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## **Director's Introduction**

It is a pleasure to write the introduction to this report as the new Director of the Institute. Taking up the post represents a return to the Institute for me, for as a doctoral student, and subsequently a member of staff, it is here that I gained much of my academic background in glaciology and, more broadly, of the Arctic and Antarctic. It is a privilege to be a part once more of one of the World's primary foci for polar research.

First, I should like to acknowledge the work of Professor Keith Richards during his time as Director. Among his achievements were significant improvements to the infrastructure of the Institute, the redesign of our MPhil course and the forging of closer links with the Department of Geography, where he held his Chair. In this context, the Institute has during the year undergone a change of status within the University of Cambridge, from a separate department to a sub-department of Geography. My view, like that of my predecessor, is that this positions us much more soundly within the University's organisational structure and also brings the benefits of closer intellectual and infrastructural collaboration.

We are now in a strong position to take forward the research strengths of the Institute. One of my principal aims as Director is to make sure that our staff are given every opportunity to carry out high-quality research on aspects of both the natural and social sciences in the polar regions, emphasising how these studies link to global problems such as environmental change and cross-cultural interaction. This means that we must be clear about our specific research aims and objectives and have the resources of time and funding with which to undertake the work. Over the year we have continued to enhance the computing and audio-visual display facilities of the Institute – important underpinnings of our research and teaching.

In this context, as a group of senior academic staff, we have discussed in depth a research strategy for the next five years, which includes the definition of key intellectual problems and the suite of skills and resources we need to tackle them. These problems, for example the role of ice sheets in climate and sea-level change, have guided the reshaping of our research-group structure and will, in turn, inform changes in the use of Institute space. We have redesigned and relaunched the Institute web site, reflecting these changes in our research structure.

The strength of research in the Institute is exemplified in this report by the very strong performance of staff in terms of scholarly publications in peer-reviewed international journals, and in the breadth and depth of our research grant funding, won competitively through the UK research councils and the European Union science budget. Our senior staff have also made many contributions to national and international organisations and committees concerning polar research. This is a mark of the esteem in which the Institute and its staff are held. We are also pleased to continue to host the secretariats of the International Glaciological Society and the Scientific Committee on Antarctic Research.

The research of the Institute has also been strengthened in both breadth and depth by several staff appointments. University-funded staff represent the intellectual core of our research activity. My own post as Professor of Physical Geography is a new one, with my research focused on the interactions between modern glaciers and climate and the record of past ice-sheet changes in ocean sediments. Dr Andrew Shepherd has also been appointed to a University Assistant Lectureship, bringing with him quantitative skills in the application of satellite radar altimetry and interferometry to the understanding of ice-sheet change through time. In addition, Dr Ian Willis, Lecturer in Geography, has also moved into the Institute in order to concentrate expertise in glaciology under one roof. Each of us will be contributing to the teaching programmes of the Department of Geography, and to college teaching in physical geography. I also acknowledge the many contributions to the intellectual life of the Institute made by Professor Peter Wadhams, especially for his sustained research into the understanding of sea ice over many years. Peter is spending three years at the Scottish Association for Marine Science's

Dunstaffnage Marine Laboratory in Oban, Scotland, before returning to the Department of Applied Mathematics and Theoretical Physics in Cambridge.

The Institute remains committed to teaching and learning, both within the University and in the context of the wider public. Excellence in teaching is demonstrated through the award to Dr Neil Arnold of a distinguished Pilkington Prize by the University. During the year, members of staff have also published several books relating to the public understanding of both science and social-science issues in the polar regions and continue to offer their time to give public lectures to adults and children. Our museum represents a further contribution in this regard. Over the year, through support from the Friends of the Institute, both the staffing and the stocking of the Museum shop have been enhanced. I should also like to acknowledge the work of Philippa Foster Back, who has just retired after a very important period as Chair of the Friends.

We are also in the first stages of planning for a major redesign of the Museum so that we can use our very extensive collections of artifacts, manuscripts, photographs and works of art with increasing effectiveness to project both the past achievements of British explorers and the continuing relevance of the polar regions in the wider context of global environmental and societal change. The Institute's Library and Archives also form a part of our developing strategy for information provision involving, for example, web-based catalogues of our very fine photographic, artifactual and documentary collections. The Institute Appeal, established last year, is aimed at enhancing the Archives, Museum and Library both by securing long-term funding for key staff, and through providing a capital sum for Museum refurbishment. I would like to thank those who have already contributed to the Appeal – our overall target is 5 million pounds. We have also benefited from the generosity of those who have donated items to our polar collections over the past year.

Looking forward to the coming year, several Arctic and Antarctic data-gathering programmes will be taking place across the breadth of our academic interests, often involving international collaboration. This polar field work is linked strongly to both satellite-acquired observations and to computer modelling of, for example, the response of ice caps and glaciers to climate warming. In Cambridge, the infrastructure of the Institute will continue to be enhanced, and working spaces will be reorganised according to our newly defined research strategy. My colleagues and I are looking forward to the academic challenges and opportunities of the coming year.

**Professor Julian Dowdeswell, Director**

## Institute Staff

*Our academic staff comprises Cambridge University teaching officers and grant-funded post-doctoral researchers, together with graduate students. In addition, we have a large complement of library and archival personnel and an administrative support team. This year, Dr Neil Arnold received a Pilkington Prize for excellence in teaching. Charles Swithinbank, was awarded a second clasp to his Polar Medal by HM The Queen.*

### Senior Academic and Related Staff

Professor Julian A. Dowdeswell	Director
Dr Neil Arnold	University Lecturer
Dr Michael Bravo	University Lecturer
Mr Robert Headland	Archivist and Curator
Mr William Mills	Keeper and Librarian
Professor Elizabeth Morris, OBE	NERC Arctic Science Advisor (seconded from BAS)
Dr Gareth Rees	Senior Lecturer
Dr Beau Riffenburgh	Editor, <i>Polar Record</i>
Dr Andrew Shepherd	University Assistant Lecturer
Dr Piers Vitebsky	Assistant Director of Research
Dr Ian Willis	University Lecturer
Professor Peter Wadhams	Professor of Ocean Physics

### Research Staff

Mr Toby Benham	Research Associate
Dr Marcelle Chabot	Research Fellow
Dr Bruce Denby	Research Associate
Mr Martin Doble	Research Associate
Mr Nick Hughes	Research Associate
Mr Arthur Kaletsky	Research Associate
Dr Colm Ó Cofaigh	Research Associate
Dr Olga Tutubalina	Research Fellow
Mr Jeremy Wilkinson	Research Associate

### Library Staff

Ms Sharon Banks	Library Assistant
Ms Naomi Boneham	Assistant Archivist
Mrs Frances Cramp	Library Assistant
Ms Caroline Gunn	Archives Assistant
Ms Lucy Martin	Manager, Picture Library
Mr Jonathan Pinhey	Nordic Bibliographer
Ms Shirley Sawtell	Information Assistant
Ms Rebecca Stancombe	Library Assistant
Ms Hilary Shibata	Antarctic Bibliographer
Mrs Isabella Warren	Russian Bibliographer

### Support Staff

Ms Bryony Amesbury	Administrator
Mrs Liz Crilley	Director's Assistant
Mrs Jennifer Dale	Receptionist/Secretary
Ms Francesca Franco	Shop Manager
Mrs Judy Heath	Senior Accounts Clerk
Mr Martin Lucas-Smith	Web Technician
Mr Stanley Chapman	Maintenance
Mr Brian Smith	Maintenance

## **Research Students**

Ms Tanya Argounova  
Mr Yevgeni Aksenov  
Mr John Ash  
Mr Mark Dwyer  
Ms Daniela Flocco  
Mr Adrian Fox  
Ms Stephanie Irlbacher Fox  
Ms Susanna Grant  
Mr Joachim Otto Habeck  
Mr Richard Hall  
Ms Ingibjorg Jonsdottir  
Mr John Lin  
Mr Sean Maher  
Ms Anna Nelson  
Mr Richard Powell  
Mrs Lena Khlinovskaya Rockhill  
Mr Steven Sawhill  
Mr Niobe Thompson  
Mr Sam Van Vactor  
Ms Emma Wilson  
Mr Kostas Zorbas

## **MPhil Students**

Ms Jennifer Anderson  
Mr Andrew Faas  
Ms Janne Flora  
Ms Caroline Gunn  
Mr Huw Lewis-Jones  
Mr Liam Parfitt  
Ms Sarah Robinson  
Ms Olga Ulturgasheva  
Ms Elana Wilson

## **Institute Associates**

Dr Valerie Alia  
Dr Lawson Brigham  
Dr Hugh Brody  
Dr Liz Cruwys  
Dr Debra J. Enzenbacher  
Mr Michael Gorman  
Dr Colin Harris  
Dr John Heap  
Mr Keith Hill  
Dr Neil Kent  
Mr Harry King  
Mr Oliver Merrington  
Professor Mark Nuttall  
Dr Simon Ommanney  
Dr Philip Pugh  
Dr Gordon de Q. Robin  
Dr Clive Smallman  
Mr Peter Speak  
Dr Bernard Stonehouse  
Dr Charles Swithinbank  
Dr Janet West  
Professor Peter Williams

## ***Other organisations based at SPRI***

### **World Data Centre for Glaciology, Cambridge**

Mrs Sally Stonehouse	Manager
Mr Oliver Merrington	Website Manager

### **International Glaciological Society**

Mr Simon Ommanney	Secretary General
Mrs Linda Gorman	Assistant to the Secretary General

### **Scientific Committee on Antarctic Research**

Dr Peter Clarkson	Executive Secretary
Mrs Mandy Dalton	Senior Clerk



## Research Group Structure

The research work of the Institute is focused around several research groups, each of which has a mix of senior academic staff, post-doctoral researchers and postgraduate students. The work of the groups is supported by a series of research grants, which are listed below. The groups are:

- Glaciology and Climate Change
- Glacimarine Sedimentary Environments
- Sea Ice and Polar Oceanography
- Polar Landscapes and Remote Sensing
- NERC Centre for Polar Observation and Modelling (collaborative with UCL and Bristol)
- Polar Social Science and Humanities

A selection of the physical and social science research projects in which we are currently engaged are outlined briefly below.

## Polar Physical Science

### Thickness and extent of subglacial till beneath an Antarctic palaeo-ice stream

Marine geophysical records have enabled us to reconstruct for the first time the three-dimensional thickness of the soft sedimentary bed beneath a large fast-moving ice stream. Such subglacial material, whose deformation accounts for the rapid flow of many ice streams, is usually hidden under several kilometres of ice in the case of modern ice sheets. We have used geophysical and geological data on the morphology of the sea floor, and the acoustic, sedimentological and geotechnical properties of the sediments directly beneath it, to infer the presence of an ice stream the last time ice expanded to inundate the 370 km-long Marguerite Trough offshore of the Antarctic Peninsula about 18,000 years ago. Fast flow of this palaeo-ice stream is implied by elongate, streamlined lineations in sea-bed sediments, orientated parallel to the long-axis of the trough. Directly beneath the sea floor, a layer of low shear-strength unsorted sediment, averaging 4.6 m and up to 19 m in thickness, is observed using reflectors on shallow-acoustic records. This layer, with its streamlined upper surface and underlain by overconsolidated glacial sediment, is interpreted as the product of subglacial deformation. This work was undertaken jointly with Dr Carol Pudsey (BAS) under the NERC Antarctic Funding Initiative.

**Julian Dowdeswell, Colm Ó Cofaigh**

### Ice shelf disintegration and climate warming

Since 1980, ice shelves of the Antarctic Peninsula have retreated by 550 km<sup>2</sup> each year in tandem with a regional climate warming, and it is widely regarded that these events are related. For several decades this topic has been the subject of much scientific debate, and has fuelled speculation as to the sustainability of the remaining ice shelves and the source of the regional climate change.

A decade of satellite radar altimeter measurements has revealed a widespread surface lowering of the Larsen Ice Shelf. The lowering may reflect a 7% thinning of basal ice as a result of enhanced ocean melting during a decade in which large sections of the ice shelf disintegrated. The thinning preceded the

2002 collapse of the Larsen-B section by at least 9 years, and has progressively weakened the remaining Larsen-C section. If the thinning were to continue unabated for a further ~ 40 years, sections of the Larsen-C ice shelf would approach the thickness of the Larsen-B at the time of its collapse. Basal ice-shelf melting may provide the simple link between regional climate warming and the successive disintegration of Larsen Ice Shelf sections.

**Andrew Shepherd**

### **West Antarctic ice thinning and sea level rise**

Whilst the Antarctic continent as a whole has had only a modest impact upon global sea level during the past century, the Amundsen Sea sector of western Antarctica has experienced a widespread thinning of grounded ice. A combination of satellite radar-altimetry and interferometry has shown that that ice thinning was concentrated along the fast-flowing trunks of the Pine Island, Thwaites and Smith glaciers – the largest ice streams in western Antarctica. Since 1992, the glaciers have thinned by more than 10 m and have retreated inland by up to 10 km, losing over 150 km<sup>3</sup> of ice to the ocean.

The pattern of thinning affects over 10,000 km<sup>2</sup> of inland ice, and is associated with ice dynamics. The presumed longevity of the thinning raises the important question as to its likely evolution, and it is possible that such a retreat could signal an accelerating and irreversible process. With enough ice to raise global sea levels by more than a metre, understanding the future rate of ice discharge from this sector of Antarctica is of pressing concern.

**Andrew Shepherd**

### **The physiography of Antarctic subglacial lakes**

In addition to the well-known Lake Vostok, more than 70 lakes have been identified beneath the Antarctic Ice Sheet using mirror-like reflectors observed on airborne radar records. The total volume of water stored in lakes beneath the Antarctic Ice Sheet is between 4,000 and 12,000 km<sup>3</sup>. Almost 60% of lakes are found within 200 km of an ice divide and only about 15% are located >500 km distant. Bedrock topography of the ice-sheet interior is characterised by large subglacial basins separated by mountain ranges. Many lakes occur in areas of relatively low bed relief, in and on the margins of subglacial basins. First, there are lakes located where subglacial topography is relatively subdued, often near the centre of subglacial basins. Secondly, some lakes occur in significant topographic depressions, closer to subglacial basin margins. Lakes are also found perched on subglacial mountainsides. Sixteen lakes are located close to the transition to enhanced ice-sheet flow. Warm-based fast-flowing ice streams provide a possible route by which subglacial lakes may establish a hydrological connection with the ice-sheet margin. At a continental scale, the locations of Antarctic subglacial lakes match the modelled distribution of pressure melting at the ice-sheet bed. This work was undertaken jointly with M.J. Siegert, Bristol University.

**Julian Dowdeswell**

### **Convective chimneys in the Greenland Sea**

Until recently it was believed that winter convection in the Greenland Sea, which helps drive the global thermohaline circulation, occurred in the form of plumes of descending dense water, generated by the salt rejected by newly formed sea ice. The effect of global warming was to reduce ice formation, and thus to weaken convection. However, during field work in 2001 it was discovered that the preferred mechanism may be an extraordinary feature known as a chimney, a rotating vortex of uniform water extending from the surface to 2500 m depth. The chimney, discovered in a cruise by RV *Lance* funded by the EU under the CONVECTION project, was only 20 km in diameter. Later cruises, in summer 2001 and winter 2002, showed that the chimney was remarkably long-lived and stationary at 75°N 0°E, properties which at present are unexplained. Each summer the chimney becomes capped by fresher surface water, only to open up again the next winter. Further work is planned for May 2003.

**Peter Wadhams**

### **First use of an AUV under Arctic sea ice**

In winter 2002, the Danish Maridan Martin autonomous underwater vehicle (AUV) was deployed in the Arctic seas, and obtained the first under-ice sonar profiles from an AUV under Arctic sea ice. The

vehicle was deployed from the Norwegian RV *Lance* in the East Greenland pack ice, and made a number of runs under the ice. It was equipped with an upward looking side-scan sonar and water-conductivity and temperature sensor. The AUV was able to keep to a well-defined overlapping grid of tracks through the use of an acoustic tracking and control system. The deployment provided valuable operational experience for future use of the more sophisticated UK Autosub AUV under sea ice in the Weddell Sea region of Antarctic and the Greenland Sea.

**Peter Wadhams**

### **Ice-surface albedo and melt rates**

Surface conditions, such as snow cover and albedo (surface reflectance) form one of the key controls which determine glacier and ice sheet melt rates, as they influence the amount of energy, especially sunlight, absorbed by the surface. A sophisticated mathematical model of the energy inputs to glacier and ice sheet surfaces has been developed, and a key focus of research over the last year has been improving the representation of snow cover within the model. Previous models have only allowed snow cover to vary slowly over glacier surfaces but, in reality, snow depth can vary considerably over quite short distances – metres to tens of metres. Including this variability should improve estimates of melt rates from glaciers and ice sheets. Research efforts have focused on the possibility that this variability may be fractal, and field work has shown that this is the case. This is an important result, as a wide variety of fractal techniques are available to simulate variable surfaces from relatively simple field measurements. Current research is focused on developing fractal snow cover models, and investigating their impacts on glacier and ice sheet melting. This will be supplemented by a field visit to the Arctic to acquire airborne remotely-sensed data of small scale surface topography and albedo over an Arctic glacier, following a successful application to the NERC Airborne Remote Sensing Facility.

**Neil Arnold**

### **Optical properties of Arctic lichens**

Arctic and sub-arctic tundra vegetation, north of the treeline, consists largely of grasses and sedges, mosses, lichens and dwarf shrubs. In many areas this vegetation is out of equilibrium, subjected to pressures from global climate change, air and ground pollution and other human disturbances, and from grazing by reindeer. In particular, it is probable that in large areas of the Eurasian north lichen-dominated tundra is being displaced by grasses and shrubs. This could impact the global climate system through its effect on the carbon and water cycles and on the Earth's albedo. Studies of the changes that are taking place in the distribution of high-latitude vegetation depend on the analysis of satellite imagery. Accurate interpretation requires detailed knowledge of the optical reflectance properties of the vegetation cover. Until now, such information has been conspicuously lacking for most lichen genera. However, new experiments based in Arctic Sweden have begun to provide reflectance measurements with an unprecedentedly high level of detail: the spectra are measured from blue light, at a wavelength of around 400 nanometres, well into the infrared region at around 2400 nanometres, in 2000 steps. The Swedish test site provides extremely clean, undisturbed conditions. In future, studies will be extended to polluted areas of the Russian arctic to investigate the effect of physiological stress on the optical properties. These results will bring us much closer to the goal of being able to assess the health of an arctic ecosystem by analysis of satellite images.

**Gareth Rees**

### **Measuring the volumes of large ice masses**

The ability to measure changes in the volumes of large ice masses (glaciers, ice caps and ice sheets) is a high priority in monitoring potential global climate change. Traditionally this task is undertaken by fieldwork, which is slow and labour-intensive, so it is particularly desirable to develop techniques based on the use of satellite data. One recently developed technique, capable of remarkably high precision, is called Interferometric Synthetic Aperture Radar (InSAR). However, it is technically challenging to implement and not yet suitable as a tool for routine monitoring. Consequently, it is likely that for some years to come it will be necessary to integrate height information about large ice masses from a number of sources, including InSAR, field-based GPS measurements, stereophotography, radar altimetry, radio echo sounding, laser profiling and photogrammetry. All of these techniques have different



characteristics, so we are investigating optimum techniques for assimilating data from different sources into a consistent digital elevation model (DEM). By recompiling such DEMs over time, it will be possible to assess changes in the volume of the ice mass and hence to link these changes to climate models.

**Gareth Rees**

### **3-D patterns of stress and velocity in glaciers**

An integrated field-work and modelling strategy is being used to study how basal conditions affect the 3-D distribution of stress and velocity within a temperate Alpine glacier (Haut Glacier d'Arolla, Switzerland). In the field, we monitored spatial and temporal variations in basal water pressure, sediment thickness, texture and strength, surface motion, internal deformation, sliding and subglacial sediment deformation using down-borehole instruments and terrestrial surveying techniques. We found distinct patterns of surface, internal and basal motion that varied between spring, summer, and autumn/winter, which reflect patterns of basal water pressure and sediment characteristics. These, in turn, are influenced by the proximity to subglacial drainage axes. For example, during the spring, the glacier surface speeds up from  $\sim 2\text{cm d}^{-1}$  to  $>10\text{cm d}^{-1}$  over short periods of a few days. The zone of maximum surface velocity shifts from the centre of the glacier towards the major drainage axes where water pressure fluctuations are greatest and sediments are relatively thin and coarse grained. The relative importance of basal motion to surface motion increases during these 'spring events,' particularly towards the drainage axes and less so away from them. The field data have been used to drive and test a 3-D glacier flow model, which can reproduce the spring, summer, autumn/winter, and annual patterns and magnitudes of movement very accurately. This work is being undertaken in collaboration with Bryn Hubbard (Aberystwyth), Pete Nienow (Glasgow), Doug Mair (Aberdeen), Urs Fischer (ETH, Zurich) and Alun Hubbard (Edinburgh).

**Ian Willis**

### **Hydrology and dynamics of polythermal glaciers**

The hydrology and dynamics of Midre Lovénbreen, Svalbard, are being studied using a combination of field-based and photogrammetric methods. Digital Elevation Models (DEMs) of the glacier surface have been constructed for 1977 and 1995. A DEM of the glacier bed has been produced from radar data. These DEMs have been used to map subglacial hydraulic potential for various assumptions about steady-state subglacial water pressure, and these have been used to construct theoretically the overall structure of the subglacial drainage network and therefore the position of major hydrological pathways under the glacier. Results suggest that the position of the terminus stream is sensitively dependent on subglacial water pressures. Observations over the last decade of the main terminus stream suggest that switches in its position have occurred as a result of variations in the rate of rain and melt water delivery to the glacier bed and therefore subglacial water pressures. Measurements of surface velocity variations during the summer suggest that spatial variations in glacier dynamics are also controlled by the presence of basal water. Temporal fluctuations in glacier dynamics occur in response to weather related surface inputs. Velocity variations may be locally forced by subglacial water pressure fluctuations or non-locally forced through changes in the longitudinal stress gradients. This work is being undertaken in collaboration with our former PhD student David Rippin (Bristol) and with Andy Hodson (Sheffield).

**Ian Willis, Neil Arnold**

## **Polar Social Science and Humanities**

### **The disunity of the Nordic Arctic**

In collaboration with a group of Nordic historians of science, we examined what the national Arctic histories of science and culture of Sweden and Denmark would provide when analysed together. If put alongside each other, would they speak to each other and reveal hitherto disregarded patterns of national strategies and agendas, of scientific practices, of indigenous relationships, and other themes? The aim was to discover either a unifying account or at least an explanation of the 'disunity of the field sciences'.

Our conclusions were counterintuitive: the Swedish and Danish histories present a complex contrast of ideas and narratives about colonial presence. When it comes to the Arctic, the additional element of nationalism is unusually powerful. Arctic exploration and research was for a long time part of public memory and national myth-making; not until very recently has this been considered a worthwhile undertaking by professional scholars in the Nordic countries. A striking phenomenon of these nationalisms is that they have remained isolated in relation to each other. Despite the geographical contiguity, the linguistic similarities, and the close historical, cultural and political links between the countries there is no collective 'Nordic' memory, very scant knowledge of the history of the other countries, and a very vaguely conceived Nordic community. Just as it seems to be a universal fact that national symbolic communities are by themselves creating knowledge barriers and selected perception of time and space, so too, the curricula in schools have painstakingly avoided the details of any other Nordic country's history, apart from that of the mother country.

**Michael Bravo**

### **Ethnic tensions in the Sakha Republic (Yakutia)**

Ethnicity is a crucial factor in discourses of regional self-determination in the Russian north, and local elites are the key actors in how these are played out. Tanya Argounova has examined the politics of ethnicity in the Sakha Republic. Throughout the Soviet period, the Sakha were subjected to a repetitive cycle in which a civil disturbance or incident was denounced as a manifestation of *natsionalizm*, which then triggered accusation and punishment of ethnic leaders. By analysing conflicts and contradictions within local cultural and political elites, she has shown how *natsionalizm* differs from 'nationalism' in western social science discourse, and how it functioned instead as a smokescreen to disguise, and prevent discussion of, a range of complex social, political, economic and ethnic issues. Her research highlights the role in these cases of the remote rural district of Tatta, a district that stands symbolically as the heartland of traditional Sakha culture. She also demonstrates how, despite this persecution, Tatta cultural and linguistic forms have come to lie at the core of a new homogenised pan-Sakha ethnic identity, in the name of which the Sakha Republic has staked its recent claim to increased self-determination and a share of the region's diamond revenue.

**Piers Vitebsky**

### **Oil development and local democracy on Sakhalin Island**

Multinational oil and gas developments affect much of the Russian North, but public consultation procedures and social impact studies are poorly developed. Emma Wilson studied opportunities and limitations on local participation in natural resource management in northeastern Sakhalin, where the prominent involvement of multinational corporations and development banks has given rise to particular concern among international NGOs about social and ecological issues. Building on an ethnographic study of attitudes in this remote area of Russia, she analysed the dynamics of subsistence gardening, sea fishing, reindeer herding, and small-scale entrepreneurship, to reveal a web of moral entitlements, differential access to information, and conflicting everyday practices. The research distinguished diverse paths leading either to activism as resistance to globalisation, or to resignation as a retreat into subsistence and self-sufficiency. By focusing on space as locus of opportunity and dialogue as critical engagement, she challenges the assumptions of 'participation' and 'sustainable development' by deconstructing interventionist discourses and showing the implications of these for concepts of agency and responsibility, and thus the theoretical and practical difficulty of incorporating multiple voices into the decision-making process.

**Piers Vitebsky**

### **Space, psychotherapy and shamanic heritage in the Russian north**

Starting from the wider post-Soviet problem of the troubled relationship between one's future and one's past, the social and psychological consequences of the drastic withdrawal of the state from Russia's northern regions as the country's economic crisis transformed huge distances from an asset into a liability has been explored. This state had systematically destroyed indigenous traditions of self-sufficiency and made indigenous communities dependent on a centralised infrastructure. Local psychotherapy groups were participated in to investigate the interplay of language, silence and non-

verbal communication among the diverse ethnic groups and to demonstrate how indigenous people's belief that they are on the verge of extinction without this support is also a psychological state related to trans-generational collective trauma. Moving beyond a focus on present conditions alone, specific links between the high rates of depression and suicide among indigenous peoples and specific forms of state violence in previous generations have been identified. In studying the life histories of the children of shamans and the vicissitudes of a hereditary 'shamanic impulse' that may be blocked, transformed or fulfilled in various ways, a theory of the distinction between historical versus existential trauma has been developed.

**Piers Vitebsky**

## **Current Research Grants**

### **Grants from UK Research Councils**

*Geometry and dynamics of large ice caps in the Canadian High Arctic*

Source: Natural Environment Research Council Grant GR3/12469  
£ 153,394 (1999–2002).

*Geophysical and geological investigations of sedimentation and ice-ocean variability on Arctic continental margins*

Source: Natural Environment Research Council, Grant GST/02/2198.  
£ 242,193 (1999–2002).

*Marine geological processes and sediments beneath floating ice shelves in Greenland and Antarctica: investigations using the Autosub AUV*

Source: Natural Environment Research Council, Grant NER/T/S/2000/00986.  
£ 369,062 (2001–2005).

*Ice-rafted debris on the Antarctic continental margin and the dynamics of the Antarctic Ice Sheet*

Source: Natural Environment Research Council, Grant NER/G/S/2000/00603.  
£ 181,043 (2001–2004).

*Centre for Polar Observation and Modelling – Earth Observation Centres of Excellence Initiative*

Funding: Natural Environment Research Council  
£ 180,000 (2000–2005).

### **Grants from Other Sources**

*Spaceborne measurements of Arctic glaciers and implications for sea level.*

Source: European Union, Framework 5, Grant EVK2-2001-00262  
£ 103,271 (2002–05).

*Économie politique et sociale des ménages Inuit.*

Social Sciences and Humanities Research Council of Canada  
Can\$ 33,500 (2002–05)

*The role of Inuit women in the household food security in Nunavik.*

Source: Nunavik Board of Regional Health and Social Services, Community Health Research Subsidy Program.  
Can\$ 19,320 (2002–03)

*Environmental change in the Barents Region*

Source: European Union, Framework 5, Grant EVK-2001-00369  
£122,285 (2002–2005)

*Regional Academic Partnership with Moscow State University*

Source: British Council, Grant MOS/395/41/018  
£30,000 (1999–2002)

## Publications by Institute Staff

*Publications in academic journals and books are a major way in which the results and wider implications of our research are communicated to the international community of scholars. Staff have also given keynote speeches and presentations at international scientific and policy-making conferences. In addition, several books published this year project the Arctic and Antarctic environment to the wider public.*

### Books

- Bravo, M.T., and Sorlin, S. (Editors). 2002. *Narrating the Arctic: a cultural history of Nordic scientific practices*. Canton, MA: Science History Publications.
- Dowdeswell, J.A., and Hambrey, M.J. 2002. *Islands of the Arctic*. Cambridge: Cambridge University Press.
- Dowdeswell, J.A., and Ó Cofaigh, C. (Editors). 2002. *Glacier-influenced sedimentation on high-latitude continental margins*. Geological Society, London, Special Publication, 203, 380 pp.
- Stonehouse, B. (Editor). 2002. *Encyclopaedia of Antarctica and the Southern Oceans*. Chichester: John Wiley.
- Swithinbank, C.W.M. 2002. *Vodka on ice; a year with the Russians in Antarctica*. Lewes: Book Guild.
- Vitebsky, P. 2001. *Shamanism*. Norman, OK: University of Oklahoma Press.

### Papers in Peer-Reviewed Journals

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## Polar Information and Historic Archives

*Our polar Library is the world's largest and our historical Archives represent the most comprehensive documentary records of the 'heroic' era of polar exploration. These and other Institute resources attract scholars from many countries.*

### Library

The renowned Library of the Institute continues to grow and to provide both information and space to large numbers of short and longer term visitors. Holdings this year were strengthened by the bequest of the fine polar library of Dennis Carter, and purchase of a large collection of books formerly owned by the distinguished ethnographer, Kaj Birket-Smith. Our Greenland collections have been particularly enhanced by the latter. More than 2000 items were added to the Library, including 1260 books and other monographic materials. By the end of the period covered, SPRILIB held over 160,000 records. Four issues of *Polar and Glaciological Abstracts* were published by Cambridge University Press and records sent for two updates of the *Arctic and Antarctic Regions* CD-ROM published by the National Information Services Corporation. Funding from the British Antarctic Survey enabled us to continue our input to the *Antarctic Bibliography*. This year's contribution included almost 7000 records from the period 1950–1961 in addition to 706 for the contemporary literature.

External financial support for information and library services during the year has come from

- |  |         |
|--|---------|
| • Ministry of Defence grant-in-aid (DSNOM) | £35,000 |
| • NERC British Antarctic Survey            | £20,000 |
| • Royal Society grant-in-aid (for WDC-C)   | £11,000 |
| • Crown Agents                             | £10,000 |

As usual, the Institute has had large numbers of academic visitors this year. Many are here to use the Library and Archives and to interact with members of the Institute. Most visitors use working space in the Library. Visitors this year have included: Professor William Barr (Arctic Institute of North America), Professor Arnoldus Blix (University of Tromsø), Professor Gary Clarke (University of British Columbia), Dr Louise Crossley (Australian Antarctic Division), Professor Julie Cruikshank (University of British Columbia), Sir Ranulf Fiennes, Dr Tom Griffiths (Australian National University), Mr David Harrowfield (Antarctic Heritage Trust, New Zealand), Dr James Higham (University of Otago), Dr Lubomir Kovacik (Comenius University), Dr Kamil Laska (Masaryk University), Dr Elizabeth Leane (University of Tasmania), Dr Lisbeth Lewander (Göteborg University), Rear Admiral John Myers (UK Hydrographic Department), Dr Alv Orhein (UNIS, Svalbard), The Revd Stephen Palmer, Professor Rajmund Przybylak (Nicholas Copernicus University), Professor Larry Rockhill, Professor Ron Savitt (University of New Hampshire), Dr Matti Seppala (University of Helsinki), the late Dr Norman Socha, Dr Erki Tammiksaar (Karl Ernst von Baer Museum), Dr Monica Tennberg (University of Lapland), Nigel Watson (Antarctic Heritage Trust, New Zealand), Dr David Wilson, Dr Marek Zajaczowski (Institute of Oceanology, Polish Academy of Sciences).

**William Mills**

### Picture Library

There have been many visitors and enquiries to the Picture Library to whom we have provided assistance with picture research, the supply of photographic material and the negotiation of reproduction rights, much concerning the early Antarctic expeditions. A number of books, TV film productions and exhibitions as well as magazine and newspaper articles have been published using images from the SPRI photographic collections. Two major television companies have used material in their films; a *Savage Planet* documentary by Granada TV and a documentary, *The Coldest March*, to be shown on Channel 4.

Requests for photographs continue to come from across the globe, including material for exhibitions at the Kerry County Museum, the Australian National Maritime Museum, the Science Museum of Barcelona, the Art Gallery of Windsor, Canada, and the Hong Kong Space Museum.

A rolling programme of preventative conservation continues. In particular, the conservation work on the five 'Red' *Discovery* photograph albums is almost complete. The photographs have been scanned and can now be viewed without damaging the originals. The albums themselves have been rebound and are housed in appropriate conservation quality boxes. The Friends of SPRI have generously agreed to fund further conservation work. Similar work will be carried out on the exceptionally important album of photographs taken by Herbert Ponting on Captain Scott's British Antarctic Expedition 1910–13.

**Lucy Martin**

## **World Data Centre for Glaciology, Cambridge**

Acquisition, cataloguing, and indexing programmes have also continued at World Data Centre for Glaciology, Cambridge, which is set within the Institute library. 180 monographs have been added to the collection and 1444 records added to the in-house database SPRILIB. In addition to the processing of current literature, cataloguing of the historic Seligman collection of pamphlets has continued to make good progress. The WDCGC website was transferred to a new server offering a considerable increase in capacity. This has enabled the database ICE AND SNOW to be reloaded with over 37,000 entries. Its address is now: <http://www.spri.cam.ac.uk/resources/sprilib/icesnow/>. The Directory of European Glaciology at <http://wdcgc.spri.cam.ac.uk/directory/> posts completed directories for Austria, Denmark, Finland, France, Germany, Iceland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom, together with international organizations involved in glaciology. The entry for Sweden is new this year, and most entries have been updated.

**Sally Stonehouse**

## **Archives**

The Archives, held in temperature and humidity controlled conditions in the Institute, continue to be a World-renowned resource for scholarly studies of the polar regions and their explorers. Among the readers were several completing biographies of polar explorers: among the subjects were Apsley Cherry-Garrard, Robert Falcon Scott, Scott's northern party, Ernest Shackleton and Lawrence Oates. Several books also appeared during the year, in which the Institute is acknowledged for access to its archives of polar diaries, logs and other records.

For the first time, funding has been obtained to support employment of staff to assist the Archivist: an assistant archivist, funded by Archives Hub; and an Archives assistant, funded by the Gladys Krieble Delmas Foundation. Archives Hub is a national initiative enabling repositories within higher education institutions to post listings of their holdings on the Internet. The entry contributed by the Institute for the Scottish National Antarctic Expedition (W.S. Bruce, 1902–04) was highlighted as 'Collection of the Month' in January 2003. The flood of acquisitions concerning Sir Ernest Shackleton has led to a significant backlog of unprocessed material. These items are now being catalogued with the aid of the archives assistant, a preparatory phase of *Virtual Shackleton*, a planned website that will illustrate the explorer's life and expeditions with images of primary materials held by the Institute.

The Antarctic Heritage Trust, the Friends of the Institute, and several other sources were most helpful in purchasing items of polar interest for our collections at Christie's recent sales. The continuing generosity of individuals to the Institute was also demonstrated in several gifts. One among these was the conversion of a long-term loan of many documents from the Wordie family into a gift outright. This includes some first class 'Shackletoniana,' further augmenting the holdings of this important and broad collection.

In February, a representative of the Public Records Office, acting for the Master of the Rolls, inspected the Institute's holdings of records from the Government of South Georgia and the South Sandwich Islands. This is conducted about every six years and, as previously, the preservation and availability of the records was highly commended.

**R.K. Headland**

## **Institute WWW Site**

The Institute's website, at [www.spri.cam.ac.uk](http://www.spri.cam.ac.uk), is an increasingly important way in which we communicate our research and library and information services externally. It is also a gateway for finding out about and contacting members of our staff. In this context, the Institute web site was completely redesigned and restructured in the later part of 2002. The site is now located on a new high-performance webserver. It contains much new information on our research aims, structure and publications. It also provides a point of access to the many resources and online databases we hold concerning the polar regions. For example, it is our aim to make catalogues of our archival material and collections of historical photographs accessible on the web

As part of the reorganisation of SPRI's website, the sites for the International Glaciological Society and the World Data Centre for Glaciology, Cambridge, have been moved to their own dedicated domain names, at [www.igsoc.org](http://www.igsoc.org) and <http://wdcgc.spri.cam.ac.uk>, respectively. These sites, together with the website of the Scientific Committee on Antarctic Research, [www.scar.org](http://www.scar.org), are now hosted on our new webserver.

**Martin Lucas-Smith**

## **NERC Arctic Science Advisor**

The Natural Environment Research Council (NERC) seconded Professor Liz Morris to the Institute from the British Antarctic Survey as NERC Arctic Science Advisor. Her role is to help develop and facilitate new Earth Systems Science initiatives which require Arctic expertise and to provide a focal point for UK research activities in the Arctic. A highlight of last year was the meeting on 'Climate Change, the Arctic and the United Kingdom: directions for future research' at the Tyndall Centre in May. The objectives of the meeting were to bring together key members of the UK Arctic research and policy-making communities in order to identify important knowledge gaps and assist in formulating the UK's future research effort in the Arctic. The meeting was most successful in raising the profile of Arctic research within NERC and a series of further activities are now underway.

**Liz Morris**

## ***Polar Record***

Four issues of *Polar Record* were published by Cambridge University Press during 2002, and the journal continued under the editor, Dr Beau Riffenburgh, and the assistant editor, Dr Liz Cruwys, as an internationally refereed journal of polar research for the sciences, social sciences, and humanities. Dr Peter Clarkson and Mrs Ailsa Macqueen also made valuable contributions to the journal during the year. An arrangement was made with Cambridge University Press whereby the Press would take over ownership of the journal from January 2003. The office for *Polar Record* will continue to be located at the Institute, and the editor will continue to work from there.

**Beau Riffenburgh**

## Teaching, Learning and Understanding

***Institute staff contribute to teaching in Cambridge University at undergraduate and graduate levels. Considerable attention is also given to stimulating public interest in the Arctic and Antarctic through media work, public lectures and visits by schools to our polar museum.***

### University Teaching

As part of their University responsibilities, members of the Institute's academic staff give lectures in undergraduate courses in Geography, Physics and Social Anthropology. In addition, undergraduate supervisions are given to students in many colleges. Members of our staff are Fellows of Christ's, Churchill, Darwin, Downing, Jesus, St Catherine's and St John's colleges. Masters students are taught by seminar and on a one-to-one basis in our Master of Philosophy course in Polar Studies, which has academic threads emphasising Physical Science and the Social Sciences and Humanities. Two students entered the course this year. The Institute has 20 doctoral students, spread across topics from physical processes at the margins of Icelandic glaciers, to investigations of reindeer herding in Siberia. Each student is nested within one of our research groups. Our seminar series in Polar Physical Science and Social Science and Humanities run throughout the academic year, and attract colleagues from a number of university departments to hear a wide range of internal and external speakers.

### Projecting the Significance of the Polar Regions

Staff of the Institute continue to be involved in a number of varied activities concerning the projection of the polar regions into the wider community. A number of radio and television programmes sought interviews and broadcasts with staff. Views and quotes from staff on polar topics also appeared in newspapers and journals, including *The Times* and *Science*. Historical photographs were also supplied to the print media from our extensive collections. The events of National Science Week included a presentation of four historic films, which were introduced with an historical account. A number of external bodies held meetings and academic workshops in the Institute lecture theatre and seminar room, often with staff involvement. For example, the International Association of Antarctica Tour Operators held its annual meeting in the Institute this year, emphasising the linkage between Antarctic tourism and the natural environment of Antarctica. We also run a regular series of Saturday Evening Lectures on polar topics which are open to the general public and usually attract audiences of between 60 and 100.

### SPRI Museum

The Institute's Museum continues to introduce the Arctic and Antarctic, and to project the history of polar exploration, to the general public and to school parties. Two special exhibitions were arranged during the year: a photographic display by Wim van Passel, with support from the Royal Dutch Embassy, ran from October to April. A display of the charts and maps of the peri-Antarctic islands was then arranged to coincide with the annual meeting of the International Association of Antarctica Tour Operators.

A museum attendant has been supported by the Friends of the Institute this year. This has greatly improved variety of polar-related books on sale, and the stock of other materials for the Museum shop, especially relating to children, has also been augmented considerably. The work of computerizing the records of the Museum holdings has also proceeded during the year. Several gifts and long-term loans of items also were received. A notable one was a brass plaque of Lawrence Oates given by the old Worcesters. An oak bookcase that held the library of Scott's *Terra Nova* was also given.

Discussions have also begun in the Institute about the redesign and refurbishment of the Museum in order to further enhance its role in the public understanding of the polar regions, past, present and future.

**R.K. Headland**

### **Expedition Support: Gino Watkins and Edward Wilson Funds**

The Gino Watkins Memorial Fund, under the joint trusteeship of the University of Cambridge and the Royal Geographical Society, gives grants towards expeditions that meets its objectives of guiding and inspiring enterprising young people towards scientific research and exploration in the polar regions. The Edward Wilson Fund also supports these aims, and emphasizing investigations of high-latitude fauna and flora.

The Committee of Managers of the Fund thank the Augustine Courtauld Trust for their generous contribution of £7000. The members of the Committee who served during the year were: Mr D. Fordham, (Chairman), Dr I. Campbell, Mr R. Crabtree, Dr L. Craig, Professor J. Dowdeswell, Dr P.F. Friend, Dr J. Heap, Professor M. Lea, Mr J. Lowther, Mr J. Muston, Professor R.C. Schroter, Dr B. Stonehouse and Mr N. Winsor.

The Committee made the following awards for 2002:

#### **Gino Watkins Fund (\*including £100 from the Arctic Club)**

Watkins Mountains to Kuummiut, East Greenland	£1200
Greenland East Coast Kayak Expedition	£750
Lemon Mountains Expedition	£750
University of Glasgow, Tungnafellsjökull Expedition	£1200
University of Sheffield Svalbard Expedition	£750
Cambridge Greenland Glaciology Expedition*	£1300

#### **Edward Wilson Fund**

Hornsund Little Auk Expedition	£500
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## External Contributions to Polar Activities

*Our academic staff play a number of important roles in helping to set the international academic agenda for polar science through their invited participation on national and international committees and working groups. The Institute is also pleased to host the secretariats of the International Glaciological Society and the Scientific Committee on Antarctic Research.*

### National and International Roles of Staff

Members of the Institute are active in many roles relating to national and international committees and advisory groups involving the polar regions. These include:

- UK Delegate to the Council of the International Arctic Science Committee (IASC)
- President, International Glaciological Society
- Chair of the UK National Committee on Antarctic Research
- UK Alternate Delegate to the Council of the Scientific Committee on Antarctic Research (SCAR)
- President, International Commission on Snow and Ice (ICSI)
- Head of the Glaciers and Ice Sheets Division of the International Commission for Snow and Ice (ICSI)
- Chair of the NERC Review Committee for the Challenger Division of Southampton Oceanography Centre
- Chair of Steering Committee for NERC British Ocean Sediment Core Repository (BOSCOR) facility
- Member of NERC Research Ship Unit Advisory Panel
- Steering Committee member of the European Science Foundation (ESF) programme on the Quaternary of the Eurasian North (QUEEN).
- Member of Hadley Centre Scientific Steering Group
- Trustee of the Kapitza Trust
- President of International Association for the Physical Sciences of the Ocean commission on Sea Ice
- Member of NASA Sea Ice Algorithm Working Group
- Member of UK Committees for World Ocean Circulation Experiment and Global Ocean Observing System
- Secretary and Treasurer of Polar Libraries Colloquy
- UK representative on the International Arctic Science Committee (IASC) working group on Arctic Glaciers.

### International Glaciological Society

The International Glaciological Society (IGS) is based at the SPRI, from where it undertakes publishing activities, organises symposia and serves the worldwide community of glaciologists. It is the international scholarly society for glaciology and has about 850 members. During 2002, the IGS published four issues of the *Journal of Glaciology*, three issues of *ICE*, its news bulletin, and two volumes of the *Annals of Glaciology*. The Society also sponsored two meetings. The International Symposium on Fast Glacier Flow was held in Yakutat, Alaska, 10–14 June 2002 and The International Symposium on Physical and Mechanical Processes in Ice in Relation to Glacier and Ice-Sheet Modelling was held in Chamonix Mont-Blanc, France, 26–30 August 2002. Glaciology-related symposia were also co-sponsored at the European Geophysical Society XXVII General Assembly, Nice, France, 22–26 April 2002. The Society actively promotes the exchange of information and ideas on all aspects of snow and ice. Details on the IGS and its activities are available from its website (<http://www.igsoc/home.htm>),



hosted by SPRI. During 2003, Dr Simon Ommanney will retire as Secretary General in 2003 and be succeeded by Dr Magnús Már Magnússon, who is currently with the Icelandic Meteorological Office.

**Dr Simon Ommanney (Secretary General)**

### **Scientific Committee on Antarctic Research**

The Scientific Committee on Antarctic Research (SCAR) of the International Council for Science (ICSU) is hosted by the Institute. New office space within the Institute is being provided to provide space for some expansion of the SCAR Secretariat. This will provide up-graded accommodation for the Executive Secretary and an additional office for a third person in the Secretariat when an appointment is made during 2003.

In June, SCAR was awarded the prestigious Prince of Asturias Prize for International Cooperation 2002 in recognition of SCAR's achievements in the field of international cooperation in Antarctica. The prize was presented at a special ceremony in Oviedo, Spain during October. A major activity for the secretariat was the organisation and attendance at the XXVII SCAR meeting held in the Shanghai Exhibition Centre in the Pudong area of the city. This was an important meeting for SCAR at which the new organizational structure was put into effect. The former Working Groups and Groups of Specialists were formally closed and three new Scientific Standing Groups were established, each with several new subsidiary groups.

**Dr Peter Clarkson (Executive Secretary)**

### **Acknowledgements**

The Institute would like to acknowledge the support in the last year of:

Tony Billingham  
Jean Crutwell  
Barbara Debenham  
Angela Haines  
Percy Hammond  
Deirdre Hanna  
Jennifer Hirsch  
Pat Little  
Ailsa McQueen  
David Powell  
John Reid  
Larry Rockhill  
Bernard Stonehouse  
Sally Stonehouse  
Winifred Ware

## Fundraising and the SPRI Appeal

*Securing the long-term future of our outstanding Archival, Museum and Library collections is the driving force behind our Appeal. Funds will be used to secure permanent staff appointments, such as a new Museum and Education Officer, and to redesign and refurbish our polar museum.*

### Friends of the Scott Polar Research Institute

The Friends had another successful year, supporting the activities of the Institute, and were once again able to make a donation to projects for the Library, Picture Library, Archives and Museum. Interest in the Friends continues, with a steady flow of new members maintaining the membership at around 520. They also contributed towards the acquisition of polar artefacts in the Christies sale in September 2002. The Summer Lunch and Autumn Buffet were well attended and much enjoyed. The Summer Lunch has, for several years now, been held at Girton College but it has been suggested that we have a change in 2003 and hold the lunch at the Institute so that the library and museum can be viewed.

As this is my last report as Chair of the Friends, I would like to take the opportunity to thank Institute staff for all the help they have given me over the years. Special thanks, however, go to all the staff in the Institute office, the three Directors I have served with John Heap, Keith Richards and Julian Dowdeswell, to William Mills and Bob Headland, and to Friends helpers Sally Stonehouse, Anne Todd and Tony Billingham. I have appreciated the help, encouragement and support they have given to me and the Friends during my time as Chair. I would also like to take this opportunity to wish Dr David Wilson every success as the next Chairman of the Friends.

**Philippa Foster Back (Chair, Friends of the Polar Institute)**

### Appeal for the SPRI Archives, Museum and Library

The Scott Polar Research Institute is home to unrivalled resources for polar information and expertise, housing the world's largest polar library, Britain's only polar museum, and a national repository for polar archives that speak evocatively of some of the most memorable episodes in polar exploration. The Institute's Archives, Museum and Library provide members of the general public, as well as scientists, government bodies, industry and polar inhabitants with important information on a variety of polar topics, including climate change, management of natural resources and historic polar expeditions. In this way, the Institute helps to educate a worldwide audience about the polar regions. In order to ensure that the Institute's resources continue to be widely accessible and to promote the understanding and responsible use of the polar regions, the Institute is seeking £5.2 million through an Appeal.

Funding is being sought to secure the future of the Institute's Archives, Museum and Library and to promote their future development. Our plans involve, first, establishing a new post of Museum and Education Officer, in order to maximise the educational benefits of the Museum, which will also be redesigned and refurbished as part of the Appeal. Secondly, we wish to provide permanent security for the important post of Institute Archivist, which has until now been supported by a series of short-term grants; an inherently unstable position. Thirdly, we wish to underpin the posts of three half-time Area Specialists within the Library, whose roles are essential to maintain the comprehensive polar acquisitions and translation programmes that we operate for Antarctica, the Russian North and Scandinavia.

Further information on the Appeal is available from Professor Julian Dowdeswell, the Director, or William Mills, our Librarian and Keeper of Collections.