

Scott Polar Research Institute Review 2010

84th Annual Report of the
Scott Polar Research Institute
University of Cambridge, UK

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Scott Polar Research Institute
University of Cambridge



**UNIVERSITY OF
CAMBRIDGE**

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Director's Introduction

2010 begins the centenary period of Captain Scott's *Terra Nova* expedition to Antarctica (1910-13). Our aim was to reopen the redesigned and refurbished museum of the Scott Polar Research Institute to coincide with the hundredth anniversary of the start of the expedition in June 1910. Beginning in January, an entirely new suite of display cases and associated text panels was installed, allowing us to exhibit around 30% of our holdings, as compared with only about 5% in the old museum. The overall theme of the new museum is 'exploration into science'. Specific displays include the indigenous peoples of the circum-Arctic, the exploration of the Canadian Northwest Passage and the 'Heroic Age' of Antarctic exploration; in addition, there is a new focus on the contemporary significance of the polar regions and their wider influence on the global climate system. The latter allows us to project much of our own scientific work in the Arctic and Antarctic to the wider public. Importantly, during 2010 we have succeeded in raising the £800,000 required to match the Heritage Lottery Fund award of almost £1 million towards the renovation of the Polar Museum. The generosity of a number of individual donors, together with private trusts and foundations, has made this possible; we thank all of them for their support.

Their Royal Highnesses the Earl and Countess of Wessex, along with almost one hundred guests, were at the Institute for the formal opening of the new Polar Museum in June. Also among the first to visit the museum were over one hundred descendants of those who took part in the *Terra Nova* expedition, who visited the Institute for a day of talks about the history of the expedition and its scientific legacy.

Since the reopening, visitor numbers have more than tripled, reaching over 25,000 in the initial six months. The refurbished galleries include both permanent displays and space in the foyer for special exhibitions. The latter have included an exhibition of Inuit Art, supported in part by a grant from the Heritage Lottery Fund's Collecting Cultures scheme and by generous loans of Inuit sculptures from the collections of Ken Mantel, Bill Johnstone and several other British collectors. A companion exhibition of Inuit sculptures and prints took place in Canada House, London, in collaboration with the Canadian High Commission. The exhibition of a selection of Antarctic landscape paintings and portraits by the well-known Australian artist Sidney Nolan completed a very successful year.

In research, too, the Institute has hosted several international meetings. These included the 11th Circumpolar Remote Sensing Symposium, organised by Dr Gareth Rees, and a NATO Advanced Workshop on environmental security in the Arctic Ocean coordinated by Dr Paul Berkman. Abroad, a number of our academic staff and research students presented papers and posters at scientific gatherings, including the annual European Geosciences Union meeting in Vienna and the American Geophysical Union fall meeting in San Francisco. Such meetings give our students in particular important opportunities to present their work to an international audience.

Field research projects have also taken place in several parts of the Arctic during 2010. In the spring Prof. Liz Morris led a campaign on the Greenland Ice Sheet to measure snow density profiles as a



TRH The Earl and Countess of Wessex meet SPRI Staff at the opening of the Polar Museum

The Director and HRH The Earl of Wessex at the opening of the new Polar Museum in June 2010



calibration of satellite radar returns from CryoSat-2. This work was funded by a grant from the UK Natural Environment Research Council, who has also awarded almost £1 million to support airborne radar investigations of the bed of the Greenland Ice Sheet to be led by the Director in 2011 and 2012. Glaciological research teams from the Institute also worked in Iceland and Spitsbergen during the summer, and several students were in Siberia undertaking social science research. Among our research students, Evelyn Landerer was the first recipient of the newly instituted Frederick Soddy Award from the Royal Geographical Society, which funded her fieldwork with reindeer herders in eastern Siberia. An extensive list of publications, given later in the Review, is evidence that this field research activity is followed up by the continuing analysis, interpretation and publication of our findings, making them accessible to the wider community of scholars and beyond.

An important gift to the Institute, generously donated in the will of the late Lady Philippa Scott, who sadly died in January, was the silver model of Captain Scott's *Terra Nova* given to Sir Peter Scott shortly after the expedition in recognition of his father's achievements. The ship is presently undergoing conservation before going on display in the Polar Museum. The family of Orpheus Jacovides donated in his memory a number of important works by Henry Evaluardjuk, including an outstanding self-portrait. Bill Johnstone also placed several beautiful Inuit sculptures on long-term loan. Our collections of artefacts, art works and documents continue to grow, and I thank all those who have made donations during the year.

Further afield, the Institute loaned a number of

artefacts, documents and paintings to a major exhibition on Scott and Amundsen which opened at the American Museum of Natural History in New York during May. Another important initiative, a joint venture with the Belgian fine-art publisher Salto Ulbeek, is a limited-edition portfolio of 48 photographic prints from the *Terra Nova* expedition, produced using the platinum process from scans of Herbert Ponting's original glass-plate negatives. The prints and portfolio have been exhibited in several locations, including the Empty Quarter Gallery in Dubai, where the Director spoke at the launch in December. The scientific work of the Institute has also been projected at home and abroad through newspapers, radio and television, with the Director taking part in a programme about Antarctica in Radio 4's 'In Our Time' series.

It is, once again, a pleasure to record my thanks to the staff of the Scott Polar Research Institute for the time and commitment that they have shown in making possible the breadth of work that we undertake. In particular, great efforts have been made this year by all those who have contributed to the Polar Museum project. In addition, our group of over 40 trained museum volunteers has provided an informed welcome to visitors since the museum reopened. Congratulations also go to Dr Peter Clarkson for the award of an MBE by HM The Queen in the New Year Honours List for services to Antarctic science.

Professor Julian Dowdeswell

Institute Staff

Senior Academic and Related Staff

Professor Julian Dowdeswell	Director and Professor of Physical Geography
Dr Neil Arnold	University Lecturer
Dr Paul Berkman	Senior Research Associate
Dr Michael Bravo	University Senior Lecturer
Dr Poul Christoffersen	University Lecturer
Mrs Heather Lane	Librarian and Keeper of Collections
Professor Elizabeth Morris, OBE	Senior Research Associate
Dr Gareth Rees	University Senior Lecturer
Dr Ian Stone	Editor, <i>Polar Record</i>
Dr Piers Vitebsky	Assistant Director of Research
Dr Ian Willis	University Senior Lecturer

Research Staff

Mr Toby Benham	Research Associate
Dr Marion Bougamont	Research Associate
Mrs Evelyn Dowdeswell	Research Associate
Dr Janne Flora	Research Associate
Dr Marga Garcia	Research Fellow
Dr Kelly Hogan	Research Associate
Dr Stephen Pax Leonard	Research Fellow
Dr Huw Lewis-Jones	Research Associate (to April)
Dr Shane McCorristine	Research Fellow (from October)
Dr Ruth Mugford	Research Associate
Dr Olga Ulturgasheva	Research Fellow

Library, Archive and Museum Staff

Ms Katherine Antoniw	Education and Outreach Officer
Ms Naomi Boneham	Archives Manager
Ms Fiona Cahill	Conservator
Mrs Georgina Cronin	Library Assistant (from November)
Ms Janette Dutton	Documentation Assistant (to December)
Mr Mark Gilbert	Library Assistant (to September)
Mr Bryan Lintott	Exhibitions Officer
Ms Lucy Martin	Picture Library Manager
Ms Shirley Sawtell	Information Assistant
Ms Hilary Shibata	Antarctic Bibliographer
Ms Willow Silvani	Documentation Assistant
Mr Robert Smith	Museum Project Manager
Ms Rebecca Stancombe	Library Assistant
Mrs Isabella Warren	Russian Bibliographer
Mr Jeremy Wong	Arctic Bibliographer

Support Staff

Ms Rosie Amos	Saturday Museum Assistant (from June)
Mrs Danielle Feger	Administrator
Mrs Kate Gilbert	Director's Assistant/Institute Administrator
Ms Jamie Horsley	Administrator
Mr Nathan Huxley	Maintenance
Ms Marion Jeffries	Maintenance
Ms Claire Lampitt	Receptionist/Secretary
Mr Martin Lucas-Smith	Web Manager
Mr Matt Nelson	Computer Officer (to October)
Mrs Maria Pearman	Senior Clerk
Mr Roy Smith	Maintenance

Doctoral Students

Ms Christine Adcock
Ms Narelle Baker
Ms Alison Banwell
Mr Kelly Dolan
Ms Amy Donovan
Mr Peter Evans
Mr Jorge Guzman
Ms Tania Kossberg
Ms Evelyn Landerer
Mr Adrian McCallum
Ms Jackie Price
Mr Martin O'Leary
Mr Allen Pope
Mr Tim Reilly
Mr Cameron Rye
Ms Katya Shipigina
Mr Laur Vallikivi
Ms Claire Warrior

M.Phil. Students

Ms Catherine Baggs
Ms Christine Batchelor
Ms Tertio Kreuzmann
Ms Robert Plews
Mr Sven-Roald Nysto
Ms Phoebe Robinson

M.Litt. Students

Mr William Eucker
Ms Dinah Molloy Thompson

Other organisations based at SPRI

World Data Centre for Glaciology, Cambridge

Mr Rick Frolich

Manager

International Glaciological Society

Dr Magnús Már Magnússon
Mrs Linda Gorman

Secretary General
Assistant to the Secretary General (to November)

Scientific Committee on Antarctic Research

Dr Colin Summerhayes
Dr Michael Sparrow
Dr Renuka Badhe
Mrs Rosemary Nash

Executive Director (to March)
Executive Director (from April)
Executive Officer
Senior Clerk

Institute Associates

Dr John Ash
Dr Lawson Brigham
Dr Liz Cruwys
Dr Fiona Danks
Dr Bob Hawley
Mr Robert Headland
Mr Keith Hill (to September)
Dr Neil Kent
Dr Elena Khlinovskaya Rockhill
Dr Beau Riffenburgh
Dr Florian Stammer
Dr John Tichotsky
Dr Olga Tutubalina
Dr Emma Wilson

Emeritus Associates

Dr Peter Clarkson, MBE
Mr Michael Gorman
Mr Harry King
Dr Simon Ommanney
Professor Larry Rockhill
Dr Bernard Stonehouse
Dr Colin Summerhayes (from April)
Dr Charles Swithinbank
Dr Janet West
Professor Peter Williams

Polar Research

Research Group Structure

The research work of the Institute continues to focus around its 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 number of externally funded research grants, which are listed below. The groups are:

- Glaciology and Climate Change
- Glacier-Influenced Marine Sedimentary Environments
- Polar Landscapes and Remote Sensing
- Anthropology and Russian Northern Studies
- Circumpolar History and Public Policy
- Arctic Ocean Geopolitics

Institute staff organise seminar series in both polar physical sciences and social science and humanities. Speakers from universities and research centres in the UK and overseas, together with Cambridge colleagues, have contributed during the year. The seminars are well attended by staff and research students from a number of Cambridge departments and from, for example, the British Antarctic Survey. A selection of the physical and social science research projects in which we are currently engaged is outlined briefly below.

Crevassed surface of the Greenland Ice Sheet with protruding mountains





Four C - 130 aircraft on the sea ice runway in McMurdo Sound, Antarctica

Polar Physical Science

Detecting lake change in the permafrost-influenced wetlands of northern Alaska

This project aims to determine whether lakes in Alaskan wetlands are changing in response to warming of permafrost, which has been 3-4°C since 1985 in this region. An automatic method has been developed to determine the number and cumulative area of wetland lakes in satellite imagery; the results show major recent change. The number of lakes and their cumulative area were similar in 1980 and 1990, but lakes grew and became more frequent in 2000. In the drainage basin of the Kuparuk River, our main study site, we found cumulative lake area growth from 694 km² in 1990 to 819 km² in 2000; an 18% increase. Overall, more than 5,000 lakes

had shrunk, whereas almost 30,000 had increased in size. We are currently mapping lake changes after 2000 to determine whether such growth continues. A numerical model of permafrost is being developed which will be used to establish whether lake growth is a result of permafrost thaw. Degradation of permafrost and lake growth may result in significant methane emissions due to the carbon-rich nature of Arctic wetlands. The project is funded by Eni S.p.A.

Poul Christoffersen, Julian Dowdeswell, Toby Benham and Ruth Mugford

Under-wing antenna for ice-penetrating 60 MHz radar system, McMurdo Station, Antarctica



Hydrology of the Greenland Ice Sheet

There is growing interest in the “plumbing” of the Greenland Ice Sheet; in particular, how meltwater is delivered from the surface into the ice sheet and how it influences basal water pressures and ice sheet dynamics as the water makes its way to the ice sheet margin. We are currently developing an ice sheet hydrology model and applying it to the Paakitsoq / Swiss Camp region of West Greenland. Our model uses local climate data to calculate patterns of snow accumulation and, using an energy-balance approach, patterns of melt. Snow hydrology and open channel flow theory are then used to route the water through snow and across ice to surface lakes. We are currently testing the surface melt / routing component

of our model against existing field data and satellite imagery. Field data include long-term measurements of surface lowering from which we calculate snow and ice melt. Satellite data consist of Landsat and MODIS imagery to classify patterns of snow and ice cover. We are also developing algorithms to calculate lake surface areas and water depths from satellite imagery. The work is being undertaken with PhD student Alison Banwell and Masters student Alex Messerli, and in collaboration with Andreas Ahlstrøm (Geological Survey of Denmark and Greenland) and Marco Tedesco (City College of New York).

Ian Willis and Neil Arnold

Past ice-sheet flow east of Svalbard inferred from streamlined subglacial landforms

The pattern of full-glacial ice flow about 20,000 years ago in the northern Barents Sea is not well known, due mainly to a lack of marine data east of Svalbard. Several years with little summer sea ice have allowed acquisition of swath-bathymetric imagery of well-preserved subglacial landforms characterising Late Weichselian ice-flow directions over ~150,000 km² of the northwestern Barents Sea. A major ice dome was located on easternmost Spitsbergen or southern Hinlopen Strait, at least 500 km west of its previously inferred position in the northern Barents Sea. This dome controlled the regional flow pattern; ice flowed eastward around Kong Karls Land into Franz Victoria Trough and north through Hinlopen Strait. An ice dome west of Kong Karls Land is required to explain

the observed ice-flow pattern, but does not preclude an additional ice dome to the southeast. Discrepancies with earlier ice-sheet reconstructions reflect the lack of previous seafloor observations, with evidence limited mainly to past ice loading and postglacial rebound. The new pattern of ice-flow directions shows predominantly eastward rather than northward flow, with Franz Victoria Trough a major drainage pathway with a full-glacial balance flux of >40 km³ per year. This work is collaborative with Colm Ó Cofaigh (Durham), Jeff Evans (Loughborough), Riko Noormets (UNIS) and Dag Ottesen (Norwegian Geological Survey).

Julian Dowdeswell and Kelly Hogan

Modelling iceberg-rafted sedimentation in high-latitude fjords

A numerical model, *SedBerg*, has been developed to simulate sedimentation from icebergs in high-latitude glaciated fjords. Sediments deposited in fjords provide an important record of glaciological response to changing climatic conditions. The model simulates the formation, drift, and melt of a population of icebergs utilizing Monte Carlo based techniques with a number of underlying probability distributions to describe the behaviour of iceberg formation and dynamics. The model captures iceberg dynamics and melting in fjord environments and has been applied to Kangerlugssuaq Fjord in East Greenland; an example of an iceberg-dominated

sedimentary environment. Sedimentation has been simulated over the past 1500 years, encompassing the climatic intervals of the Medieval Warm Period and the Little Ice Age of the past few centuries, which terminated about 100 years ago. Model results have been compared with the observed sedimentary record in the fjord. The model demonstrates that the glaciological regime plays a more important role than the direct influence of climate (such as ocean and air temperatures) on iceberg sedimentation. This research has been published recently in the *Journal of Geophysical Research*.

Ruth Mugford and Julian Dowdeswell

CryoSat

SPRI continues to participate in an international programme to calibrate data collected by a new radar altimeter (SIRAL) carried on the CryoSat-2 satellite, launched this year. The first of the post-launch field activities was a repeat traverse along the Expedition Glaciologique Internationale au Groenland (EGIG) line across the Greenland Ice Sheet. As in 2004 and 2006, measurements of snow density profiles were made using

an automated neutron profiling system but, for the first time, an 800 km round trip from Summit Station was also undertaken. This allowed measurements of summer densification of surface snow over short time periods to be made. A paper on snow densification in Greenland was presented at the 2010 American Geophysical Union Fall Meeting and is being prepared for publication.

Liz Morris

Snow mechanics

Adrian McCallum is completing his doctoral thesis on the mechanical properties of snow. Field studies of the strength of snow on the Brunt Ice Shelf in Antarctica have shown that a commercial cone penetrometer system can provide useful data on the fracture strength of undisturbed polar snow and of snow roads and runways prepared using

heavy machinery. Cone penetration tests reveal strong and weak layers in natural snow and the effect of various techniques for forming hard pavements by reworking and compressing the surface snow. The work has been presented at conferences in California and Perth, Australia.

Liz Morris

Spectral and physical characterisation of glacier surfaces

Airborne multispectral remote sensing data were used to determine spatial variations in the physical properties of glacier surfaces. Quantitative analysis has been carried out on multispectral imagery from Langjökull, Iceland, and from Midre Lovénbreen, Svalbard. In July and August we undertook fieldwork on Midre Lovénbreen, collecting detailed spectral reflectance data on a number of ice and snow surfaces using an ASD Fieldspec 3 spectroradiometer loaned to us by the Natural Environment Research Council.

We also collected data on the physical state of the glacier surface, particular snow density and grain size. These data are being used to link the physical and spectral properties of the ice surface and to scale up the results to the resolution of airborne imagery (a few metres) and, ultimately, to that of satellite data (tens of metres).

Allen Pope, Neil Arnold, Ian Willis and Gareth Rees

The validation of British Arctic whaling information, 1750-1850

During the 18th and 19th centuries, the British whaling industry was conducted from over 30 ports. Information from the industry is still scattered, unconsolidated and without a central repository. This project makes use of primary data extracted from contemporary documents such as ships' logs, journals, voyage listings, maps and pictures sourced from archives, museums, public and private collections and port authorities throughout Britain. Data from voyages of the Whitby scientist and whaler William Scoresby Jr. provide a baseline for comparison with those of a contemporary group of other Hull whalers.

Scoresby's navigational observations are matched against present-day charts. His seasonal ice drift observations are tested against his own records of wind vectors, confirming a high standard of reliability. A test sample of 20 logs from 1810 to 1820 is used to examine topics such as navigation, wind strengths and directions, sun, ice and weather observations. The vocabulary to express ice and wind observations shows a level of consistency indicating a similarity between ports and masters.

Dinah Molloy Thompson and Gareth Rees

Sediment corer used to sample the sea-floor, deployed in a Greenland fjord



Polar Social Science and Humanities

Adolescent pathways to adulthood around the indigenous Arctic

This project, funded by the US National Science Foundation, examines shared and divergent stressors and resilience strategies among young people from communities among the Alaskan Inupiat, Alaskan Yup'ik, Canadian Inuit, Norwegian Sami and Siberian Eveny. The focus is on how rapid social change is manifested in the changing expectations and challenges which young indigenous people face in a world very different from that of their parents and grandparents. At a planning meeting held at SPRI, youth, adult and elder community members and university researchers established a shared set of cross-site research questions and data collection strategies to use throughout the circumpolar region, covering interviewing, data collection, analysis procedures and local dissemination of findings. The event allowed indigenous youth and adults from each community to articulate their own social experiences while encountering and communicating with people from other field sites. It generated new ideas about

how to pursue collaborative inquiry across cultural, national and disciplinary boundaries. Fieldwork was conducted in Alakanuk (Alaska, USA), Kotzebue (Alaska, USA), Igloodik (Nunavut, Canada), Topolinoye (Yakutia, Russia) and Kautokeino (Finnmark, Norway). Data collection has been completed in all sites, and the project has entered a stage of data translation, transcription, collaborative analysis and dissemination. The resilience strategies identified among youth will be used by the communities for programmes and policies to develop youth well-being. Community elementary and high schools are starting to use the findings for prevention of youth suicide.

Olga Ulturgasheva and Piers Vitebsky

BOREAS - International research programme in Arctic Humanities and Social Sciences, European Science Foundation

The BOREAS programme, subtitled 'Histories from the North - environments, movements, narratives' and launched in 2006, came to a successful conclusion in 2010. It was initiated at SPRI by Dr Piers Vitebsky, who also chaired the scientific committee on behalf of the European Science Foundation (ESF) in Strasbourg. With a budget of 6 million euros, BOREAS is the largest programme ever funded for humanities research (including social science) in the Arctic. The ESF coordinated funding from Canada, Denmark, Estonia, Finland, Iceland, Norway, Poland, Sweden, and the United States, with additional associated partners in Belgium, France, Germany, Russia, Switzerland, and the UK. The circumpolar reach of the Arctic allowed and encouraged funding agencies from the USA and Canada to collaborate formally with the ESF for the first time. Compared with North America, European humanities researchers on the Arctic are widely scattered and without strong institutional support, and BOREAS has made a significant contribution to building capacity and team strength in Europe. As well as making distinctive contributions to the wider field of the humanities themselves, BOREAS complemented the International Polar Year with a distinctive agenda to enable the humanities to collaborate more effectively with the better funded and better institutionalised natural sciences. Another ambition of BOREAS was to make a significant global contribution to the wider humanities disciplines by 'de-provincialising' Arctic research, so that the Arctic becomes a better known locus for regional studies, on a par with India, Latin America or Africa. Current discourses

about global environmental change, human adaptation, international partnership and regional sovereignty largely ignore northern cultures, which are numerous and diverse. BOREAS is named after the Greek god of the North Wind and the programme emphasises the fact that the Arctic, unlike the Antarctic, is virtually all inhabited, with a long and complex history of human adaptation in which the land and the sea have been traversed, named and known for millennia. The most strongly represented disciplines have been anthropology, archaeology, history, geography and demography, but BOREAS has also encouraged further capacity-building in core humanities disciplines such as literature, linguistics and philosophy. Numerous conferences and workshops were held throughout the Arctic and beyond. As well as hosting meetings in Cambridge, SPRI formally co-organised conferences in Halle (Germany), Rovaniemi (Finland), and (jointly with the Russian Academy of Sciences) in Novosibirsk. Details of BOREAS projects can be found at www.esf.org/boreas, which includes a 44-page list of publications arising from the programme.

Piers Vitebsky

Dilemmas of state-induced migration in the Russian North

This project studies current state-induced migration in the Russian North linked to the recent collapse of northern living standards, and the future viability of northern industrial communities. With field sites in the Vorkuta and Magadan regions, researchers examined problems of individual agency and community fabric during rapid de-industrialisation and managed depopulation under World Bank and Russian Government restructuring initiatives to relocate up to 600,000 non-indigenous residents back to Moscow and the Russian "South." This policy marks a critical retreat from earlier Soviet policies of northern development through mass settlement, with profound implications for settler and indigenous communities alike in Russia's Far North, as well as for the national economy and demographic structure. Researchers have analysed the reception of this policy in local contexts, by developing an actor-oriented analysis of adaptation strategies and social capital in communities experiencing migration-related

flux. This has yielded not only a top-down account of emerging Russian state policy on the North, but also an ethnographically rich analysis of its reception and effects in local human settings. Topics include: responses to resettlement pressures and opportunities; coping strategies of actors and communities in movement; how forms of social capital and community identity are preserved or lost as people resettle; sentiments of belonging in place, versus the desire for mobility among local actors, leading to an understanding of how people living in conditions of northern isolation derive power by balancing mobility and rootedness; mobility as an ingredient in the construction of individual and group identities; and how histories of movement serve as a basis for self-understanding. Results will be of practical interest to stakeholders in northern restructuring. The project forms part of the BOREAS programme.

Elena Khlinovskaya Rockhill and Florian Stammler

Women's experience and the reindeer herder's family life

Research has followed the different survival strategies of herding families among a community of Eveny in the northern Sakha Republic (Yakutia). The imposition of collectivisation on reindeer herders in Soviet times industrialised their previous subsistence herding into a system of ranching, converting the vast landscape filled with spirits and family memories into a giant open-air meat factory. Children who were removed by helicopter to harsh and distant boarding schools now lack the skills or sensibilities to work with animals. The removal of women from the land and their placing into newly established villages forced them into quite separate orbits of work and movement from those of their male herders. As a result, the very existence of family life is now threatened by alienation, alcoholism and suicide, especially among

young men. Through a focus on gender, research reveals a spectrum of adaptation or resistance to the organisations which have succeeded the state farm, revealing diverse possibilities of fulfilment (or its absence) for their women as an older model of integrated family matriarch is replaced by that of a hired dinner-lady. Whereas previous management regimes aimed for, and often achieved, uniformity of experience, the fine-grained approach of this research shows how people can become vulnerable in drastically different ways because of small differences in their demographic and personal circumstances, but also suggests that significant improvements can be made by small local adjustments to budgetary or schooling procedures.

Piers Vitebsky

A warm August day in Verhoyansk, Siberia; women feed reindeer salt to keep them tame



Supernatural and disembodied experience in nineteenth century narratives of Arctic exploration

This project re-thinks our knowledge of Arctic experience by investigating the debates surrounding the legitimacy of supernatural and disembodied knowledges as they were manifested in narratives, speculations, imaginings and other Regency and Victorian representations of Arctic exploration. They were far from being merely ethereal and intangible. By examining how the 'unseen' played a role in Western polar activity, attention is drawn to the

embodied aspects of exploration and the engagement or entanglement of the explorer in the environment. Figuring the Arctic as a passage rather than a static object, where British stoicism could be enacted, highlights the extent to which place could be constructed 'in the field' and not always according to the precepts of ideological chauvinism or romanticism.

Shane McCorratine

Environmental security in the Arctic Ocean

The environmental shift in the Arctic Ocean from a semi-permanent sea-ice cover to a seasonally ice-free sea underscores the potential for political, economic, and cultural instabilities in the High North. These security matters are related to significant opportunities for living and mineral-resource exploitation as well as challenges for marine-ecosystem protection and spatial planning with unresolved territorial issues and a new trade route emerging that will influence the global balance of power. Convened at the Scott Polar Research Institute on 13-15 October 2010, the NATO Advanced Research Workshop on *Environmental Security in the Arctic Ocean* provided an opportunity to discuss challenges and opportunities in the Arctic Ocean. The workshop involved co-directors from the UK and the Russian Federation, creating an important bridge to consider security issues in the

Arctic Ocean through a shared dialogue. Participants included government diplomats, scientists, legislators, administrators, corporate executives, students and other members of civil society from 17 nations, including all the Arctic states, as well as from Arctic indigenous peoples' organizations. The workshop was designed to facilitate sharing of insights about the dimensions of environmental security in the Arctic Ocean, building on the "common Arctic issues" of sustainable development and environmental protection. The challenge was to think holistically about how to balance national interests and common interests within the framework of the law of the sea. Results of the NATO workshop will be reflected in an edited book that is being published by Springer.

Paul Berkman

New display cases in the Polar Museum, showing Oates' sleeping bag and a model of Shackleton's Nimrod



Current Research Grants

Institute research staff currently hold grants of about £3.6 million, of which £1.3 million is from the UK research councils.

Grants from UK Research Councils

Airborne geophysical investigations of basal conditions at flow transitions of outlet glaciers on the Greenland Ice Sheet

Source: Natural Environment Research Council, Grant NE/H020667/1
£840,000 (2010–13)

Marine geophysical and geological investigations of past flow and stability of a major Greenland ice stream in the late Quaternary

Source: Natural Environment Research Council, Grant NE/D001986/1
£217,341 (2006–2010)

Understanding contemporary changes in the Antarctic Ice Sheet

Source: Natural Environment Research Council, Grant NE/E005950/1
£165,878 (2007–2010)

Airborne geophysical exploration of central East Antarctica

Source: Natural Environment Research Council, Grant NE/F016646/1
£11,250 (2008–2012)

Determining the dynamic response of the Greenland Ice Sheet to climatic forcing using a geophysical, remote-sensing and numerical modelling framework

Source: Natural Environment Research Council, Grant NE/G00692X/1
£93,018 (2009–2012)

Grants from Other Sources

Arctic glaciers and their response to environmental change

Source: John Ellerman Foundation
£90,000 (2008–2011)

Modelling permafrost dynamics and change in the Arctic

Source: ENI SpA
£521,744 (2008–2012)

Investigations into the impacts of environmental change on the glaciers and ice caps of the Arctic

Source: ConocoPhillips
£100,359 (2008–2011)

Management of bar-coding data for the identification of Antarctic marine animals from genetic DNA

Source: Scientific Committee for Antarctic Research, CAML Bar-coding Project
£45,578 (2007–2010)

Growth and decay of Antarctic and Arctic ice sheets from marine geophysical records with particular reference to the West Antarctic Ice Sheet

Source: Prince Albert II of Monaco Foundation, Sir Isaac Newton Trust
£75,701 (2010–2012)

Antarctic Treaty Summit: Science-Policy Interactions in International Governance

Source: Prince Albert II of Monaco Foundation
Euro 75,000 (2009–2011)

Arctic Ocean Geopolitics

Sources: Judge Business School, World Wildlife Fund, Foundation for the Good Governance of International Spaces
£145,000 (2008–2010)

Environmental Security in the Arctic Ocean, NATO Advanced Research Workshop.

Sources: NATO Science for Peace and Security Programme, Aspen Institute, Shell International, Darmouth College, WWF Arctic
£44,000 (2010–2011)

HLF Stage 2 Museum Grant - Renovation of museum and archives: developing the Scott Polar Research Institute museum

Source: Heritage Lottery Fund, Grant HG-06-01385/2
£994,000 (2009–2011)

HLF Collecting Cultures Grant - Arctic visions: Inuit art and material culture

Source: Heritage Lottery Fund, Grant CC-07-011106
£200,000 (2008–2010)

Publications by Institute Staff

Books

Berkman, P.A., 2010. *Environmental Security in the Arctic Ocean: Promoting Cooperation and Preventing Conflict*. Rutledge, London, 135 pp.

Bravo, M.T. and Triscott, N., (Eds.), 2010. *Arctic Geopolitics and Autonomy*. Hatje Cantz, 116 pp.

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Mantel, K. and **Lane, H.**, (Eds.), 2010. *Tuvaq: Inuit Art and the Modern World*. Sansom, Bristol, 263 pp.

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Baggs, C., M.Phil., Climate and pro-glacial discharge interactions in the Pakitsoq region of Western Greenland.

Batchelor, C.L., M.Phil., Submarine landforms and Late Quaternary ice flow in Hinlopen Strait, Northern Svalbard margin.

Kreuztmann, T., M. Phil., Relations between humans and spirits in East Greenland.

Plews, R., M.Phil., Recent changes in surging outlet glaciers of the Langjökull Ice Cap, Iceland.

Robinson, P., M.Phil., Dynamics of ice-cap drainage basins from marine geophysical evidence: eastern Austfonna, Svalbard.

Seminars

Polar Physical Sciences seminars included:

Calving laws for ice sheet models

Douglas Benn (University Centre in Svalbard and University of St. Andrews)

Environmental protection in the Arctic Ocean

Paul Berkman (SPRI)

Ice stream tides

Hilmar Gudmundsson (British Antarctic Survey)

Flow, fracture and modelled stability of Larsen C Ice Shelf, Antarctica

Bernd Kulessa (Swansea University)

Glacial and climate changes in the Northernmost Antarctic Peninsula

Daniel Nývlt (Czech Geological Survey)

Lives on the Ice - changing patterns of Antarctic experience from Scott to Byrd

Lisle A. Rose

Automatic satellite monitoring of East Greenland's calving glacier fronts: seasonal signals and southern retreat

Anthony Seale (University of Cambridge)

Effects of coastal ocean warming and increased supraglacial run-off on water temperature and circulation in Kangerlugssuaq Fjord, East Greenland

Andrew Sole (University of Aberdeen)

Polar Social Science and Humanities seminars included:

W.H.R. Rivers' ideas about magic, medicine and religion

Tim Bayliss-Smith (Geography, Cambridge)

Non-fiction film and the ethnographer: a Melanesianist moves to Siberia

Stéphane Breton (École des Hautes Études en Sciences Sociales, Paris)

New maritime Arctic: implications of globalization, climate change and geopolitics

Lawson Brigham (University of Alaska, Fairbanks)

Trouble with female shamans in Mongolia

Manduhai Buyandelger (Anthropology, MIT)

Legal framework and formulation of policies in the Arctic Ocean

Rolf Einar Fife (Norwegian Ministry of Foreign Affairs)

Qivittoq: encounters with the undead in the Greenland wilderness

Janne Flora (SPRI)

Walking with reindeer: new experiences of place and movement in Siberia

Evelyn Landerer (SPRI)

Spirits of Place in Arctic Exploration, 1818-45

Shane McCorrstine (SPRI)

Ghosts and psychiatrists in Sápmi (Lapland)

Jens Ivar Nergård (Anthropology, Tromsø)

Research and governance needs in the age of an accessible Arctic

Mead Treadwell (United States Arctic Research Commission)

Language and forms of expression in the Arctic: urgent issues of endangerment

Nikolai Vakhtin (European University of St Petersburg) and Stephen Pax Leonard (SPRI)

Polar Information and Historic Archives

Library and Information Service

The Library provides services to students and academic staff from many departments of the University. In addition, the Library received over 600 visits from external readers in 2010. Library staff again provided induction sessions and delivered information literacy training on demand for postgraduates. During the year, the Library hosted visits from the Foreign and Commonwealth Office Polar Regions Unit, students from the Arizona Center for Medieval and Renaissance Studies, Bryony Dixon, Curator of Silent Film at the British Film Institute, researching the history of Herbert Ponting's film *The Great White Silence*, Cambridge MP Julian Huppert and the Cambridge Visiting Scholars group. The Librarian again provided tours during the Alumni Weekend and the Open Cambridge weekend, all of which were fully booked. Library and archival material relating to Captain Scott was filmed by the Italian television company RAI.

A total of almost 1500 monographic items was added to the library during the year. The SPRILIB web catalogue (Antarctica, Ice and Snow and Russian North) was also updated to include material published up to the end of 2009. *Polar and Glaciological Abstracts* was published in-house and three issues were produced during the year. Records were sent for two updates of the *Arctic and Antarctic Regions* CD-ROM published by the National Information Services Corporation. Working in co-operation with the World Data Centre for Glaciology, records of items relating to the current International Polar Year were submitted quarterly to the IPY Publications Database, <http://www.nisc.com/ipy>. Input continued to the Antarctic Bibliography, searchable free of charge at <http://www.coldregions.org/dbtw-wpd/antinfo.htm>.

Mark Gilbert continued his studies for a Masters degree in Library and Information Science by distance learning from the University of Wales Aberystwyth. He was also seconded for one day per week to the HLF funded Collecting Cultures Inuit Art project until the end of May, and Mrs Ann Keith continued to provide replacement cover. At the end of this period of employment, Mrs Keith kindly offered her services to the Library on a voluntary basis. Mark left the Institute for a new post at King's College London and the Library Assistant vacancy was filled by Georgina Cronin, who was formerly employed at the University Library. Heather Lane continued to chair the Cambridge University Bibliographic Standards Advisory Group. She represented the Institute on the Journals Coordination Scheme Consultative Committee for the School of Physical Sciences. She was interviewed on radio and television on a number of occasions, including a feature on Scott for the BBC World Service.

Our volunteers assist the staff to research and maintain the Library's collections. Their efforts are critical in helping the library to provide research support and the work they do is much appreciated by users worldwide. Percy Hammond and Jean Cruttwell continued to catalogue the map collection. John Reid and Maria Shorthouse worked on a number of projects and were joined by Janey Huber, who began work on a new bibliography of the French peri-Antarctic islands. Katja Loebel, a graduate student of librarianship from Munich, visited in February for a three week internship. The Library also offered work placements in January to Dougal Heap, grandson of former Director John Heap, and in July to Fionnula Hughes. The Bibliographers' Office was refurbished during the summer as part of a continuing renovation programme.

In addition to research grants received for specific projects, the Institute received, during the financial year, sums for the general support of information and library services. Thanks are due to several supporting bodies.

Ministry of Defence grant-in-aid (DC-ICSP)	£35,000
Royal Society grant-in-aid (for WDCGC)	£11,000
FCO Polar Regions Unit	£ 5,000

The Library hosted a number of scholars visiting the Institute for extended periods, including: Adele Airoidi, Milieu Ltd, Belgium; Professor Gary Wilson, Department of Political Sciences, University of Northern British Columbia; Su Yan, Institute of Space and Earth Information Science, Chinese University of Hong Kong; Yarjung Gurung, a shaman from the Annapurna region of Nepal; Professor Karl Guthke, Kuno Francke Professor of German Art and Culture, Harvard University; Saffia Hossainzadeh, University of California; Runya Wang, International Max Planck Research School for Maritime Affairs, Germany; Professor Arnoldus Blix, Department of Arctic Biology, University of Tromsø, Norway; Melissa Idiens, National Gateway Antarctica, University of Canterbury, New Zealand; Pey-Yi Chu, Department of History, Princeton University.

Heather Lane

World Data Centre for Glaciology, Cambridge (WDCGC)

The WDCGC manager acquires and catalogues glaciological material for the SPRI Library, supplies material to the WDCGC website and maintains the online Directory of European Glaciology. WDCGC also responds to requests for glaciological information from academic and media researchers and the general public, either directly or by referral. Fully abstracted and indexed records for a wide range of material of glaciological interest were added during 2010 to our in-house database, SPRILIB. Three issues of *Polar and Glaciological Abstracts* were also produced during the year and edited by the WDCGC Manager. Updates were supplied to the quarterly CD-ROM and online database *Arctic and Antarctic Regions* (published by National Information Services Corporation).

WDCGC also manages the SPRI contribution to the International Polar Year Database (IPY PD), which is available at www.nisc.com/ipy. Relevant SPRILIB records continue to be made available freely (approximately eight months after appearing in *Polar and Glaciological Abstracts*) via the online database SPRILIB ICE AND SNOW, available at www.spri.cam.ac.uk/resources/spriblib/icesnow/. With over 52,000 entries, this resource receives around 15,000 requests annually. The WDCGC site received hits from over 100 countries in 2010. The Directory of European Glaciology, <http://wdcgc.spri.cam.ac.uk/directory/>, has been maintained and continues to be well used, receiving many thousands of hits from over 45 countries in the past year.

Rick Frolich and Heather Lane

Picture Library

The Picture Library continues to assist many visitors and enquirers from around the world with their research on photographic material for use in a variety of publications, television programmes, lectures, museum exhibitions and theatre productions. Strong interest in the British Antarctic Expedition, 1910-13, led by Captain Scott has dominated the activities of the Picture Library during this, the first year of the *Terra Nova* centenary. Photographic material has been supplied for a number of exhibitions including those at the American Museum of Natural History, New York, the Natural History Museum, London, the Getty Images Gallery, London and the Cardiff Harbour Authority. Images have also been supplied for a number of books including *The Longest Winter* by Meredith Hooper and *The Lost Photographs of Captain Scott* by David Wilson. Many more images have been supplied to accompany a plethora of

articles in magazines, journals and BBC News items.

The Picture Library acquired by donation approximately 12,000 digital photographs from the British Army Antarctic Expeditions, 2001-02, 2004-05 and 2007-08. These photographs, generously given to the Institute by Major Richard Pattison, are a welcome addition to the collection and will complement material the Institute already holds from these expeditions.

A significant number of images from the Institute's paintings and drawings collection have been placed with the Bridgeman Art Library and will be made available for purchase as copy prints or under licence. Included in the selection are paintings by the artists Edward Adams, Ivan Dmitriyevich Bulychov, Samuel Cresswell, Edward Moss and Dr Edward Wilson.

The settlement of Ilulissat in West Greenland with a cruise ship offshore



The preventive conservation programme for the Institute's photographic collection continues with the provision of five purpose-built boxes of archival quality. Four of the boxes store two sets of mounted prints from the British Arctic Expedition, 1875-76 (Nares), an early expedition to the Canadian Arctic and Greenland. The fifth box stores a photograph album containing 111 photographs taken

during Livingstone Learmonth's voyages in *Eclipse* to East Greenland in 1888 and in *Maud* to Davis Strait and Baffin Bay in 1889. The Friends of SPRI generously provided funds for the boxes. The Picture Library would like to acknowledge the invaluable help given by Angela Haines.

Lucy Martin

Thomas H. Manning Polar Archives

With the centenary of Captain Scott's *Terra Nova* expedition upon us, the archive has welcomed many readers undertaking research into the 'Heroic Age' of Antarctic exploration with a particular emphasis on this expedition. Just under five hundred half-day bookings were made by researchers this year with some 1,215 documents produced for consultation. As well as displaying many documents in the refurbished Polar Museum, the archive lent several of its treasures to the American Museum of Natural History in New York for their exhibition on Scott and Amundsen. The archive also welcomed researchers from the Natural History Museum in London in preparation for their forthcoming exhibition with museums in Australia and New Zealand.

The availability of an on-line catalogue of the Institute's art collection at www.spri.cam.ac.uk/museum/catalogue/polarart/ has also stimulated scholarly interest in this important part of our collection. Several artists visited during the year to view material from the collections after carrying out their initial research through the electronic catalogue. Our Archive volunteers - Sally Stonehouse, Deirdre Hanna, Michael Laughton and Helen Hale - have again provided invaluable assistance during 2010.

Naomi Boneham

Polar Record

The journal continued as an internationally refereed and ISI-listed journal of polar research for the sciences, social sciences and humanities. Four issues were published by Cambridge University Press during 2010. Thirty-three articles appeared during the year together with twelve notes, seventeen book reviews and other contributions including two obituaries. This represents a continuing increase over previous years, arising largely from technical improvements in the use of space; for example, reducing font size for notes and obituaries. A further development is the advent of colour reproduction not only for illustrations within papers but also, perhaps more significantly, on the front cover.

The practice of issuing reprints has ceased and authors now receive a final pdf file that they are at liberty to

copy. All accepted papers are published on the journal website maintained by Cambridge University Press, before appearing in hard copy form. This is regarded as publication for citation purposes and means that the turn-round time may be radically reduced. The aim is that, if a paper is approved by referees, electronic publication should be no later than eight weeks after submission. This makes *Polar Record* attractive to authors for whom priority is important. A further factor stimulating the increasing number of submissions for publication appears to be the journal's ISI status, received in 2006. No fewer than 76 referees were consulted during the year and, for their input towards making the journal a success, the Institute is most grateful.

Ian R. Stone (Editor)

SPRI Website

Development of the SPRI website has been a case of continued evolution of material, following several very active years of new developments. Various sections of the site have seen upgrades to their usability and content. Older sections, such as the SPRI LIB database,

have undergone improvements in preparation for more extensive changes. Continued expansion of material has seen page views of the site double in the last two years.

Martin Lucas-Smith

Teaching, Learning and Understanding

University Teaching

Academic members of the Institute's staff coordinate and participate regularly in undergraduate lecture courses and supervise in the departments of Geography, Physics and Social Anthropology. Undergraduate supervisions are also provided to students in many colleges. Members of our staff are Fellows of Christ's, Downing, Jesus, Murray Edwards, St. Catharine's and St. John's colleges. Our M.Phil. course in Polar Studies has academic strands in Physical Sciences and in Social Science and Humanities, and staff also contribute to other M.Phil. programmes taught in

the Department of Geography and to Part III of the Natural Sciences Tripos. We have twenty or so doctoral students, registered to study topics which range from remote-sensing studies of glaciers and ice sheets to the nature of the reindeer herders of the Eurasian North. Each student is nested within one of our research groups, providing a strong and integrated research culture.

Julian Dowdeswell

The Polar Museum

2010 marked a major milestone for the new Polar Museum. Following the completion of the building and renovation works in 2009, the museum fit-out contractors, The Workhaus, started work early in the year, building the showcases and exhibition ready for the installation of objects for the displays. At the same time, the interpretation went into full stride, working closely with the graphic designers, Blue the design company Ltd, to produce texts and graphics to accompany the objects on display. With the completion of the fit-out works, a specialist museum object installation company, The Museum Workshop, was employed to make and install all the mounts and fittings for the objects in the displays. While this was progressing, object conservation was completed in time for mounting in the galleries. May was an extremely busy month as the whole museum project – objects, captions, texts and graphics – were finally installed. The new Polar Museum opened on 1 June, the hundredth anniversary of *Terra Nova* leaving London at the start of her journey south, and was officially opened on 8 June by Their Royal Highnesses, the Earl and Countess of Wessex. Following the opening of the Museum, an event for the descendants of the officers and crew of *Terra Nova* was held over the weekend of 12/13 June. Some 125 participants gathered at the Museum to celebrate with a weekend of tours, lectures and a gala dinner. With the opening of the new museum a series of publications, *Polar Profiles*, has been initiated. Two titles were published in 2010, *Douglas Mawson* and *Roald Amundsen*, both written by Beau Riffenburgh. Response to the new Museum has been very positive and visitor numbers are significantly higher than in previous years. In the period 1 June to 31 December 2010 we welcomed 25,466 visitors (for the same period in 2008, visitor numbers were 9,121). Recognition of the work that has gone into the renovation came at the end of the year when the museum was chosen by the Art Fund as one of ten on the long list for Museum of the Year 2010. The winner will be announced in June 2011.

The Museum mounted three temporary exhibitions between June and December. Alongside the preparatory work for the new museum, the acquisition of Inuit Art objects, made possible by a grant of £200,000 from the Heritage Lottery Fund Collecting Cultures scheme, was completed with the invaluable assistance of Ken Mantel of the Narwhal Inuit Art Education Foundation (NIAEF). Library Assistant Mark Gilbert helped to put together *Sananguaq: Inuit Art*, the first display in the newly refurbished special exhibition space, which included a wall hanging by Jessie Oonark from the Royal Collection, as well as many exceptional works lent by private collectors. A fully illustrated catalogue, *Tuvaq: Inuit Art and the Modern World*, edited by Ken Mantel and Heather Lane was published to coincide with the exhibition. A second exhibition of Inuit Art from the Institute's collection and from other British collectors was also staged at Canada House, in cooperation with the Canadian High Commission. The Nunavut Arts and Crafts Association also assisted by funding two artists, Andrew Qappik and Jayko Ishulutak, to spend a week in Cambridge, collaborating with the Museum to create new work using the facilities of the St Barnabas Press and Gallery. A print by Andrew was presented to the Earl of Wessex at the opening of the Museum. In the autumn the museum exhibited *Sidney Nolan: Antarctica*, displaying paintings completed after a visit to Antarctica by Nolan in 1963. The exhibition was made possible by the generous assistance of the Sidney Nolan Trust and we extend particular thanks to Lady Nolan and Anthony Plant. A catalogue of the paintings was published to accompany the exhibition.

With the appointment of Education and Outreach Officer Katherine (Suzy) Antoniow at the beginning of the year, new educational programmes were developed, including the popular Exploration Station series of in-gallery activities. A highlight was the opening of the Museum as a check point on the city's annual Bridge the Gap charity walk, when over 3000 visitors passed through the doors in a single day. There were 67 planned school visits to the museum

between June and December 2010, totalling 1635 students. The breakdown is as follows:

Level	Number
Key Stage 1	7
Key Stage 2	14
Key Stage 3	9
Key Stage 4	7
Higher education	7
Overseas students	20
Teachers	1
Miscellaneous	2
Total	67

Acquisitions during the year included a number of gifts and purchases. On behalf of the Scott family, Dafila Scott presented the museum with a silver model of the *Terra Nova*, which had been given to her father, Peter Scott, in 1913. This magnificent gift is currently undergoing detailed conservation and will be added to the displays at the end of 2011. A silver matchbox with the initials of William Burton, given to him by E.L. Atkinson on the return to Lyttelton as a member of the crew of the *Terra Nova* in 1913, was presented to the Museum by his granddaughter Louise Hoskins. Dr Richard Hudson offered on loan the sextant used on the journey of the *James Caird* to South Georgia, which had belonged to his father Huberht Hudson, a member of Shackleton's *Endurance* Expedition. Papers and items belonging to Leading Stoker Edward McKenzie of the British Antarctic Expedition 1910-13 were purchased at auction, with the help of a generous donation from the UK Antarctic Heritage Trust. Mrs Verity Isitt presented the museum with a set of 21 ivory miniatures. Mrs Isitt had been given the set as a child by a Moravian missionary based in northern Canada prior to 1930. Iridium Communications Inc. presented a satellite phone. Peter Clarkson donated a set of standard issue British Antarctic Survey clothing and equipment. Four Inuit carvings by the well-known artist Henry Evaluardjuk were presented in memory of Orpheus Jacovides. The museum also acquired, by purchase, a number of items including Inuit carvings bought from Bill Johnstone, the Narwhal Gallery (NIAEF), the Spirit Wrestler Gallery and the collections of Orpheus Jacovides. Bill Johnstone and NIAEF also generously agreed long term loans of further material.

The family of Kevin Walton kindly presented his medals as a loan to the museum at an event in April to celebrate his life and achievements. Walton was awarded the Albert Medal for rescuing a trapped colleague from certain death in a crevasse. Walton was lowered into the crevasse and, after three hours chipping at the ice, placed a rope around the trapped man who emerged like a 'cork from a bottle'. Walton received a Clasp (Antarctic 1946-7) for his Polar Medal and a Queen's Commendation for a second crevasse rescue on South Georgia in 1952.

The Museum lent material for display to a number of institutions, including the American Museum of Natural History in New York for *Race to the End of the Earth*, a

major new touring exhibition on Scott and Amundsen. SPRI's touring exhibitions included: *Art of Exploration: the polar vision of Sir Wally Herbert* at the Braintree Museum, *Face to Face* at the Stevenage Museum and *The Antarctic photographs of Herbert Ponting* on board HMS *Scott* in Cardiff in June 2010, which then transferred to Cardiff University until September. We worked closely with the Natural History Museum (NHM) on the first collaborative venture undertaken by their Centre for Arts and Humanities. Dr Beau Riffenburgh led a research project on the impact of the science of Scott's *Terra Nova* expedition, which will underpin the NHM's projected exhibition on this subject in 2011-12.

The museum web site has been greatly enhanced by a blog maintained by our conservator, Fiona Cahill, on the work she carries out behind the scenes to clean and conserve objects from the museum's collections. Work also continued to develop a new design for the site and to add new content relating to exhibitions and outreach events. The Museum benefits greatly from the help and enthusiasm of its volunteers. Thanks go especially to the group of new volunteers, now over 40 in number, who staff the museum during opening hours, meeting and greeting visitors and looking after the shop. This team was recruited by our volunteer manager, Nick Hunnisett, who stepped down at the end of the year. The volunteers are now ably looked after by Grant Rabey.

Heather Lane and Robert Smith



Projecting the Significance of the Polar Regions

Institute staff have continued to be involved in the outward projection of polar research and education through, for example, media work, public lectures and visits by schools to our polar museum. Staff have made appearances on both radio and television, including BBC and ITV news programmes. The Director was a guest on Melvin Bragg's popular Radio 4 programme, *In Our Time*, speaking on Antarctica.

Views and quotations on polar topics, many of which include an emphasis on polar environmental change issues, have also appeared in broadsheet newspapers at home and

abroad. Several staff have given external talks at primary and secondary schools, in addition to academic seminars at British and foreign universities. Our regular series of Saturday evening Public Lectures, organized by Celene Pickard on behalf of the Friends of SPRI, also attracts audiences of up to 100. These external activities are time consuming, but are important in ensuring that the work of the Institute, in terms of both its scholarship and curatorial activities, are projected as widely as possible.

Julian Dowdeswell

Expedition Support: Gino Watkins Memorial Fund

The Fund, under the joint trusteeship of the University of Cambridge and the Royal Geographical Society, provides grants towards expeditions that meet its objectives of guiding and inspiring enterprising people towards scientific research and exploration in the polar regions. The Committee of Managers of the Fund would like to thank the Augustine Courtauld Trust for their generous contribution of £9,000. The members of the Committee who served during the year were Mr. D. Fordham (Chair), Dr. P. Adams, Dr. I. Campbell, Mr. R. Crabtree, Dr. L. Craig, Dr. K. Crosbie, Professor J.A. Dowdeswell, Dr. D. Goodman, Dr. M. Humphreys, Professor M. Lea, Mr. J. Muston, Professor R.C. Schroter and Dr. M. Tinsley.

The Committee made the following awards for 2010, from the Gino Watkins Fund and the Arctic Club:

Unclimbed Walls of Baffin Island	£2,000
Tasiilaq Community Kayak Project 2010	£1,000
Inushuk Northwest Passage Sea Kayak Expedition 2010	£1,500
Expedition to Sermiligaarsuk Fjord, SW Greenland	£1,000
BSES Arctic Adventure Expedition 2010	£1,000
NW Greenland Sea Kayak Climb	£1,250
Greenland 2010 – Tilman International	£1,500
Alpine Club Antarctic Expedition	£1,500
First Winter Crossing of the Antarctic Continent 2012	£2,000
The Uummanaq Expedition 2010	£1,500

External Contributions to Polar Activities

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, and are members of the editorial boards of a number of international journals. These include:

- UK Delegate to the Council of the International Arctic Science Committee (IASC); J.A. Dowdeswell
- Head of the Glaciers and Ice Sheets Division of the IUGG International Association of Cryospheric Sciences (IACS); J.A. Dowdeswell
- Member of the UK Antarctic Place-Names Committee, J.A. Dowdeswell
- Member of the International Arctic Social Sciences Association (IASSA) International Polar Year Taskforce; M. Bravo
- UK representative on the International Arctic Science Committee (IASC) Working Group on the Cryosphere; J.A. Dowdeswell
- UK Delegate to the Arctic Ocean Sciences Board (AOSB); J.A. Dowdeswell
- Member of the NERC National Capability Action Group (NCAG); J.A. Dowdeswell
- Treasurer, International Glaciological Society; I.C. Willis
- UK Delegate to the International Science Initiative for the Russian Arctic; W.G. Rees

- Member of the international steering group for the Tundra-Taiga Initiative; W.G. Rees
- Chair of Scientific Committee, BOREAS Programme of Arctic Humanities and Social Science Research, European Science Foundation; P. Vitebsky
- Chair of Scientific Committee, Forward Look on Religion and Belief Systems, European Science Foundation; P. Vitebsky
- Permanent UK representative of the Association of Marine Mammal Hunters of Chukotka; P. Vitebsky
- Trustee, Sutasoma Trust; P. Vitebsky
- Chair, Polar Libraries Colloquy; H.E. Lane
- Editorial Board members: *Polar Record*, *Transactions of the Royal Society of Edinburgh*, *Archaeology, Ethnology and Anthropology of Eurasia*, *Anthropology and Archeology of Eurasia*, *Earth's Cryosphere*, *Cultural Geographies*, *Worldviews: Environment, Culture, Religion*.

International Glaciological Society (IGS)

The IGS headquarters is based at SPRI. Its aim is to serve the worldwide community of glaciologists by publishing activities, organization of symposia and actively promoting the exchange of information and ideas on all aspects of snow and ice. 2010 saw yet another record number of paper submissions to the *Journal of Glaciology*. This is the fifth year in a row we have broken the previous year's record. In total, 196 submissions were received, 52% above the 10 year average for 2001-2010. The average time between submission and publication remains well within a year. During 2010, the IGS published six issues of the *Journal of Glaciology*, three issues of *ICE*, its news bulletin, and three volumes of the *Annals of Glaciology*.

The IGS also organized three international symposia in 2010: one on 'Sea Ice in the Physical and Biochemical System', held in Tromsø, Norway, in June; another on 'Snow Ice and Humanity in a Changing Climate', held in Sapporo, Japan, in June; and a third, 'Earth's Disappearing Ice: Drivers, Responses and Impacts', held in Ohio, USA, in August. In addition, the Society also co-sponsored several IGS branch meetings and other meetings by separate organizations. Details of the IGS and its activities are available from its website (<http://www.igsoc>), hosted by the SPRI.

Magnús Már Magnússon (Secretary General)

Scientific Committee on Antarctic Research (SCAR)

SCAR's mission is to be the leading non-governmental, international facilitator and advocate of research in and from the Antarctic region, to provide objective and authoritative scientific advice to the Antarctic Treaty and other bodies, and to bring emerging issues to the attention of policy makers. In August 2010, SCAR held its Business meetings, Open Science Conference and Delegates' Meeting in Buenos Aires, Argentina. The Open Science Conference attendance was over 800 and it was particularly gratifying to see a large number of students and early career researchers attending. During the 2010 SCAR meetings, the new Scientific Research Programme (SRP), Astronomy and Astrophysics in Antarctica (AAA) began officially. AAA will provide a focus for this growing scientific community within SCAR. Four new Programme Planning Groups were also approved with the aim of proposing the next generation of SCAR SRPs: (i) Solid Earth Responses and Influences on Cryospheric Evolution (SERCE), (ii) Antarctic Ecosystems: Adaptations, Thresholds and Resilience (AntETR), (iii) State of the Antarctic Ecosystem (AntEco), and (iv) Past and Future Change of the Antarctic Environment (PACE).

During 2010, SCAR continued to work on its commitment to produce annual updates of the Antarctic Climate

Change and the Environment (ACCE, <http://www.scar.org/publications/occasional/acce.html>) to be provided to the Antarctic Treaty Parties and other policy makers. The Ice Sheet Mass Balance and Sea Level: A Science Plan (ISMASS, http://www.scar.org/publications/reports/Report_38.pdf) was finalized. ISMASS is co-sponsored by SCAR's sister organization the International Arctic Science Committee (IASC). As part of its commitment to the IPY legacy, SCAR, in partnership with the Scientific Committee on Oceanic Research (SCOR), finalised the draft Southern Ocean Observing System Science and Implementation Plan (<http://www.scar.org/soos>). The final version of the SOOS plan will be published early in 2011. A SOOS Secretariat is also being established in Hobart, with financial support from Australia. Another major contribution to the IPY has been the Census of Antarctic Marine Life (CAML, www.caml.aq), which has identified more than 1000 new species, one quarter of which are common to the Arctic.

From an administrative viewpoint the SCAR Secretariat, which is hosted by the SPRI, underwent some changes with the retirement of Colin Summerhayes and his replacement as SCAR Executive Director by Michael Sparrow. Renuka Badhe became the new SCAR Executive Officer.

Dr Mike Sparrow (Executive Director)

Fundraising and the SPRI Appeal

Friends of the Scott Polar Research Institute

The year opened with excitement growing at progress on the refurbishment plans and with anticipation of museum reopening in June. The Friends' first event in the new museum was linked to our Summer Lunch held on 10th July. Our lecture series in the Michaelmas Term returned to its normal routine in the Institute lecture theatre and we were delighted to welcome Friends and guests alike.

Of particular note during the year was the commencement of the Friends 'Artist in Residence' programme aboard HMS *Scott*. Rowan Huntley, a landscape artist based in Cardiff, joined HMS *Scott* in January 2010 for its cruise in Antarctic waters. Her work has attracted much favourable comment and was displayed aboard the ship during her brief visit to Cardiff in June 2010.

2010 has marked the beginning of the centennial period leading up to Amundsen's 1911 attainment of the South Pole and the tragic deaths of Scott and his companions on their return journey in 1912. There are many events planned around the world to commemorate these events which began with the departure from Cardiff of the *Terra Nova* in June 1910. The centenary was marked by the presence of HMS *Scott* on an official visit to Cardiff in June when Friends enjoyed a private tour and lunch on board in the company of the Captain, Commander Gary Hesling RN and his officers. The ship also hosted a display of selected iconic photographs from the Ponting collection.

My term as Chairman came to an end in December and Rear Admiral Nicholas Lambert was elected to the role. At the same time, other members of the committee have retired or resigned under the pressure of other commitments and I am indebted for their support to Wendy Driver (Vice Chair), Cathy Cooper (Dog-sledging), Judy Skelton, Duncan Lawie and Alison Jolley. David Wilson, co-opted member, stood down from his role as liaison with the Centenary Events programme in December. The 2010 appetite for sledging activities was again somewhat muted but Adam Janikowski raised more than £2000 for the Friends whilst a former sledger and new member of our committee, Grattan MacGiffin, went trekking for the Friends in the Atlas Mountains.

Finally, I must record the Friends' thanks to the Staff at the Institute who, despite coping with the building and museum modifications have been unfailingly helpful, and to Ann Bean and Celene Pickard, the Friends Membership and Executive Secretaries, without whom the work of the Friends could not be carried on. I wish the new Chairman and his committee every success in the future.

Robin Back
(Chair, Friends of the Scott Polar Research Institute)



Descendants of those aboard Scott's Terra Nova assemble 100 years on at the Institute



Detail from the Institute's polar museum - polar bears and snow crystals



A watercolour, 'Icebergs' by EA Wilson, from the Institute's collection

SPRI Appeal

The Scott Polar Research Institute is an international centre for research into the polar regions and is also home to unrivalled resources of polar information and expertise, housing the world's largest polar library, Britain's only dedicated polar museum, and a national repository for polar archives that record some of the most memorable episodes in exploration of the Arctic and Antarctic. 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 historical polar expeditions. Through both the publication of our research and by public outreach, the Institute helps to educate and inform a worldwide audience about the polar regions.

This year, we were able to complete the raising of £800,000 to match the Heritage Lottery Fund award of almost £1 million towards the redesign and refurbishment of our Polar Museum. The generosity of a number of individual donors,

together with private trusts and foundations, has made this possible; we thank all of them for their support.

In 2011 we will turn to further fundraising priorities. We wish to endow academic posts, and especially a Professorship in the field of Polar Environmental Science. We are also working to underpin the future development of the Institute's Archives and Museum. Our highest priorities in these areas are to provide permanent funding for the important posts of Institute Archivist and Polar Museum Curator. Funding for these positions has until now been supported by a series of short-term grants – an inherently unstable position.

Particular thanks are due to Sir Humphry Wakefield and William Stancer for their continuing support of the Appeal.

Further information on the Appeal is available from the Director, Professor Julian Dowdeswell (director@spri.cam.ac.uk; 01223-336541).

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