research by non-Treaty countries), there is a natural tendency for some people to suggest that SCAR, as a non-political body of ICSU, should take positions; but this is dangerous both for SCAR and for Antarctic science, and for ICSU itself. In many ways the credibility and scientific effectiveness of SCAR and ICSU depend upon the fact that they deal with scientific knowledge for its own sake and do not get mixed up with politics.

For another example and comparison of the relative roles and effectiveness of science-related bodies at the non-political scientific level, at the government support level, and at the international political level, it may also be useful to reflect on the roles of SCOR - the Scientific Committee on Oceanic Research -, in comparison with IOC - the Intergovernmental Oceanographic Commission -, and treaty-like mechanisms like UNCLOS - the still unratified United Nations Convention on the Law of the Sea. SCOR, like SCAR is a body of ICSU, and is very parallel to SCAR in its terms of reference and objectives. But although SCOR has instigated and co-ordinated some very useful international research, it has not been as conspicuously effective as SCAR in achieving international co-operation. It may be that the differences are not so much between SCOR and SCAR, or in the subjects that they deal with, as they are between the Antarctic Treaty System on the one hand and IOC and UNCLOS on the other.

In the Arctic, there is no mechanism equivalent to the Antarctic Treaty to provide continuing international discussion of intergovernmental arrangements, and not even an equivalent to the IOC; and no expectation of there being one in the foreseeable future, even if it were desired by several countries. Thus any international body to achieve better contact or co-operation in arctic science must somehow be, in addition to a means of exchange on purely science subjects, a mechanism for intergovernmental discussion if it is to be useful. Otherwise, it will have to restrict its activities to those matters that can be supported within the national policies and northern science support decisions of each country. But at the same time, science and research in the Arctic is much more closely tied than it is in the Antarctic or even in the oceans to national policies of military strategy, national sovereignty, economic development and social issues. Also, within each arctic country there are a number of different agencies with arctic science responsibilities that are themselves parts of internal domestic policies and the country's international scientific relations. The arctic situation is much more complicated than for the same countries with regard to their antarctic science, and for most countries more complicated than for their policies and support mechanisms for oceans research.

We should give careful thought to the subject scope of any international arctic science body and contemplate at what level of science or political authority it should operate. It might be, for example, that in some subject areas, for example climate research, the committee could operate as a genuine international body, whereas in other areas, adaptation of northern native cultures or environmental assessment research, it could simply provide liaison between national scientific activities. But trying to operate at different levels within the same international body brings its own problems.

4. The Separation of Science from Politics at the International Level

The degree to which science, and scientific priorities, can be separated from national or international politics varies greatly around the circumpolar arctic. It is not wise to generalize about countries, but anyone who has been involved in international arctic affairs for a few decades becomes aware of differences in the political approach to science of each of the Nordic countries, Canada, USA, and USSR. Some countries openly regard all their arctic science as being in the national interest, and expect or receive political support, if not funding. In some other countries, most scientists seem sincerely to feel that as long as their work is openly published and all aspects can be freely shared, the science is essentially free from political interference, even though a national or military or commercial purpose may lie behind the decision to fund it. Scientists from still other countries, whose own scientific work is no less open but is more directly tied to national policies, tend to be skeptical of these claims to non-political science, and even though they may co-operate with the research they are under some suspicion of foreign collaboration rather than co-operation. This is particularly true if some agencies have to distort their own research programmes to meet the timetables or convenience of others ... yet it is such co-ordination that is often a main purpose of an international science committee. Failure to be sufficiently sensitive to the different views that different countries have of the independence of science from politics has, it seems, been an important reason why some excellent international arctic research programs never got off the ground, and is a cause for the difficulties or collapse of some of the international arctic science organizations that have been tried in the past. We should not be afraid to discuss these problems.

We should look at the advantages and disadvantages of any international arctic science openly representing the member countries, or alternatively being as non-political as possible. Would it be more helpful for the body to work openly at a political level, to ease the international arrangements for the science itself, which is essentially non-political? Or should the "committee" be deliberately aside from national positions or politics, representing the scientists as individuals, and having as one of its main tasks to keep politics to a minimum in arctic research? How would it work, how would it be structured, in each case?

5. Review of some recent and current experiences in international co-operation in the Arctic

There have been since the International Geophysical Year in 1957-58 several serious attempts to achieve improved international cooperation and liaison in arctic science. We should learn from these experiences, and think carefully what will work in 1987 and the years ahead before we try to decide on a new Arctic Science Committee. The following are some examples to consider.

5. (a) Comité Arctique International

The founders of the Comité Arctique International realized many of the problems noted above, when in 1979 it was decided that it would be worth the effort to try a new approach to the old question - "Why not an arctic SCAR"? It was decided to be deliberately multi-disciplinary, embracing both the social and economic sciences as well as the natural sciences and development engineering; it would get around the political problem by being non-political, including members who came from private life, industry, universities as well as from governments, each acting in personal capacity; but it would be able to have international influence and affect the support of science by including in the Comité persons of senior national responsibility and influence in each country. And it would avoid domination by any one arctic country by having its headquarters in a neutral non-arctic and non-threatening country. Each of these points carried with it some foreseeable disadvantages and difficulties, which were discussed at length. If you look at the "founding fathers" of CAI you will see that they were an experienced group who knew the practical difficulties, as well as the benefits, of international arctic co-operation.

The fact that CAI was able very quickly to attract such an impressive list of senior arctic people from so many countries, as well as senior industry representatives, shows how widely felt was - and still is - the need for some sort of organization of this nature.

But, as it has turned out, the very heterogeneity of the CAI membership, and the breadth of its interests, which are in many ways the strength of the Comité, have also proved perhaps to be its greatest problem. Comité Arctique did not have much appeal for the leading arctic research scientists, who generally consider any such international organization to be useful only if it is of direct help to them in advancing their particular scientific research programs. The Comité soon was persuaded that if it was to be influential, it had to be more than a communicator for science and arctic interests; it had to be an active promoter or organizer. There was much debate about how "operational" CAI should be, for many saw the problems this would bring.

It seems, looking back, that CAI responded to the interests of scientists in an appropriate way when it set up a separate management group for the Fram Strait Project, and it did an excellent

job in this respect, although neither the time, nor perhaps the project nor the promoters were right for success in 1982-83. However, despite the large number of senior people on the Comité Council who sincerely desire that there be an effective international body to communicate or influence arctic scientific issues, the Comité has not really found another role than that of promoting conferences and publishing the proceedings. It has organized seven excellent international conferences, each on a broad and different topic, which would have been hard to carry out so successfully by any other organization. In its short history the CAI has done a great deal to organize and disseminate useful scientific information on a variety of arctic subjects, and has been a valuable vehicle of contact for persons with arctic interest and responsibility. Largely by default, the Council has left the Comité direction and initiative almost entirely to the president. In so doing, it came to act less as a broad genuinely international body and more as a small self-contained group. To a degree, it lost credibility among leading arctic scientists and government agencies. But the broad international representation and interest in achieving the original objectives of the CAI are still strong. Under new leadership there is a determined effort to rebuild its credibility and find the right role for the future.

The terms of reference and formal constitution of the Comité Arctique International address precisely many of the issues suggested for a possible future Arctic Science Committee. In looking to the future and the possible role of a new or different organization, we should be clear about what we should want to change or do differently.

The Comité Arctique International is one serious and sustained attempt to deal with the questions:- what should be the activities of an international arctic science organization? - at what level of operational science, science management, information exchange or personal communication should it operate? - at what level is it really needed? - how should its leadership be organized? - how should it be supported or funded?

5. (b) Arctic Ocean Sciences Board

The Arctic Ocean Sciences Board is another and different recent example that should be considered carefully, if we want a new Arctic Science Committee to be an improvement on what we have at present. After several instances of failure to achieve international co-ordination to produce support for well-planned research programs in the Arctic Ocean, and after a lot of internal and international discussion, an international body that became known as the Board was designed. It was composed of people at a higher decision-making level than the research planners. It was not to be a club of scientists, but a voluntary management-oriented body that could provide communication between those in different countries who had, each in their own country, responsibility or influence on resources, budgets, and ship allocation. It was felt than an organization for

communication at this level of responsibility was necessary to enable multi-national Arctic Ocean research programs to be fitted into the planning and budgetting of each country. It was hoped that through such communication the Board could achieve international co-ordination of support of research within the priorities and resources of each country.

But a sufficiently senior level of involvement and interest in the Arctic Ocean Sciences Board has been very hard to achieve and sustain. In part the difficulty has been because some countries have been in a hurry and wanted to use the Board to get international involvement for programs that their scientists wanted to do quickly, while other countries have not been ready to re-direct their programs and resources. In part the difficulties with the Board have admittedly been because of temporary difficulties and changes in the ocean science management structure in Canada, which unfortunately left the Board without firm direction and momentum for more than a year. Since it got going again, the Board has been revived much more on the science planning and international communications level than on the level of management or commitment of arctic science resources. This is useful, but it is different from the original purposes of the Board ...

> "... to advance scientific knowledge of the Arctic Ocean and adjacent seas by bringing together resources into co-operative programs ..."

In the way it is working at present, the Board is for the most part discussing science plans and not the bringing together of resources.

The problems of the Arctic Ocean Sciences Board illustrate some of the problems we have to think about if an effective, more widely ranging international arctic science committee were to be planned. If the committee were to be at the resource decision level, rather than at the science level, the members will be there because of their office and their authoritative position, not necessarily because of their personal scientific expertise or their dedication to arctic science. Thus they will be dependent on specialist scientists for knowledge of the projects they are discussing. This is on the whole a good thing, but it seems invariably to work to the disadvantage of the smaller countries. Also, the membership is more likely to change for reasons that have nothing to do with arctic science, as has happened with the Canadian representatives on the Board; and the new people may not have background or interest in the subjects, even though they may have responsibility for support of science. Perhaps more significantly, it is not really clear, so far, that the Board is dealing with issues or programmes of sufficient national importance in each country to make it worthwhile for people who are senior enough to commit resources, to meet on a regular basis. Once these senior people begin to send junior alternates, experience has shown that a committee like this soon becomes ineffective.

Another important factor, especially in the Arctic Ocean in the 1990's, is that any international body that attempts to promote the support of research on an international basis is bound to be under suspicion from others that it is doing so for political motives. That the Arctic Ocean Sciences Board is suspected by some people or some countries to be connected with NATO interests is understandable, for if Western countries are involved in research in the North Atlantic or Arctic area, the scientific knowledge will undoubtedly be useful to their defense and political interests. We cannot have it both ways; we cannot have our research supported because it is in support of national interests and at the same time claim that the research is independent from national interests. But we can put many fears to rest by being completely open about our discussions, being very sensitive to the concerns of those who are hesitant, or suspicious, and by involving as wide a range of non-political interests as possible.

5. (c) Attempts to keep it simple

The first presentations that are made for an arctic science committee are usually very simple:- A number of scientists or science managers have agreed that there is need for a forum where active scientists can exchange ideas and plan future research programs. Nearly every scheme that has been tried for arctic science co-operation has started out as simply as this. The discussions in San Diego in 1986 were equally simple. But nearly every scheme that has been put into practice has soon become more complex as it has found its members wanting action, or to influence decisions, etc., with consequences that are anything but simple. Two attempts that have tried to keep to a simple forum for exchange are:

(i) CHARLIE - The Committee for High Arctic Research Liaison and Information Exchange, founded about 1976 largely through the efforts of Jørgen Taagholt. It was successful, in its modest way, until it voluntarily disbanded to have its role taken up by the Comité Arctique International; but as Jørgen will agree, it depended entirely on the selfless dedication of a couple of volunteers, and probably could not have been sustained for long without a more organized form of support. And, being an informal group, it did develop a considerable amount of resentment and opposition among established authorities (not the scientists) in Canada and the U.S. who did not like the idea of an unattached outside group discussing their programmes and exchanging information on research priorities in their "area";

(ii) The Northern Science Network of the Man and the Biosphere Program. This program was deliberately designed to be a communications network between interested

scientists and national activities within MAB. Each northern country belongs to the Network, although in Norway and the USSR the action is dormant. The enclosed article tells a little about what the northern science network is trying to do. Each country seems to think that the idea is very good; but after the enthusiasm of the first couple of years, there has been much less action, and in October 1986 the International Coordinating Council of MAB agreed to a plan to have more direct involvement of MAB National Committees in future activities of the Network. This experience also should be considered when thinking about a new Arctic Science Committee.

6. A Purely Scientific International Body?

Is there need for a rigourously scientific international arctic body, one that provides an outlet and forum for discussion of research results and scientific knowledge, not discussions of programs, co-ordinated planning, and research support? There are some arctic scientists who think so. In 1982-83 there was some discussion and correspondence about whether a separate arctic scientific body under ICSU was warranted, and a draft proposal for a separate arctic scientific union or association was circulated. The proponents were people who had been active in CHARLIE and who felt that a permanent on-going scientific body focussing on the arctic was needed. The proposal came up for discussion at the business meeting of the IUGG (International Union for Geodesy and Geophysics) in Hamburg in August 1983, and there was an interesting and lengthy discussion. Speakers divided into three groups: (a) those who felt that arctic sciences already were in danger of becoming less rigourous and exacting than sciences in low latitudes, partly because of the difficulties of doing science in the arctic but mainly because the total number of researchers in any field in the arctic is small and there is not enough critical peer review; therefore it was to those people scientifically important not to have a separate group, but to take every means to ensure that arctic sciences are fully incorporated with research in the same subject areas in the rest of the world; (b) those who felt that it was logical for ICSU to have a special body focussing on the arctic, just as it had SCAR for the Antarctic and SCOR for the oceans. This was along the lines of the proposal first made by Dr. Leonard Johnson of the U.S., and the people who supported it said it was necessary to have an international, science-oriented, multi-disciplinary organization or committee, sponsored by a prestigious neutral body like ICSU, just because, without such an organization, arctic science always became tied to national politics and priorities and eventually became dominated by the more powerful countries; (c) a few people, who said that Comité Arctique International has been established just to do what the others said was necessary, - to give focus to arctic science in an international sense but link it professionally to leading science in respective disciplines and also to allow discussion between science, government, and industry.

The discussion in IUGG in 1983 was interesting, but inconclusive. To the best of our knowledge, no recommendation was passed on to ICSU. Has the situation changed much today?

7. A variety of issues

In addition to the points noted above, where different countries or different groups of scientists may have different viewpoints on the role of science in arctic regions, there are other issues that will necessarily be the concern of an international arctic science committee, and in which different arctic countries may have different positions.

Some of these issues are:

- What is to be included in "arctic"? Do we draw a line and state that some areas, some researches are "in", while others are "out"? (We could ask the same question, of course, about "science".) The U.S. Arctic Research Commission took one approach; they drew a firm line defining the arctic for the purposes of a specific piece of legislation. The MAB Northern Science Network, on the other hand, changed its name from "arctic" to "northern" to avoid having to draw a line, and so that areas like Iceland, Sweden, and northern Canadian provinces could be included.

- How will elegible membership be defined? How will responsibility for operation or direction of the organization be achieved when the magnitude of arctic science effort varies widely between arctic countries?

- How much of a distinction should be placed on "arctic rim" (i.e. bordering the Arctic Ocean) countries and interests, compared with arctic areas in general? Some decisions on this have already been made in agreeing on the list of countries invited to the Oslo meeting; but the wider implications of this issue, as regards area of research interest, should be discussed in an open and friendly manner.

- How to include or deal with non-arctic countries (U.K., Germany, France, Japan, etc.) who have a real interest in arctic science and can contribute scientifically, as well as provide links with global or world science?

- Is the Committee going to be dominated by "big science" programs and focus on main sources of science support (which generally are not in Nordic countries) or is it to be one that helps the smaller countries and more modest programmes do their own research?

- How is it going to approach social science research and the research needs of native peoples? All arctic countries have this problem; but each arctic country, including Greenland as possibly a member of the Committee in its own right, puts a different and distinctive dimension on the international research activities with regard to social sciences, and these in turn are different from those of non-arctic countries interested in arctic research.

If an international arctic science committee is to be successful, it must be able to accommodate the views and desires of different countries or groups on questions like these, or at least acknowledge the differences and agree to accept differences of view.

8. Other general points

8.1 There is a need for systematic consultations between arctic countries, on science matters. This process will take some time and should not be rushed. There is need for consultation on at least three levels:-

(i) between scientists, where there are already some mechanisms, although they can be much improved;

(ii) between science administrators;

(iii) between Ministers or Ministries.

What we need to consider is how an international arctic science committee can serve, or fit into these three needed levels of communication.

8.2 Whatever is done should support and strengthen, not destroy, any international arctic science organizations or mechanisms presently in existence. From our observation, clearly there is a role for an independent organization like Comité Arctique International, if it can achieve the momentum, and internatnional service to knowledge and to scientists that it originally set out to do. It can be a useful meeting place for various fields of science knowledge, industry, non-political discussion of arctic, social and legal issues, etc., to come together. As such it can be useful both to scientists and government people, and it has shown that it is a good organizer of those kinds of non-specialist conferences and meetings that are not handled well by government agencies or specialist scientist organizations. Thought needs to be given to how any new organization, if one is to be created, would fit in with CAI, support it, use it, or build from it, etc. A variety of options can be considered; what we should avoid is competing with it or ignoring it.

Similarly, also, there is a need for continuation of what the Arctic Ocean Sciences Board is trying to do. The subject matter of AOSB - research on the Arctic Ocean, which by nature is largely multi-disciplinary, international, and sophisticated "big science" with co-operative commitment by several governments - makes it necessary and practical to have such a body, even if it is having difficulty finding the right "level" and means of operation. There appear to be clear benefits in considering some kind of organic working relationship between AOSB and any broader arctic science committee that may be established. But it is very important to avoid any suspicion that a group of international planners are setting up a committee to tell the oceanographers (or indeed any specialized branch of science) what research they should be doing or how they should organize it.

Other international arctic science bodies - the Northern Science Network of MAB; the Northern Research Basins Network of IAHS and IHP, etc. - should be aided and supported, not threatened, by any new action taken.

8.3 Practical results depend primarily on resources that can be sustained. Arctic countries have tied up a large part of their arctic science resources in "domestic science". Non-arctic countries do not have these responsibilities, and by moving their science into arctic areas, especially as parts of larger global studies in which they are already leaders, they may dominate research priorities in international arctic studies. A committee of arctic nations may help counteract this problem.

8.4 Full international field co-operation in science in arctic regions is unrealistic. However, agreed areas of co-operation in several selected subjects is achievable, and progress is being made. An international arctic science committee might agree, for example, on goals and specifications for data collection, with each country being responsible for data in its own territory. Even this form of co-operation may take a long time to achieve, as experience in Antarctica and in other subjects such as climate research, shows. But a recognized continuing committee, to exchange available information and maintain contacts, may make it easier.

8.5 The practical and formal organizing of any new body should be done carefully and at the appropriate time. It may be wise to delay a decision until most countries are ready for it. But the consideration of the idea, and preliminary actions in this direction, are becoming widely known and conspicuous already. Thus there needs perhaps to be some preliminary name for the idea, without implying a commitment by any country or group, or limiting the final design or structure.