

Chapter 3

The Consolidation Years (1968-77)

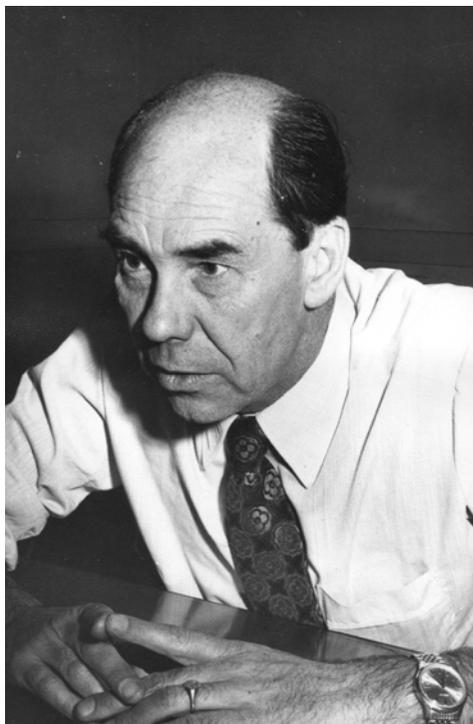
Building on the legacy of the IGY

SCAR meetings had now settled into a familiar pattern. There were sufficient countries coming forward with offers to host the biennial meeting for adequate planning and advance warning to the community. The format of meetings with the meetings of the Working Groups preceding the Delegates' Meeting kept the meeting length to a manageable two weeks. However, this did mean that the Chairmen and Secretaries of the Working Groups were normally spending the whole weekend between the two parts compiling and editing the reports for their groups as well as arguing over the exact wording of the recommendations for discussion.

X SCAR in Tokyo, June 1968, considered the progress of the 12 Groups of Specialists but noted that there were still difficulties in appointing an effective group on Communications, which had now become the responsibility of the Logistics WG. Delegates discussed the fact that SCAR had been operating for ten years on procedures established at the first two meetings and it was time for a review. An *ad hoc* group was established to draft a discussion document that was circulated as *SCAR Circular* no 241 in 1969 and was reviewed at XI SCAR in Oslo, Norway, August 1970.

This certainly stirred up National Committees. One element over which there was some controversy was the proposal that nations no longer active in Antarctic research should be removed from SCAR

membership. This proved rather awkward for Gould as President since under this rule Norway, which was hosting the SCAR meeting, would have to be asked to leave. The Soviets objected to the idea of Groups of Specialists, to any bipolar mandate for SCAR and to any communication with Treaty Parties other than through National Committees. This last position was supported by Australia who also opposed any re-organization of WGs.



George E. Hemmen, Assistant Secretary (1962-70) and Executive Secretary (1970-89) of SCAR.

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Delegates at X SCAR, Tokyo, Japan, June 1968, together with ladies of the meeting secretariat.

Amongst the many comments received were that officers from WGs should be part of the Executive, that WGs should meet every two years, that there should be rotation of membership on WGs and these should all be active scientists. Everyone agreed that there was a need to revise the outstanding list of Recommendations (which had already become unmanageable) and to select some to be standing resolutions. It was also decided to cancel all past general recommendations and start again. Many of the proposed changes were adopted (although some – like Chief Officers attending the Executive had to wait much longer to be accepted) and it was agreed that the Executive should revise the SCAR Constitution in the light of these. However, an *ad hoc* Meeting of Officers of Working Groups present at XI SCAR agreed that the present working group structure should be retained and suggested that, where possible, the working groups should meet in conjunction with regular SCAR meetings every four or six years. It was also agreed that members of the Executive should hold office for a four-year term with the Secretary being eligible for election to a second term. Delegates agreed

that there should now be an Executive Secretary for SCAR and George Hemmen, who had been Assistant Secretary (part time) since January 1962, was appointed (part time) from August 1970.

It was at this meeting that an application for membership from Uruguay was turned down because it had not yet established an Antarctic research programme. However, it was decided that any country wishing to establish such a programme could obtain advice from SCAR and could be invited to send an observer to SCAR meetings.

Discussion of better links with Arctic research concluded that SCAR should not extend its purview north but that ICSU should consider if an organization could be formed to co-ordinate Arctic research. This idea had to wait many decades before progress was made and then the solution was not organized through ICSU.

An official nomination from the Australian Academy of Sciences in November 1969 proposed Phil Law as the next President. Internal discussions between senior SCAR officials began rapidly with suggestions from some quarters that G A Avsiuk from

Gordon de Q Robin, President 1970-74

Gordon Robin was an outstanding glaciologist who is remembered for his pioneering studies on large ice sheets, his enthusiasm for international collaboration and his leadership in polar affairs. Born in Melbourne, Australia, on 17 January 1921 his first degree was in physics at the University of Melbourne. Volunteering for the submarine service in World War II he demobilized in the UK and went to Birmingham University to study nuclear physics. Deciding he wanted to work in the Antarctic, he was appointed Base Leader at Signy Island and went south in 1947 to establish the station. After returning to Birmingham he was offered a place on the Norwegian-British-Swedish Expedition in charge of seismic surveys, obtaining the first detailed profile of the ice and subglacial topography. In 1958 he became Director of the Scott Polar Research Institute, a post he held until 1982. It was during this period he developed the radio-echo sounding system with Stan Evans that would revolutionize glaciology at both poles. He remained the UK Delegate to SCAR from 1958 to 1984, and was Honorary Secretary until 1970 when he was elected President. It was therefore natural that SPRI should offer to host the SCAR Office when it was formed. Much of the shape of SCAR from these early years is due to Robin's tireless efforts to foster international



initiatives. He died on 21 September 2004, having received the Polar Medal, several other medals and honorary degrees as well as the foremost prize in glaciology – the Seligman Crystal. Robin Peak ($60^{\circ}41'S$, $45^{\circ}37'W$) and Robin Rocks ($60^{\circ}41'S$, $45^{\circ}36'W$) at Signy Island commemorate his time as Base Leader there, whilst Robinheia ($72^{\circ}25'S$, $0^{\circ}40'E$), Robinsøkket ($73^{\circ}40'S$, $0^{\circ}45'W$) and Gordonnuten ($72^{\circ}25'S$, $0^{\circ}30'E$) in Sverdrupfjella commemorate his part in the Norwegian-British-Swedish Antarctic Expedition.

USSR would be a good choice but his deteriorating health seems to have undermined this. The Americans thought that it should be Dick Willett. In the end Gordon Robin was elected President and it was agreed that the office for the SCAR secretariat would continue to be located at the Scott Polar Research Institute. Delegates also unanimously approved the retiring President, Larry Gould, as an Honorary Member.

At XII SCAR in Canberra, Australia, August 1972 the Subcommittee of Special-

ists on Seals of the Working Group on Biology proposed that the Subcommittee should become a Group of Specialists and stressed that the members “should meet as a group of independent scientists rather than as national representatives”. These terms of membership for a Group of Specialists set an important precedent for SCAR, namely that the members should be expressing individual scientific opinions that were not coloured by national views or agendas. Delegates agreed to establish a “Group of Specialists on Seals” with Dick Laws as Convenor,

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and agreed that the Quaternary Group should become the Group of Specialists on Late Cenozoic Studies of the Antarctic with Eduard van Zinderen Bakker as convenor. A little later another group - the Group of Specialists on Ice Shelf Drilling Projects under Jim Zumberge - was also agreed.

The medical researchers had so far existed within the Working Group on Biology but this clearly did not suit them and there was pressure for change. A proposal to the SCAR Executive in 1973 led to the formation of the Working Group on Human Biology and Medicine, with Jean Rivolier as Secretary. This brought the current total of Permanent Working Groups to ten:

- Biology
- Geodesy and Cartography
- Geology
- Glaciology
- Human Biology and Medicine
- Logistics
- Meteorology
- Oceanography
- Solid-Earth Geophysics
- Upper Atmosphere Physics

Until XIII SCAR at Jackson Hole, United States, in September 1974, there had been little discussion of the mineral resources in the Antarctic but as this had now been raised both at a meeting at the Nansen Institute and at the Antarctic Treaty the Geology WG was asked to assemble information on the subject. The US Committee on Polar Research had formally raised a question in 1973 about the need to investigate the implications of disposal of nuclear waste in the Antarctic ice sheet. Lengthy discussion at Jackson Hole resulted in a recommendation urging further research into the environmental implications of this but noting as well that it was forbidden under Article 5(1) of the Treaty. At this meeting Tore Gjelsvik (Norway) was elected President and Gordon Robin was made an Honorary Member.

An interesting internal development at this meeting was the first edition of the *SCAR Song Book*. Comprising a collection of well-known Anglo-American ditties - from Clementine to Auld Lang Syne - it also featured the newly written "SCAR Marching Song" (at that point only 15 verses long!) and provided a new community activity after the banquet with the music being provided by Phil Law and Jim Zumberge on accordions or the piano. Four more editions of the book were to be produced (see pages 48-49).



Jim Zumberge at the keyboard after a SCAR Banquet.

Antarctic Treaty Interactions

Telecommunications proved to be a continuing problem as far as some Parties were concerned. The agreement achieved at the First Antarctic Telecommunications Meeting in 1963 had not provided adequately for developing needs, especially in meteorology. At the V ATCM in 1968 there was agreement that a second special meeting was needed and Argentina offered to host it. Whilst the first meeting had been dominated by technical discussions this one was clearly going to be predominantly political. It was agreed that WMO, SCAR, the International

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Telecommunications Union (ITU) and the Inter-governmental Oceanographic Commission (IOC) should attend as Observers. Whilst the Buenos Aires meeting in 1969 did adopt nine proposals after two weeks of haggling it was not a good meeting. Lt Col Bastin was appointed to represent SCAR and that was already a problem as the Belgian Government and its Antarctic organization had already fallen out with him, yet he had done an excellent job collating all the communications material for the communications group in the Logistics WG. The Australian Government position was that communications were not a proper responsibility for SCAR and it made strenuous efforts to convert others to this position. Bastin's report shows that, except for the WMO, all the Observers were treated as annoyances, interfering in what was government business, and that several countries considered that the Logistics WG's *Communications Manual* was acting against their national interests. Others apparently accused SCAR of wanting to "run" everything whilst others took against SCAR because of the recommendation to the Treaty that it hold its consultative meetings on odd years to allow SCAR to meet on even years. SCAR was told firmly that it should not be suggesting how the Treaty should behave. Bastin noted that he had a poor hand to play as SCAR had not provided him with a detailed brief of working group requirements, nor had any national committee come forward with suggestions for communication requirements. In the end SCAR had to be included in the proposal on scientific and technical matters affecting communications but the future of the *Manual* was left unclear.

At VI ATCM in 1970 New Zealand raised the question about the use of radioactive isotopes in the Antarctic, an action that appears to have been precipitated by disagreements between the USA and New Zealand over the use of radioactive tracers in groundwater movement. The Treaty agreed two Resolutions, one of which proposed that anyone intending to use radioactive isotopes should give prior

warning to all Parties, whilst the second requested SCAR to provide "comprehensive principles for their control which can be considered under Article IX of the Antarctic Treaty". SCAR tried hard to get information from National Committees on isotope usage and in the meantime approached the International Atomic Energy Agency, National Radiological Protection Board in the UK and several individual experts for advice. Formal advice was finally agreed and sent to the Wellington VII ATCM which gracefully accepted the paper and declined to take any further action.

The potential for renewed and uncontrolled commercial harvesting of seals first caught the attention of the Treaty in 1964. Banning all sealing was not a politically acceptable option so it was agreed that a sustainable management approach should be developed. This culminated in an international conference in London in February 1972 at which the draft Convention for the Conservation of Antarctic Seals (CCAS) was hammered out. CCAS requires expert scientific advice for decision-making and it was decided that SCAR would be asked to collate the scientific data and advise on permissible catches. To involve an independent ICSU body directly in this way was certainly unusual and indeed the signing of the instrument was delayed until 2 June 1972, the day after SCAR formally accepted the task.

At VII ATCM in Wellington in 1972 there was talk of an informal meeting on mineral resources to be sponsored by the Nansen Foundation in Norway. This took place 30 May – 9 June 1973 with 29 invited experts; SCAR was represented by Dick Willett and Tore Gjelsvik was also present. This marked the start of SCAR's involvement with minerals that continued throughout the later negotiations on the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA).

The Parties delayed VIII ATCM for two and a half years holding it in Oslo in 1975. It appears from a letter, from Gordon Robin to Larry Gould dated 29 November 1972,

The SCAR Marching Song

The origin of the SCAR Marching Song has been lost in the blizzards of time but it probably appeared at an early meeting of SCAR and was sung after the SCAR banquet, accompanied by Jim Zumberge on his accordion. Some verses were added or modified as new members joined and Presidents changed. When Sherburne Abbott joined the staff of the US Polar Research Board she set about altering some words that she regarded as sexist and made them politically correct. Jim Zumberge's last meeting was XX SCAR in 1988 and at XXI SCAR in 1990, although there was a Brazilian band playing after the banquet, the SCAR Marching Song was not sung but Delegates were entertained by the President, Claude Lorius, crooning into a microphone to give a passable impression of Charles Aznavour.

As SCAR has evolved, so the characters of SCAR Delegates have changed. No longer are they all Antarctic explorers, fresh from the field after IGY; many are



Some editions of the SCAR Song Book

science bureaucrats, even diplomats. SCAR meetings, while no less serious, are conducted in a different atmosphere. The SCAR Marching Song was last heard in 1988 and has no place in today's formal meetings.

SCAR Marching Song* (1972)

We are the men of SCAR, we are
Antarctic is fraternity.
We leave our homes for many months,
Way from women's liberty.

Chorus:

Scar de ree, scar de ra,
Scar de ree, scar de ra ha ha ha ha ha,
Scar d ree, scar de ra,
Way from women's liberty.

Twelve nations all have delegates
From South to Northern clime;
The list is an impressive one,
We're meeting all the time.

[Chorus]

We've working groups and specialists,
Symposia, and the lot;
Our membership is limited
A more exclusive bunch there's not.

[Chorus]

New Zealand, France, Australia,
South Africa and U.S.A.,
Japan, Belgium, and the Argentines,
U.S.S.R., and old Norway.

[Chorus]

Two more countries make up the list,
Chile and the good U.K.
There's hardly room for any more,
Let's keep it all that way.

[Chorus]

Our meetings are away from home;
There's a reason, don't you see?
At home we're just a bunch of blokes,
But here - we're company.

[Chorus]

We've met around the world a bit,
From Cape Town t' Oslo, Nor;
And soon we'll meet in Jackson Hole,
In nineteen seventy-four.

[Chorus]

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G Robin is our President,
de Q R, says he.
We all know what the R stands for,
But the Q's a mystery.

[Chorus]

G Hemmen, he's another bloke,
Executive Secre'try,
He pushes papers all day long,
And never stops for tea.

[Chorus]

We have some glaciologists,
With ice they have a ball,
They chip it, chop it, crush it too,
Bartenders one and all.

[Chorus]

Our bio boys have big ideas,
'Bout man in polar stress.
After boozing through the winter night,
Who wouldn't be a mess?

[Chorus]

The met boys are a happy lot.
They look up in the sky.
And though it's ninety-nine below,
They never wonder why.

[Chorus]

Geophysicists do a job,
They measure sound through ice,
And when you see th' results they get,
It's the same as shaking dice.

[Chorus]

The Ross Ice Shelf has got to go,
It's been around too long,
While we watch it disintegrate
We'll sing our happy song.

[Chorus]

Geologists break rocks all day
They work very hard, indeed.
They climb the mountains and scale the
peaks,
And knowledge to impede.

[Chorus]

*To the tune of "The Happy Wanderer"



A lusty rendering of the SCAR Marching Song being given at XIII SCAR by J O Fletcher (United States), R B Thompson (New Zealand), S Z El-Sayed (United States), R H Rutford (United States), and W F Weeks (United States).

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that this was apparently to ensure that Treaty meetings were in alternate years to SCAR to provide a sufficient gap for SCAR to continue providing advice in response to requests.

It was during this period that the Antarctic Treaty decided to consider the problem of mineral resources, a category deliberately omitted from the original treaty because, quite apart from the paucity of knowledge about any possible or potential mineral resources, it was recognized that this would have been too difficult a topic on which to reach agreement. Any attempt to include mineral resources would have probably scuppered the negotiations. At VII ATCM the possibility of mineral exploitation in the Antarctic was raised and it was agreed (Recommendation VII-6) that the subject “be carefully studied and included on the Agenda of the Eighth Consultative Meeting”. In 1975 at VIII ATCM SCAR was formally asked (Recommendation VIII-14) to assess the possible impacts of mineral exploration and exploitation and to continue co-ordinating scientific research to determine the geological structure of Antarctica.

SCAR responded by establishing a Group of Specialists from 13 countries under the convenorship of Jim Zumberge to review the available data and produce a report entitled *A preliminary assessment of the environmental impact of mineral exploration/exploitation in Antarctica (EAMREA)* that was submitted to IX ATCM in London, 1977. This report was circulated to Treaty Parties and other interested groups but was not actually published by SCAR until 1979 under a slightly different title: *Possible Environmental Effects of Mineral Exploration and Exploitation in Antarctica*. In addition, a workshop was held in Bellagio, Italy, during March 1978 and the report, edited by Martin Holdgate and Jon Tinker, was published by SCAR in 1979 under the title: *Oil and Other Minerals in the Antarctic: the environmental implications of possible mineral exploration or exploitation in Antarctica*. The original Zumberge report was also used as a working document at a Treaty Group

of Experts meeting in 1977, and their report contained not only an overview of existing technology but also guidelines for exploration and the protection of the environment. Although the report of this Treaty group was never formally published it marked the start of the international discussions that culminated in the Convention for the Regulation of Antarctic Mineral Resource Activities, agreed in 1988 but never ratified.

It is clear from the report of the SCAR Meeting in 1976 that Delegates were concerned that organizing assessments like the Zumberge report in response to Treaty requests might have a detrimental effect on SCAR’s basic science activities. This is a recurring theme through the decades as SCAR has struggled on inadequate resources to ensure that key political and legal decisions were taken after due consideration of all the scientific data, rather than simply that which any particular country saw fit to put forward.

Logistics

The Working Group on Logistics decided that it needed new terms of reference and some new goals which principally meant working more closely with the scientists to understand the logistic implications of proposed programmes. It clearly struggled during this period with a lack of full participation, and a period without a secretary did not help in keeping communications between members active.

At X SCAR, the Logistics WG was asked to produce a *SCAR Radio Communications Guidance Manual (SCARCOM)* which they did very rapidly. SCAR financed its printing and distribution to all Antarctic users in 1969 and it was discussed in detail at both V ATCM and the WMO Working Group on Antarctic Meteorology.

The continuing problems with communications in the Antarctic, especially those affecting transmission of meteorological data, were discussed at XI SCAR and it was agreed that only a meeting of scientists, engineers and operators together could resolve the problems. Thus Roy Piggott

(United Kingdom) was asked to chair an organizing committee for a symposium on Scientific and Technical Problems affecting Antarctic Telecommunications, Oslo, Norway, May 1972, to examine both the scientific problems of propagation as well as the best equipment to use. The report "*Antarctic Telecommunications*" from this meeting was discussed by the Parties at VII ATCM where they decided that the handbook should be prepared by national operators in a loose leaf format; they even produced Recommendation VII-7 recognizing SCAR's suggestions. R S Kirby, who had chaired the group now called Scientific and Technical Problems Affecting Antarctic Telecommunications, decided that this was enough and the Group was formally disbanded at XIII SCAR having completed its task. In future, matters relating to this subject would be considered by the Working Group on Logistics, known colloquially as SCARLOG.

In 1974 SCARLOG had begun to wonder if savings could be made by sharing supporting infrastructure. Whilst various bilateral agreements existed the WG discussed how shipping could be shared and what might be the possibilities for an air transport system based on three intercontinental access routes. This was exciting stuff and a Subcommittee on Co-operative Air Transport was established with membership from Argentina, Australia, France, USSR and USA.

The Biology WG's initiatives on environmental impacts caused some consternation amongst the operators. They had read the documents from the Working Group about Man's impact on the environment and decided that the scientists needed a reality check in terms of some of their suggestions to mitigate impacts. They pointed out that it was necessary to avoid conflict between scientific interests and essential logistic needs, and they were especially concerned that protected areas might be endorsed by SCAR before there had been logistic comments on the plans. Communication within SCAR was still not as effective as it should have been.

Biological Sciences

It was in July 1968, at the 2nd SCAR Biology Symposium, that scientific interest in krill began to appear again. Research work on krill first began as part of the Discovery Investigations during the late 1920s and all of this work was synthesized in James Marr's monograph on the species that was published as part of the *Discovery Reports* in 1962. Little research had been published since then, although it was known that the Soviet Union had been actively researching the species as a fisheries target for years.

Listening to the mainly Russian papers on krill a few US scientists recognized the importance of the species in the food web and organized a cruise in 1972 on the USNS *Eltanin* to investigate its ecology further. This cruise was led by Dr Mary Alice McWhinnie whose work on krill ecology was to prove a potent force in taking forward renewed international efforts. McWhinnie later became the first female US station commander at Palmer Station on Anvers Island. Meanwhile the SCAR WG on Biology had also seen a need for international activity and in 1972 established a subcommittee to deal with Marine Living Resources of the Southern Ocean under the chairmanship of Sayed El-Sayed (USA). Meeting in Montreal in 1974, the subcommittee provided a range of recommendations that triggered a cascade of activities through to VIII ATCM in Oslo in 1975, where SCAR was officially requested to convene a meeting on the conservation of marine living resources. Upgrading the subcommittee to a Group of Specialists allowed SCAR to involve some key scientists from a wide range of countries in developing these plans. The US National Academy of Sciences hosted the first international meeting on the living resources of the Southern Ocean at Woods Hole in 1976 with a key objective being to develop a plan for immediate collaborative work on virtually all aspects of physical and biological oceanography of the Southern Ocean. Dick Laws came up with a new title – Biological Investigations of Marine Antarctic Systems and Stocks – and a logo and so BIOMASS was born.

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A medley of photographs at XIII SCAR, Jackson Hole, USA, September 1974.



Delegates attending a lecture.



The first four Presidents of SCAR: Tore Gjelsvik (1974-78), Gordon Robin (1970-74), Larry Gould (1963-70) and Georges Laclavère (1958-63).



Philip Law (Australia) and Alfredo Martínez-Abal (Argentina).



George Knox (Australia), Genevieve Pilet (URSI) and George Hemmen (Executive Secretary).



Tore Gjelsvik (Norway) and Sir Vivian Fuchs (UK).



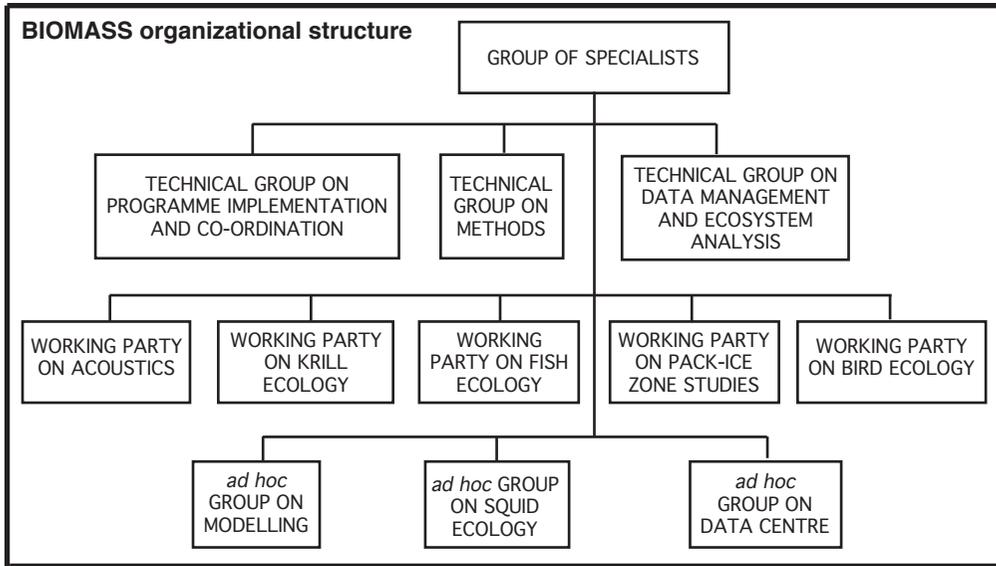
Lou de Goes (USA).



Roy Piggott (UK) in flamboyant mood.



Al Fowler (USA) later to become the first Executive Secretary of COMNAP.



Originally conceived as a ten-year research programme with two phases of international oceanographic cruises this was international science on a much larger scale than SCAR had ever attempted before and required a new style of management. The Group of Specialists established a range of technical groups and working parties and a BIOMASS Office run by Sayed El-Sayed at Texas A & M University. Funds were in short supply but an appeal to SCAR National Committees, to SCOR and to National Antarctic Operators to provide extra funds was successful.

The outcome of the 1976 meeting in the US had captured the attention of several nations at a political level and at the Antarctic Treaty the initiative was taken to establish a new conservation and management regime for the whole of the Southern Ocean. This happened remarkably quickly with agreement at IX ATCM in 1977 that a series of Special Consultative Meetings should be initiated to develop a new international agreement with boundaries that went farther north than those defined in the Treaty. As SCAR ramped up its research efforts the diplomats increased their own efforts so that in 1980 in Canberra, Australia, the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) was signed and

entered into force just two years later on 7 April 1982 on completion of the ratification process by all the Consultative Parties. Obviously the Convention predated the multi-ship research and so for scientific aspects it had to rely heavily on the overview of past research on krill and the food web prepared by SCAR for the Woods Hole meeting.

As George Knox (New Zealand) has remarked, there was a change in emphasis for Antarctic biology between the 1st and 2nd symposia. There had been an increase in the number of shore stations and their increasing sophistication allowed more specialized biology including physiology and biochemistry. More ships became available for offshore work so pelagic biology and physical oceanography increased. The cruises of the USNS *Eltanin* proved to be especially significant in building a larger Antarctic marine science community.

A new breed of young ecologists, influenced by the International Biological Programme and keen to try out new ideas, descended on the Antarctic. Their interests in productivity and energy transfers coincided with ideas for harvesting marine living resources. The SCAR Steering Committee for the 2nd Biology Sympo-

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sium in Cambridge in 1968 decided not only to introduce a unifying theme “Antarctic ecology” but also decided the time was ripe for focused reviews and accordingly commissioned twenty five of them. Although there was a session on new techniques these were omitted from the published volumes whilst in several sessions papers providing comparisons with the Arctic were encouraged. Martin Holdgate, who organized the meeting and edited the proceedings volumes, divided the papers into 24 groups each with a short overview introduction and finished with a brief summary of the points raised in the discussions. Despite the large number of papers Holdgate managed to have them edited and published only two years after the meeting, this time by a commercial international academic publisher which ensured a much wider distribution of the science.

The Biology WG held its meeting in conjunction with the symposium in Cambridge. Martin Holdgate resigned as Secretary and was replaced by George Knox from New Zealand. As part of the discussions on protected areas the Working Group recognized the lack of a scientific framework for the selection of the sites and established a subcommittee to determine how representative samples of habitats might be chosen. This proved to be the forerunner of the Conservation Subcommittee which in turn later became the Group of Specialists on Environmental Affairs and Conservation (GOSEAC).

By XII SCAR in 1972 the biologists were very busy. What had originally been a subcommittee on bird banding had outgrown its remit but the development of several national programmes on ornithology suggested the continuing need for a specialist forum. Accordingly a Subcommittee on Bird Biology was started with M D Murray as its chairman and broad terms of reference.

Since there was now much business referred from the Treaty on conservation matters it was agreed to establish a Subcommittee on Conservation with George

Knox as chairman. Meanwhile the WG was discussing protected areas and decided that management plans were needed for all of them and that the existing criteria for selecting Specially Protected Areas viz. “Outstanding scientific interest and uniqueness or rarity of the ecological system” needed to be elaborated to include representative samples of all terrestrial and freshwater ecosystems, type localities and unique assemblages, and areas already studied as a baseline for change. This was the beginning of a long-term study by the WG to provide a comprehensive classification of terrestrial and aquatic ecosystem types in order to ensure that protected areas were chosen on scientific criteria and were adequately representative. The importance of limiting impacts, especially of alien species and waste disposal, was recognized and the WG wanted to compile a detailed list of monitoring projects that could detect pollutants. Little did they realize just how many decades it would take to realize many of their excellent ideas.

The third SCAR Biology Symposium in 1974 was organized by George Llano in Washington DC. The local Organizing Committee, chaired by Bill Benninghoff comprised many well-known Antarctic names – Sayed El-Sayed, Mary McWhinnie, Bruce Parker, Don Siniff, E K E Gunderson, J T Shurley, G W Rogers. The symposium attracted around 150 scientists from 13 countries, with 75 papers all given as oral presentations in plenary sessions. The SCAR Steering Committee of George Knox, Dick Laws, Jean Prévost, Sayed El-Sayed and Bill Benninghoff came up with the unifying theme this time of “Adaptations within Antarctic Ecosystems” and brought in further changes – all papers were peer reviewed, papers could be submitted in French, and there was an invited historical review of the exploration of the Southern Ocean by George Deacon. Meanwhile the organizers added a film evening and a very popular “Chesapeake seafood cookout” at the National Zoological Park.

Llano faced a major task in getting all the papers reviewed, revised, edited and the book published. In addition six of the papers were presented in French which Llano had supposed would be published in English, following a statement by Jean Prévost on the subject. However, Laclavère waded into the discussion to insist that since the French Government had paid for the scientists to attend their papers would have to be published in French. Few of the papers were available at the meeting and persuading all the authors to submit their manuscripts proved extremely time consuming. Indeed, despite the assistance he managed to organize, editing the volume consumed much of his spare time over the next three years and it was not until late 1977 that the enormous tome of 1252 pages was finally distributed. Structured into eight sections Llano had published every paper (72) that passed review and was returned to him revised. With no apparent attempt at controlling page length the volume grew uncontrollably and it was only thanks to the substantial grant of US \$40,000 that he engineered from the National Science Foundation that the volume was published at all in an edition of 3,000 copies.

Knox felt that this would be the last symposium to encompass the whole spectrum of biological research, suggesting that in future there would need to be a narrower focus or that combined symposia with other disciplines would be possible. He could not have guessed how long it would take to achieve the latter!

Whilst elephant sealing had continued on South Georgia as long as the shore-based whaling it had been based on a management plan devised by Dick Laws to ensure long-term sustainability. By 1965 this had ended and there was no sealing taking place, other than the killing of a small number of seals to feed sledge dogs. In 1964 there had been an exploratory Norwegian sealing expedition aboard *Polarhavn* to the Weddell Sea to test the potential for commercial exploitation of crabeater seals. They killed 322

seals in the pack ice of which 218 were crabeaters. Although the crabeater was believed to be the world's most abundant seal there were no accurate measures of this abundance with estimates fluctuating wildly from 10 to 35 million animals. Even the lowest estimate meant that there was theoretically a large annual sustainable yield from this population but the previous experiences with both fur seals and elephant seals suggested that the resource might well be over-exploited. The scientists decided to move pre-emptively to stop this.

As well as suggesting to IV ATCM in 1966 that both fur seals and the Ross seal should be made Specially Protected Species, SCAR drew up proposals for "Interim Guide Lines for the Voluntary Regulation of Antarctic Pelagic Sealing" which were also adopted at the meeting. In addition, the Parties urged SCAR to continue to work on this and provide reports. All this had alarmed the Parties sufficiently to ask for further input from SCAR. This came in the form of a report in 1968 and effectively laid out the details of what would become the Convention on the Conservation of Antarctic Seals. Dr Brian Roberts, UK Delegate to ATCMs, was the driving force behind this push to develop the regulations in advance of exploitation. This, importantly, recognized the principle of sustainable use and so set out to manage any commercial undertaking by permits, reserves and closed seasons rather than seek a total ban on harvesting.

The Parties decided that this activity did not fall properly under the original Treaty, which excluded the High Seas, and decided to set up a separate Convention, agreed in London in 1972. SCAR is mentioned repeatedly throughout the text of the Convention but specifically, in Article 5, SCAR is charged with providing scientific advice to Parties on all aspects of harvesting including stocks, catch and any amendments to the practical details set out in the Annex. This legal recognition of the pre-eminence of SCAR as a source of advice was unprecedented.

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This poem was written by Ralph Harry, Australian Ambassador to Germany at the end of the IV ATCM in Santiago in 1966 and read at the end of the Convention for the Conservation of Antarctic Seals.

In the cold and frosty south
The Killer Whale's rapacious mouth
Strains tons of plankton at each meal.
But who would want to eat a seal?

The minishrimp's a tasty dish
For the fierce Antarctic fish;
He may suffer a good deal,
But who would hunt the gentle seal?

In the ecological distribution
Fish may suffer retribution;
The Skua is a thorough heel,
But nobody could hate a seal.

The Penguin may need some protection,
He doesn't like too close inspection,
But the deserving case, I feel,
Is the Fur (or Rossi) seal.

Experts meet on logistics
May compile complete statistics-
Dog and sled and track and wheel-
But please don't exclude the seal.

You may flash communications
Hourly between stations,
Synoptic data by the reel,
But please don't molest the seal.

In the tourist expeditions,
Chefs should limit their ambitions,
Serving chicken, pork and veal,
But not the poor pelagic seal.

Let the seal of every genus
Be immune from threat or menace.
Listen to this last appeal
Please, please don't be an enemy of
the seal!

During this period SCAR had only a subcommittee on seals as part of the Biology Working Group but it provided a great deal of valuable scientific advice to the Parties during the negotiations. In Canberra in 1972 the subcommittee decided that they needed to be a Group of Specialists in order to meet the larger role envisaged in the legislation. So, in 1973 after the Convention had been signed, but before it had been ratified by all the Parties, SCAR agreed the new terms of reference needed to upgrade the seals group to a Group of Specialists with Dick Laws as the convenor and Don Siniff as Secretary, to ensure that there was enough specialist expertise available to answer questions arising from any new sealing operations. In the event no commercial sealing has ever taken place and thus SCAR's advice has never been needed. Nevertheless, SCAR collected the annual returns from all the Treaty Parties on all seals captured or killed during scientific research and these were forwarded to the UK government as the depository government for CCAS.

Human Biology and Medicine

The WG on Biology had recognized that there was an active group of doctors and medical researchers whose normal discussions could not be easily included within the normal business of the Working Group. It already had a subcommittee on Human Adaptability in the Antarctic which had been established to co-ordinate IBP programmes in the Antarctic. Replacing this by a Subcommittee on Human Biology and Medicine with a more general focus solved the problem and immediately highlighted a continuing feature of this field - the mix of research and healthcare. Whilst initially the group was concerned with developing standardized physiological techniques that could be applied at different stations, an interest in the psychology of small groups was also evident from several countries.

Otto Edholm, Rainer Goldsmith and E K E Gunderson organized the first polar medical symposium in 1972 in Cambridge, and made it bipolar to increase participation. With a heavy emphasis on Antarctica there were papers from 10

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countries, including Arctic Canada and Sweden. Even at this early stage it was clear that several countries had already decided that medical research was an important field and Australia, France, USA and the UK all made major contributions. Whilst the breadth of subjects covered acclimatization, epidemiology, physiology and psychology there were also papers on health care, dental problems and even clothing design. The edited papers were published by Heinemann Publications as a book in 1973 and it remained for many years as the standard work on Antarctic human biology.

The doctors were clearly unhappy with their role in SCAR and had been considering their position. Writing formally to the Executive in 1973 they suggested that their interests were sufficiently dissimilar to biologists to merit a separate group and they proposed that a new Working Group on Human Biology and Medicine should be established. This was rapidly agreed along with terms of reference and encouragement to meet at the next SCAR meeting.

Despite all this enthusiasm to stand on their own, at XIII SCAR the WG was poorly represented with only eight members present yet they managed to establish five subcommittees! They met both with the WG Biology and WG Logistics and it was the latter that generated action. The new WG had a dual role dealing with research and with health care matters and in the latter they needed agreement from the operators. Their concerns over health care recognized two important features that seemed simple to fix and yet showed just how uncoupled the national logistics was from this forum, despite the SCAR WG on Logistics. The doctors wanted to have a standardized form for accident recording so that data could be amalgamated from across all nations to study trends, and they were also certain that improvements in screening methods by national operators at the point of personnel selection would decrease medical emergencies on the ice. This clear linkage and potential feedback

from one group to another was a key reason for SCAR's existence yet, in this instance, there was little progress for many years. The doctors generated clear recommendations that were formally passed through to National Committees but then simply ignored or dismissed by many national operators.

Geological Sciences

The second SCAR symposium on Antarctic Earth Sciences was held in Oslo in 1970. The seven years since the first symposium had seen a considerable increase in scientific activity in most disciplines and the importance of the meeting was reflected in an increase to 120 participants from the earlier 50. The symposium volume contained 138 papers this time and the sessions were arranged around geographical units, each introduced by a major review, to encourage a more synthetic approach. Representation was again heavily skewed with a very large number of American papers. There was evidence that geologists had begun to work outside their traditional national areas but, based on authorship of papers, there were few indications of international collaboration. The breadth of discipline was stretched further than before with papers in related fields from glaciologists, oceanographers and palynologists. By this time several scientists who would spend their research careers on Antarctic science were becoming evident, for example: Bob Rutford, David Elliot, Charlie Bentley, Ian Dalziel, Peter Webb and Campbell Craddock from USA, Olav Orheim from Norway, Peter Barrett and Fred Davey from New Zealand, Ray Adie, David Drewry, Mike Thomson, and Peter Barker from the UK, Garrik Griukurov from USSR, Tony van Autenboer from Belgium. Many of these were to go on to give a great deal of their efforts to SCAR in a variety of ways. If the first symposium could be seen as a foundation and baseline for modern geology in Antarctica this second symposium moved the field on significantly. New geophysical techniques had changed the view of sub-

Tore Gjelsvik, President 1974–78

Tore Gjelsvik was a field geologist by training and never lost his enthusiasm for hands-on geology. He was born in Bodo on 7 September 1916 and studied geology at the University of Oslo, graduating in 1942. Throughout the Second World War he was active in the Norwegian Resistance and after the war spent two years at Harvard University before completing his PhD in Norway in 1953. The next seven years were spent with the Geological Survey of Norway during which time he worked in Turkey and Burma. Appointed Director of the Norsk Polarinstitut in 1960 he retired in 1983. At the start of his directorship he was told to concentrate on the Arctic, especially Svalbard, and it took him until 1972 to get Antarctica included within the institute's interests and 1976 before the first Norwegian expedition returned to the Antarctic. Elected as President at XIII SCAR in Jackson Hole he had been the Norwegian delegate since IV SCAR, 1960. He died on 23 January 2006 at the age of 89. He was certainly a leader in Norwegian polar affairs, a position recognized by the honours he was awarded. His name is commemo-



rated in Gjelsvikfjella (72°05'S, 2°50'E), Gjelsvik Peak (85°19'S, 168°00'W) and Gjeslvik Spur (79°18'S 156°19'E).

glacial topography, whilst seaborne magnetic, seismic and gravity measurements now illustrated aspects of the magnetic anomalies and the major fracture zones in the Scotia Sea for the first time. The arguments about plate tectonics were no longer about if the theory applied but how it helped to explain different data trends.

The Geology WG was again trying to think to the future. At XI SCAR Craddock produced a list of 25 major geological problems whilst Ravich had a list of 12 major work fields. At a joint meeting with the Solid-Earth Geophysics WG a list was agreed of 17 areas needing deep seismic sounding but as many of these, like the Gamburtsev Mountains and central Marie Byrd Land, were rarely visited they could

have had little expectation that progress would be rapid.

One of the stalwarts of SCAR and the Geology WG, Dick Willett, died suddenly on 6 June 1974 having served in SCAR continuously since 1959. When the Geology WG met in Canberra in 1973 Campbell (Cam) Craddock from the USA was elected Chairman with Ian McLeod from Australia as Secretary. They spent a great deal of time on their recommendations but also managed to outline the subject areas for the next geology symposium in Wisconsin.

The third SCAR symposium on Antarctic Earth Sciences was held in Madison, Wisconsin, USA, 22–27 August 1977. A 6-day pre-symposium field trip took 35



The logo for the third SCAR symposium on Antarctic Earth Sciences held in Wisconsin, USA, during August 1977.

participants to the Precambrian rocks of the Lake Superior district. More than 200 participants read around 140 papers in twelve categories that required parallel sessions on three days. It was noted that major advances had been made in the fields of geophysics, Precambrian geology and structural geology. The highlight of the Symposium Banquet was an emotional address by Bob Nichols on Captain Scott's last expedition. Afterwards, Mikhail Ravich presented Soviet polar medals to Bob Nichols and Al Wade in recognition of their major contributions to geological research in Antarctic over many years. The symposium proceedings volume was published in 1982, a massive tome of 1172 pages, a tremendous task achieved by Cam Craddock and his editorial team.

Oceanography

The three subcommittees established in 1966 were disbanded at the 1970 meeting. Indeed, the Group took a close look at the value they brought to co-ordination of activities in the Southern Ocean, especially in the light of activities by SCOR, IOC and BIOMASS. They decided that there was still a role for them but a much more focused one, acting essentially as a link between SCAR and other international organizations. It was

this year that the WG organized a short symposium on Antarctic oceanography during the SCOR/IAPSO/CMG/IABO joint oceanographic assembly in Tokyo. The resulting publication *Symposium on Antarctic Ice and Water Masses*, was edited by Sir George Deacon and published by SCAR the following year.

A joint meeting with SCOR on Polar Oceans was organized by M J Dunbar and took place in Montreal in 1974. This was the first meeting to bring together oceanographic interests from both polar regions. It attracted strong support although the Soviets failed completely to attend. Interestingly for a scientific meeting it concluded with a list of fourteen recommendations addressed to SCAR, SCOR and IOC covering almost every conceivable aspect of biological and physical oceanography! It is not clear that any of them were acted upon.

Meteorology

The establishment of a new research unit, the Bureau of Meteorological Research and Climate (BMRC), in Melbourne combined with the very limited international enthusiasm for the International Antarctic Meteorological Research Centre (IAMRC) spelt the end for the IAMRC on 12 June 1969.



The logo for the XIV SCAR Meeting in Mendoza, Argentina, in October 1976.



The venue for the XIV SCAR Delegates' Meeting in Mendoza had the appearance of a court in session!

Upper Atmosphere Physics

Enthusiasm for the WG on Geomagnetism decreased and at IX SCAR the WG was disbanded, transferring many of its activities to the Working Group on Upper Atmosphere Physics. Tak Nagata asked all countries to review their representation on the group in the light of this change. In 1971 Roland Schlich decided to resign as Secretary and in his letter to the Executive raised concerns about the

effectiveness of the WG as many of its science questions were more adequately dealt with by other more global fora. Clearly the Executive at this point did not want to close the WG so suggested instead that it focused its attention on purely Antarctic problems.

In 1974 the Scientific Committee on Solar-Terrestrial Physics' (SCOSTEP's) Committee for the International Magnetospheric Study (IMS) 1976-78 had

asked in 1974 for SCAR's participation. The WG developed some proposals in response to this.

Geodesy and Cartography

Australia continued to have a very active interest in this Working Group with an Australian, Bruce Lambert, acting as chairman of the group throughout most of this period. He took on the presentation of reports from SCAR to the International Association of Geodesy. During discussions in 1970 the Argentine Delegate raised the interesting question of the actual location of the coastline in ice shelf areas: was it at the front of the shelf, as accepted by the International Hydrographic Bureau, or at the rear, which had already been adopted by some cartographers? It did not seem important then and no decision was reached but, decades later, this question was to have major legal relevance as claimant states tried to register claims to the continental shelf under the United Nations Convention on the Law of the Sea (UNCLOS).

Glaciology

A very successful symposium on glaciological exploration was held jointly with the International Association of Scientific Hydrology in 1968 at Dartmouth College, Hanover, USA. With 125 participants from 15 countries it provided a topical survey of what was known of the Antarctic ice sheet and how new techniques could take the field forward. The Glaciology WG met in the evenings and began to develop a new international programme (International Antarctic Glaciological Project (IAGP)) to investigate the ice between 90°E and 160°E. Of particular interest was the report from radio-echo sounding of an ice-thickness of 4200 m over by Sovetskya Station as well as more details of the Gamburtsev Subglacial Mountains.

At XII SCAR in Canberra, 1972, the WG met with the rest of SCAR for the first time since 1961, having managed to attach all its previous meetings to symposia

or meetings of other societies. Uwe Radok stood down as secretary after eight years and was succeeded by Charles Swithinbank. Much of the discussion centred on meeting requests from IAGP whilst the proposal for a European expedition to Dronning Maud Land (that would become the European Programme of Ice Drilling in Antarctica (EPICA) project) was described for the first time. Swithinbank outlined ideas for a new glaciological initiative on the Antarctic Peninsula and it was agreed that a group would meet in Cambridge in 1973 to develop a full plan, the outline of which was published in *SCAR Bulletin* No 46 the following year.

The International Antarctic Glaciological Project (IAGP) was primarily an initiative of Australia, France, USA and USSR, with the UK as a later participant, and aimed to determine the glaciological regime of a significant part of the continent. IAGP had an initial major objective of understanding the ice flow regime in order to interpret ice cores (although it later became more dynamic/mass balance). It was driven by Lorius, Radok, Budd, Kotlyakov and Korotkevitch. It was under sponsorship from WG on Glaciology, but existed as a separate programme. One of its strengths was that each nation sent both a scientist and a logistics expert to meetings. The main field programme began in 1971–72 and by then there had been international agreement on common standards for various studies to ensure international comparability. Setting standards within a small discipline was certainly something SCAR could achieve but the general problem of setting standards on a much broader basis seemed too politically difficult to be tackled then.

Work on ice cores from the Camp Century site in Greenland and from Byrd Station in Antarctica had shown that there was a relationship between temperature profiles and stable isotope profiles in ice cores. This stimulated a two week workshop in Cambridge in January 1973 which made major steps forward in this field which were to prove crucial for palaeo-

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temperature reconstructions at a later date.

Group of Specialists on Ice Shelf Drilling Projects

A letter in 1969 from Jim Brodie, then Director of New Zealand Oceanographic Institute, to George Hemmen raised the interesting question of what could be achieved by drilling through the Ross Ice Shelf. All sorts of interdisciplinary possibilities were raised including sampling of the water column and sediments, and measuring under-ice currents and heat flow. The USA already had a plan for undertaking this and now decided that they wanted to make this an international project. With positive responses from Australia, New Zealand, the UK and

the USSR, Jim Zumberge proposed to IX SCAR in 1970 that the existing US *ad hoc* committee chaired by Sayed El-Sayed should be replaced by a SCAR Group of Specialists on Ice Shelf Drilling Projects whose first concern would be the Ross Ice Shelf Project (RISP). Zumberge was nominated as the Convenor and the Executive allowed another 11 members to be appointed including Uwe and Rainer Radok (Australia), Gordon Robin and Charles Swithinbank (UK), Charlie Bentley, Lyle Hansen and Chester Langway (USA), Robin Adams and Jim Brodie (New Zealand), Eugen Seibold (Germany) and Mikhail Grosswald (USSR). Meanwhile the US had established a RISP Steering Committee using many of the original members of the *ad hoc* committee.



Bob Garrott, Montana State University, sorting through the flipper tags used to track and study Weddell seals in Erebus Bay. Photograph: Steven Profaizer / NSF.

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Above: Graham Hosie preparing a Continuous Plankton Recorder (CPR) aboard TS *Umitaka Maru* for deployment in the SCAR Southern Ocean CPR Survey. Photograph: Takashi Ishimaru.

Below: Karolien Peeters taking gravel and stone samples to investigate the bacterial diversity on Utsteinen in Sør-Rondane. Photograph: Annik Wilmotte.





Kathy Conlan diving amongst spectacular brine tubes beneath the sea ice at Cape Evans. Photograph: Stacy Kim. Reproduced by courtesy of the Canadian Museum of Nature.

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Above: Freddy Boehmwald taking samples for microbiological analysis on King George Island, Antarctica. Photograph: Instituto Nacional Antártico Chileno (INACH).

Below: Laurend Chauvaud using calcein, a fluorescent pigment, to study the growth of Antarctic scallops. Photograph: Erwan Amice.



Chapter 3. The Consolidation Years (1968-77)



Above: Jason Gedamke retrieving a passive acoustic mooring (for recording whale vocalizations) off BANZARE Bank. Photograph: Steve Nicol.

Below: Jacek Siciski and Krzysztof Jadewski with a large thallus of *Himantothallus grandifolius*. Photograph: Krzysztof Pabis.

