

Scott Polar Research Institute Review 2012

86th Annual Report of the
Scott Polar Research Institute
University of Cambridge, UK



Scott Polar Research Institute
University of Cambridge



**UNIVERSITY OF
CAMBRIDGE**



Captain Scott Memorial in Waterloo Place, London

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Director's Introduction

One hundred years ago, Captain Scott and his four companions, Wilson, Bowers, Oates and Evans, reached the South Pole and died on their return journey across the Ross Ice Shelf towards their hut at Cape Evans. Their legacy is not only in the achievement of the Pole and the subsequent tragedy of their deaths, but in the science that was pursued with such commitment and success during both Scott's *Discovery* and *Terra Nova* expeditions. The Scott Polar Research Institute is part of their legacy, too, being founded with the residue of the Scott Memorial Fund as a multi-disciplinary polar research centre and as a national memorial to the endeavours of the Polar Party and their memory.

In this context, it is no surprise that the Institute has taken a leading role in the Scott centenary year, which has been marked by a series of events to celebrate and project the achievements, in terms of both science and exploration, of the *Terra Nova* expedition and those who took part in it. Among the most memorable of these events was a service of national remembrance for Scott, Wilson, Bowers, Oates and Evans, held in St. Paul's Cathedral on 29 March 2012, exactly one hundred years to the day from Scott's last diary entry. The service was organised jointly by the Institute and the UK Antarctic Heritage Trust (under the auspices of their Chair, Philippa Foster Back), and was attended by over 2000 people, including HRH The Princess Royal, and was probably the largest ever gathering of the polar community in Britain. Sir David Attenborough read Scott's powerful message to the nation and the Bishop of London, the Rt. Revd. Richard Chartres, gave a sermon that was widely acclaimed by those present. After the service, the City of London and its Lord Mayor hosted a reception in the Guildhall, where The Princess Royal was able to view a number of Herbert Ponting's wonderful images of the *Terra Nova* expedition from our collection. The day was rounded off by the Band of the Royal Marines beating retreat before the statue of Captain Scott in Waterloo Place. I should like to acknowledge the support of many who worked so hard to make this event such a success, including staff of both the Scott Polar Research Institute and the UK Antarctic Heritage Trust, the Royal Navy, and, in particular Dr David Wilson, great nephew of Edward Wilson, who was at the heart of the planning and implementation of both the St. Paul's service and many of the other centenary events commemorating Scott's last expedition.

Earlier in the year, on 17 January, the Scott Polar Research Institute organised a further event to celebrate the centenary of the Polar Party reaching the South Pole. A day of talks in the Institute about both the history of Antarctic exploration and the modern significance of the continent in terms of environmental change and governance was complimented by the

opportunity to view our exhibition about the *Terra Nova* expedition, *These Rough Notes*, in the Institute's Polar Museum. This was followed by a gala dinner for 140 in Corpus Christi College. The dinner was attended by HRH The Duke of Edinburgh and HSH The Prince of Monaco and, among many others, a large number of descendants of members of the *Terra Nova* expedition. After dinner, the Director spoke about the achievements of the Polar Party and the modern scientific research of the Institute, and the Vice-Chancellor of the University of Cambridge was able to announce the establishment of the 'Scott Polar Scholarship Fund', which will support research studentships at SPRI, with a generous initial donation from Brian Buckley. I should also like to acknowledge the gift to the Institute of a most generous legacy from the late Barbara Debenham, who sadly died this year. Her gift will support future generations of 'Debenham Scholars' to undertake research work in the polar regions. Barbara was daughter of Frank Debenham, geologist on the *Terra Nova* expedition and Founder and first Director of the Institute.

Throughout the year the Polar Museum at the Institute has projected the history and contemporary significance of the polar regions, with a record number of 52,000 people visiting during 2012. As well as the continuing display of many of the very moving last letters written by Scott and his companions, Scott's diary, kindly loaned by the British Library, was open at the very last entry: 'For God's sake look after our people'. The five-month long exhibition, *These Rough Notes*, placed on public display diaries, artefacts, drawings and photographs of Captain Scott's last expedition that are not usually on view. It gave a unique insight into the expedition and demonstrated the breadth and depth of the Institute's collection. The Polar Museum also provided the focus for visits from school parties, with over 3,500 children taking part in our formal learning programme and a further 700 adults and children visiting in just one evening event to view the museum by torchlight.

Our Polar Library, documentary Archive and Picture Library have also been inundated with requests for access and information during the Scott centenary year, and much filming and recording has taken place in the Institute linked to television and radio programmes about the *Terra Nova* expedition. A particularly important addition to our photographic collection during 2012 was the acquisition of the so-called 'Lost Photographs' of Captain Scott. These were the photographs of the southward journey towards the South Pole taken by Scott himself, after his training by Herbert Ponting. The images, displayed publicly for the first time in the Polar Museum during 2012, show the polar party leading their ponies across the Ross Ice Shelf and during their ascent of the

Beardmore Glacier. The acquisition was made possible by a grant of £704,000 from the Heritage Lottery Fund, augmented by donations from The UK Antarctic Heritage Trust, the Staples Trust and Dr John C Taylor OBE.

The research and teaching activities of the Institute have continued to flourish during 2012. This is demonstrated through a particularly large number of publications in the international academic literature and the successful submission of what I think must be close to a record number of dissertations by our doctoral and masters students in both the sciences and the social sciences and humanities. Much of this work has been based on field research in the Arctic and Antarctic. Several staff, including the Director, were in north-westernmost Greenland during the spring, undertaking airborne radar operations to measure the thickness and basal properties of this little-known part of the Greenland Ice Sheet. Parties of staff and students from SPRI were also involved in field

work in Svalbard and Russian Siberia and, during the austral summer, in Antarctica. These activities continue to be supported by competitively won research grants from a wide variety of sources including the UK Research Councils.

It remains for me to thank the staff of the Institute for their efforts to make the centenary year of Scott's last expedition such a great success, and for taking on this extra work in addition to their normal commitments to research, teaching and the provision of polar information. Finally, I should also like to record my particular thanks to Shirley Sawtell on her retirement from the Institute after more than 20 years of assisting visitors to our library.



Professor Julian Dowdeswell

The Director at the memorial cross at Cape Evans, with Mt. Erebus behind



Institute Staff

Senior Academic and Related Staff

Professor Julian Dowdeswell	Director and Professor of Physical Geography
Dr Neil Arnold	University Senior Lecturer
Dr Michael Bravo	University Senior Lecturer
Dr Poul Christoffersen	University Senior 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 (to January)
Dr Kelly Hogan	Research Fellow
Dr Stephen Pax Leonard	Research Fellow
Dr Shane McCorristine	Research Fellow
Dr Ruth Mugford	Research Associate
Dr Stephen Palmer	Research Associate
Dr Olga Ulturgasheva	Research Fellow

Library, Archive and Museum Staff

Ms Naomi Boneham	Archives Manager
Mrs Georgina Cronin	Library Assistant
Mr Bryan Lintott	Exhibitions Officer
Ms Lucy Martin	Picture Library Manager
Mrs Sophie Rowe	Conservator (from April)
Ms Christina Rozeik	Conservator (from May)
Ms Shirley Sawtell	Information Assistant (to October)
Ms Hilary Shibata	Antarctic Bibliographer
Ms Willow Silvani	Documentation Assistant
Ms Kay Smith	Museum Project Manager (from December)
Ms Rebecca Stancombe	Library Assistant
Mrs Isabella Warren	Russian Bibliographer
Ms Sophie Weeks	Education and Outreach Officer (to October)
Mr Jeremy Wong	Arctic Bibliographer

Support Staff

Mr Grahame Adley	Maintenance
Ms Rosie Amos	Saturday Museum Assistant (to August)
Mrs Lisa Avis	Receptionist/Secretary (from April)
Mrs Danielle Feger	Research Administrative Officer
Mrs Kate Gilbert	Director's Assistant/Institute Administrator
Ms Marion Jeffries	Maintenance
Mr Martin Lucas-Smith	Web Manager
Mrs Maria Pearman	Senior Clerk
Mr Roy Smith	Maintenance
Dr Adam Strange	Administrator (from March)

Ms Narelle Baker
Ms Alison Banwell
Ms Christine Batchelor
Ms Amy Donovan
Mr William Eucker
Mr Peter Evans
Mr Jorge Guzman
Ms Tania Kossberg
Ms Terto Kreutzmann
Ms Evelyn Landerer
Mr Adrian McCallum
Ms Jackie Price
Ms Dinah Molloy Thompson
Mr Martin O'Leary
Mr Allen Pope
Mr Tim Reilly
Ms Katya Shipigina
Ms Anna-Maria Trofaier
Mr Laur Vallikivi
Ms Claire Warrior

Ms Clare Fraser
Mr Jonathan Furhmann
Mr Jerome Mayaud
Mr James McMillan
Mr James Pearson
Mr Joe Todd

World Data Centre for Glaciology, Cambridge

Manager

Dr Magnús Már Magnússon

Secretary General

Dr Michael Sparrow
Dr Renuka Badhe
Dr Eoghan Griffin
Mrs Rosemary Nash

Executive Director
Executive Officer
Project Officer
Senior Clerk

Prof. R.C. Kennicutt, Chair
Prof. J.A. Dowdeswell, Sec.
Prof. S.E. Owens, OBE
Prof. J.A. Pyle
Prof. D.A. Hodell
Prof. S. Schaffer
Prof. P.M. Brakefield

Chair of the Council of the School of Physical Sciences
Director, Scott Polar Research Institute
Head, Department of Geography
Department of Chemistry
Department of Earth Sciences
Department of History and Philosophy of Science
Director, Museum of Zoology

Prof. J.A. Jackson, Chair
Prof. E. Hill, OBE
Rear Admiral N. Lambert
Ms J. Rumble
His Excellency, The Hon
Mr G. Campbell
Dr E. Jolley
Dr J. Craig
Professor R. Mair, CBE
Professor S. Smith

Head, Department of Earth Sciences
Interim Director, British Antarctic Survey
Chief Executive UKHO and National Hydrographer
Head of the Polar Regions Department, FCO

High Commissioner for Canada
BP
Eni
Department of Engineering
Mistress, Girton College

Dr John Ash
Dr Lawson Brigham
Dr Liz Cruwys
Dr Nick Cutler
Dr Fiona Danks
Dr Bob Hawley
Mr Robert Headland
Dr Neil Kent
Dr Elena Khlinovskaya Rockhill
Dr Beau Riffenburgh
Dr Florian Stammer
Dr John Tichotsky
Dr Olga Tutubalina
Dr Emma Wilson

Dr Peter Clarkson, MBE
Mr Harry King
Dr Simon Ommanney
Professor Larry Rockhill
Dr Bernard Stonehouse
Dr Colin Summerhayes
Dr Charles Swinbank
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

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.

Captain Scott's hut at Cape Evans with the Barne Glacier in the background





RRS James Clark Ross in sea ice, Bellingshausen Sea, Antarctica

Polar Physical Science

Using airborne remote sensing to investigate glacial geomorphic processes

High resolution remotely sensed data are used increasingly in glaciology to map aspects of the landscape and quantify current environmental change. These data are also used in glacial geomorphology to map landforms, infer processes of erosion and deposition, and characterise past glacial conditions. As more data become available at increasingly high spatial and temporal resolutions, there is a need to automate the process of landform and landscape mapping using objective, consistent and accurate computer-based object and pattern recognition techniques. This project uses a large airborne lidar data set, covering all the large ice caps and outlet glaciers in Iceland, together with their forefields, collected recently as part of a collaborative venture between SPRI, the Icelandic

Meteorological Office and the University of Iceland. Algorithms are being developed, and calibrated and evaluated against existing geomorphic maps and field evidence. New fieldwork is planned for further algorithm testing in 2013. A key research output will be a suite of glacial geomorphic maps for Iceland that can be used to identify spatial and temporal patterns of surge and non-surge behaviour as well as important glacial geomorphic processes such as glacier tectonics, styles of sediment deformation, surface hydrology and retreat patterns. The work is being undertaken in collaboration with PhD student Ciaran Robb, and Tomas Johannesson, Icelandic Meteorological Office and Finnur Pálsson, University of Iceland.

Neil Arnold and Ian Willis

Glacier hydrology in the Langtang Khola, Nepal: lake formation and drainage on debris-covered glaciers

As glaciers retreat in response to climate warming, substantial modifications occur to meltwater production, hydrological routing, and water storage and release, resulting in major changes to water flow from glaciated basins. Although high resolution glacierized catchment modelling has been applied successfully in, for example, the European Alps, Scandinavia and North America, far less attention has been given to watersheds in the Himalayas, where basic climate and hydrological data are lacking, where logistical, political and cultural challenges are greater, and yet where some of the largest communities reliant on water from glacierized catchments live. The aims of this project are to: i) collect climate, glacier mass balance and hydrology data in the Langtang region, Nepal; ii) analyse the back catalogue of satellite multispectral data for the region to measure

past glaciological and hydrological attributes of the catchments; iii) use the data in (i) and (ii), together with gridded climate reanalysis data for the past, to develop a high spatial (~100 m) and temporal (hourly) resolution glacier mass balance and hydrology model for the region. The model will calculate the filling and draining of surface and ice-marginal lakes, which pose a threat of sudden flooding in the region. Finally, the model will be run into the future to assess the likely changes to glacier mass balance and hydrology into the 21st century in response to projected climate change. We are undertaking this work with PhD student Evan Miles, in collaboration with Francesca Pellicciotti, ETH, Zurich and Dorothea Sturm, ICIMOD, Kathmandu.

Ian Willis and Neil Arnold



Tidewater ice cliffs of Austfonna, Svalbard, the largest ice cap in the Eurasian Arctic

Two new projects on ice-sheet stability in Antarctica

The UK Natural Environmental Research Council has funded several new and ambitious projects within its Ice Sheet Stability (iSTAR) programme. The research programme focuses on the Amundsen Sea and Pine Island Glacier, a key region in West Antarctica where the ice sheet interacts strongly with the adjacent ocean. SPRI is participating in two projects specifically targeting the flow of Pine Island Glacier. The iSTAR-C project, entitled 'Dynamical control on the response of Pine Island Glacier', will investigate processes responsible for the dynamic transfer of effects taking

place at the ice-ocean interface and the ice shelf extending in front of the glacier. The iSTAR-D project, entitled 'The contribution to sea level rise of the Amundsen Sea sector', is concerned with quantifying the region's contribution to sea level rise. Forthcoming work within the two projects includes development and application of numerical models, supervision of a PhD student, and fieldwork during scientific traverses of Pine Island Glacier in 2013-14 and 2014-15.

**Liz Morris, Poul Christoffersen
and Marion Bougamont**

Hydrologic forcing of ice streams

Results from numerical ice-sheet modelling at SPRI are shedding new light on the basal environment of fast-flowing ice streams. By implementing realistic, time-dependent and highly nonlinear 'plastic bed' properties, fundamental new insights were gained, not only on the causes of fast ice-streaming flow, but also on sedimentary processes occurring beneath the ice streams. The experimental setup produced results in which ice-stream flow was characterized by recurring switching (oscillations) between fast and stagnant modes of flow. The outcomes showed that there was a strong coupling between the amplitude

of the ice-stream oscillations and the amount of sediment eroded and transferred by ice streams, due exclusively to the formation and advection of a layer of debris-bearing basal ice. The results also showed that increased incorporation of water from a basal water system amplified the oscillations, thereby promoting erosion and delivery of sediment to the ocean. The results, published in the journal *Geology*, are consistent with observations made in Antarctica as well as the seemingly erratic behaviour of palaeo-ice streams in the northern hemisphere.

Marion Bougamont and Poul Christoffersen

Spectral and physical characterisation of glacier surfaces

Allen Pope's investigation of the relationships between the optical properties of a glacier surface and its physical characteristics moved from the data collection to the analysis stage. This is now giving a much clearer and, for the first time, systematic understanding of the importance of spatial and spectral resolution for satellite studies of changing glaciers in the Arctic. Allen also continued to work with the Association of Polar Early Career Scientists, and shared his research with a very wide audience by creating and disseminating

a short, very popular, video. He participated in the Juneau Icefield Research Program in Alaska, and was one of the first student members elected to the Council of the American Geophysical Union. He presented his work at numerous venues, including the IPY conference in Montréal, the American Geophysical Union conference in San Francisco and the 12th International Circumpolar Remote Sensing Symposium in Levi, Finland.

Gareth Rees and Allen Pope

Understanding the behaviour of the Arctic treeline

For over a decade, SPRI has been central to the international effort to understand the characteristics and behaviour of the transition region between boreal forest and tundra that lies to its north. Arctic treeline research has been carried out within the project 'PPS Arctic' (Present day processes, Past changes, and Spatiotemporal variability of biotic, abiotic and socio-environmental conditions and resource components along and across the Arctic delimitation zone), an international collaboration of over 100 scientists and students working at about 30 sites around the Arctic. PPS Arctic is coordinated by the Norwegian Institute for Nature Research and by SPRI. A significant finding is that the Arctic treeline is not responding to climate change in the way predicted by coupled climate-vegetation models (DGVMs). These models, based on the assumption that global vegetation, where not locally disturbed, is in equilibrium with climate, predict that boreal forest should be advancing into

the tundra at a rate of about 2 km per year. At this rate, models predict that about 40% of Arctic tundra will be lost by the end of the century. In fact, the observed rates of advance seem to be very much less than predicted. If this result, which is already firmly established for northern Fennoscandia, is verified across the entire Arctic, it could have significant implications for understanding the behaviour of the global climate. As part of our effort, Katya Shipigina has developed a methodology for automated land-cover mapping using satellite images spanning a wide spatial and temporal range, capable of monitoring the whole of northern Fennoscandia. Anna-Maria Trofaier is also investigating thaw lakes in permafrost using spaceborne radar, obtaining field data from Vaskini Dachi on the Yamal Peninsula, Russia.

**Gareth Rees, Katya Shipigina
and Anna-Maria Trofaier**

Variable history of Quaternary ice-sheet advance across the Beaufort Sea margin, Arctic Ocean

The seismic stratigraphy and architecture of the Beaufort Sea shelf and slope were investigated using a comprehensive grid of high-resolution 2-dimensional seismic-reflection data. Three cross-shelf troughs, representing locations of former ice streams draining a 1,000 km-long section of the Quaternary North American Ice Sheet were examined; the Mackenzie, Amundsen Gulf and M'Clure Strait systems. Dynamics of these palaeo-ice streams influenced ice-sheet configuration and may have forced abrupt climatic change through delivery of ice and freshwater to the Arctic Ocean. A comprehensive understanding of their geometry and dynamics is crucial for constraining numerical models of the former ice sheet. Evidence for two Quaternary ice advances to the shelf break is interpreted from Mackenzie Trough. By contrast,

seismic stratigraphy of Amundsen Gulf Trough, 400 km east of the Mackenzie, records at least nine Quaternary ice advances. Here, the outer-shelf consisted of several stacked till sheets, extending to the shelf break and forming a trough-mouth fan. The contrasting glacial histories of these neighbouring ice streams were explained by their positions within the past ice sheet; Mackenzie Trough ice stream was situated at the extreme north-west ice-sheet margin, whereas Amundsen Gulf ice stream had a more central location and larger drainage basin, supplying significant quantities of ice and sediment to the Arctic Ocean through much of the Quaternary. This work has been published recently in *Geology*, and was undertaken in collaboration with Dr Jeff Pietras of BP.

Christine Batchelor and Julian Dowdeswell

Coal mining history and modern housing in Longyearbyen, Spitsbergen



An extensive and dynamic ice sheet on the West Greenland shelf during the last glacial cycle

Considerable uncertainty surrounds the extent and timing of the advance and retreat of the Greenland Ice Sheet on the continental shelf bordering Baffin Bay during the last glacial cycle. We used marine geophysical and geological data to show that fast-flowing ice-sheet outlets, including the ancestral Jakobshavn Isbræ, expanded several hundred kilometres to the shelf edge during the last glaciation about 20,000 years ago. Retreat of these outlets was asynchronous. Initial retreat from the shelf edge was under way by about 15,000 years ago in Uummannaq Trough. Radiocarbon dates from the adjacent Disko Trough and adjoining trough-mouth

fan imply later deglaciation of Jakobshavn Isbræ, and, significantly, an extensive readvance and rapid retreat of this outlet during the Younger Dryas cold interval. This is the first evidence of a major advance of the Greenland Ice Sheet during the Younger Dryas on the West Greenland shelf, although its short-lived duration suggests that it may have been out of phase with temperatures at this time. The field work was undertaken on the RRS *James Clark Ross* as part of a major NERC-funded research cruise led by Colm Ó Cofaigh (Durham) and involving a team of colleagues from several universities.

Julian Dowdeswell and Kelly Hogan

CryoSat-2

Liz Morris continued to participate in an international programme to validate ice sheet surface-elevation data collected by a new radar altimeter (SIRAL) carried by the CryoSat-2 satellite. Using a unique set of direct determinations of strain rate in polar snow, a new empirical snow densification law was derived which allows the effect of future climate change on ice-surface elevation to be estimated.

Liz has also provided scientific support for a joint services expedition to the Antarctic Peninsula and is a participant in the new NERC consortium project 'iSTAR-D: the contribution to sea-level rise from the Amundsen Sea sector of Antarctica'. In December 2012 she gave the prestigious Nye Lecture at the Fall Meeting of the American Geophysical Union.

Liz Morris

The village of Qaanaaq in Northwest Greenland





The church in Longyearbyen, Spitsbergen

Polar Social Science and Humanities

A pan-Inuit region of horizons and trails

In this study, a component of the Inuit Northwest Passage project, the investigators examine the conceptual bridges linking local and regional scales of Inuit trails. Previous anthropological research on Inuit geographical knowledge has focused predominantly on local knowledge linked to units of ethnicity and place. Our hypothesis is that places of significance to Inuit life are linked across great distances through an interconnected regional-scale system of trails. However, explaining how traditional techniques of navigation, which use the horizon as a primary framework of orientation, are able to synthesise multiple views to generate knowledge 'beyond the horizon' is a complex problem. This is because, while the geographical knowledge of neighbouring peoples overlaps, it is not shared symmetrically or evenly.

Fieldwork carried out in summer 2011 in collaboration with elders of Pond Inlet, Nunavut, Canada, combined with the use of printed and archival sources, formed the basis of this ongoing analysis. It was revealed that different groups of Inuit would traditionally have distinctive as well as shared techniques of navigation. Groups inhabiting mountainous terrain possessed skills for negotiating difficult ascents that would not be shared amongst neighbouring groups inhabiting flatter terrains. The study also demonstrated that, in spite of knowledge and technique being local, trails were interconnected, shared, and communicated through narrative and travel. This study was based at SPRI and Carleton University, and was collaborative with Dr. Claudio Aporta.

Michael Bravo

Searching for Franklin: a modern Canadian ghost story

When, in 2008, the Canadian federal government signalled its intention to sponsor a marine hunt for the sunken and lost ships of the 1845 Northwest Passage expedition led by Sir John Franklin, one of the main reasons given was the need to assert their claims to Arctic sovereignty in an unstable and tense circumpolar geopolitical environment. The wrecks of the *Erebus* and *Terror* in this context were seen as important due to their historic associations with the development of Canada as a nation. Through

literature, documentary, popular culture, and heritage policy, the Franklin expedition represents a haunting inheritance for modern Canada that can be approached through three thematic gateways: haunted history, possession, and geopolitical sovereignty. Through an examination of recent Franklin searches this project locates the place of this 'quintessential interdisciplinary, diachronic, semiotic subject' in the contemporary imagination.

Shane McCorristine

Relations between hunters and spirits in the Thule region of northwest Greenland

Terto Kreutzmann carried out extensive fieldwork on contemporary culture, with particular focus on religion and spiritual beliefs, among the Inughuit in the Thule region, the remotest area of northwest Greenland. She focused on explaining which aspects of Inuit spiritual belief are still maintained and how they function in a hunting society today. Further topics are kinship and sharing; secrecy and revelation; and naming and dreaming. This is the first in-depth study of religion in this area, and the culture here is likely to prove significantly different from the rest of Greenland. The Greenland government considers the Inughuit to be engaged in the supposedly primitive and non-profitable activity of hunting. The current

move towards Greenland's full independence is based mainly on the hope of revenue from hydrocarbons and other minerals. Much of this exploitation will take place in Baffin Bay, adjacent to the Inughuit, and the military imperatives of the Thule air base remain powerful. Because of their isolation, their dependence on hunting, and the geopolitical demands of military security, all these issues are currently affecting the Inughuit to a greater degree than any other community in Greenland. The project is funded by the Commission for Scientific Investigations in Greenland and Greenland Self-Government.

Terto Kreutzmann and Piers Vitebsky

Mental health services and psychotherapy in the Norwegian Arctic

Tania Kossberg has carried out ethnographic fieldwork on mental health care services in the Finnmark area of northern Norway. The study combines the perspectives of managers, health practitioners and community members. During her fieldwork she gained access to a mental health organisation which specialises in the delivery of psychological services for the indigenous Sami population. There, she conducted participant observation in family therapy. Drawing on multiple personal experiences the study shows the complexity of the perception of mental health services, as well as the perception and experience of therapeutic practice and healing. By

studying therapy as a cultural practice, the research addresses the link between the development of mental health service delivery on the one hand and the history of northern Norway, the history of the Sami populations, and the Welfare System on the other. The research reveals contradictory ways in which the meaning of ethnic background is situated within the health organisation and therapy, particularly in terms of intergenerational aspects, family history and family explanatory systems. The study also explores family and individual belief systems, and other perceptions of what is the most effective therapy.

Tania Kossberg and Piers Vitebsky

Garden of the Governor's residence in Port Stanley, Falkland Islands



Current Research Grants

Staff of the Institute currently hold research grants of over £3.5 million, of which about £1.8 million is from the UK Research Councils.

Grants from UK Research Councils

Airborne geophysical exploration of central East Antarctica

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

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 (2010-14)

Airborne geophysical investigations of conditions at the bed of fast-flowing outlet glaciers of large Canadian Arctic ice caps

Source: Natural Environment Research Council, Grant NE/K004999/1
£573,000 (2012-16)

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)

Dynamical response of Pine Island Glacier, West Antarctica (iSTAR-C)

Source: Natural Environment Research Council and the Newton Trust
£134,409 (2012-2015)

The contribution to sea-level rise from the Amundsen Sea sector of Antarctica (iSTAR-D)

Source: Natural Environment Research Council, Grant NE/J005797/1
£20,451 (2013-2016)

Validation and provision of CryoSat measurements of fluctuations in the Earth's land and marine ice fluxes

Source: Natural Environment Research Council, Grant NER/O/S/2003/
£116,192 (2009-2015)

Will climate change in the Arctic increase the landslide-tsunami risk to the UK?

Source: Natural Environment Research Council, Grant NE/K00008X/1
£32,154 (2012-16)

Late Quaternary deglaciation of the NW Barents Sea

Source: Natural Environment Research Council, Radiocarbon Facility
£5,800 (2012-2013)

Grants from Other Sources

Modelling permafrost dynamics and change in the Arctic

Source: ENI SpA
£521,744 (2008-2012)

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
£75,701 (2010-2012)

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

Source: Isaac Newton Trust, Cambridge
£18,101 (2010-2012)

Negotiating pathways to adulthood: social change and indigenous culture in four circumpolar communities (NSF ARC-0755348)

Source: US National Science Foundation
£67,959 (2008-2012)

Collaborative research: using visual methods to engage indigenous youth and community members in cross-site, international analysis: a methodological study (ARC-1219344).

Source: University of Massachusetts/National Science Foundation
£20,000 (2012-2013)

Developing indigenous research methodologies in the Arctic (IRM-A): examining the impacts of settlement on socialization and youth experience in Siberia and Alaska (ARC-1207894)

Source: University of Alaska Fairbanks/National Science Foundation
£199,266 (2012-2014)

Heritage Lottery Fund 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 (2009-2013)

Heritage Lottery Fund Collecting Cultures - Arctic visions: Inuit art and material culture

Source: Heritage Lottery Fund, Grant CC-07-011106
£200,000 (2008-2013)

Publications by Institute Staff

Books

Brightman, M., Grotti, V.E. and **Ulturgasheva, O.**, (Editors), 2012. *Animism in Rainforest and Tundra: Personhood, Animals, Plants and Things in Contemporary Amazonia and Siberia*. Berghahn, Oxford, 226 pp.

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Doctoral and Masters Theses

Baker, N.P.M., Ph.D., The influence of subglacial hydrology on the flow of West Antarctic ice streams

Banwell, A.F., Ph.D., Modelling the hydrology of the Greenland Ice Sheet

Donovan, A.R., Ph.D., Public engagement with developing science: new technologies and hazard management at persistently active volcanoes

Eucker, W., Ph.D., A geospatial analysis of Arctic marine traffic

Fraser, C., M.Phil., Characterising sikussak and other forms of ice mélange in Greenland fjords

Fuhrmann, J., M.Phil., Multi-resolution analysis of runoff from the Paakitsoq region of West Greenland: a study of temporal variability and its causes

Mayaud, J., M.Phil., Modelling the subglacial hydrology of the Greenland Ice Sheet

McCallum, A.B., Ph.D., Cone penetration testing in polar snow

McMillan, J., M.Phil., A study of variability and change in circum-Arctic snow water equivalent

O'Leary, M.E.W., Ph.D., Stability of West Antarctic ice shelves

Pearson, J., M.Phil., People and resources: indigenous populations and the Russian oil and gas industry

Todd, J., M.Phil., Calving stability of Rink Isbræ: flow-line modelling investigation using Elmer finite element model

Vallikivi, L., Ph.D., Words and silence: Nenets reindeer herders' conversion to evangelical christianity

Seminars

Polar Physical Science seminars, including:

What's going on in Greenland?

Alun Hubbard (Aberystwyth University)

Modelling the evolution of supra-glacial lakes in the Russell Glacier region of the Greenland Ice Sheet

Amber Leeson (University of Leeds)

Microbial activity beneath the Antarctic Ice Sheet: impacts beyond the ice margin?

Jemma Wadham (University of Bristol)

Glaciers on Mars

Bryn Hubbard (Aberystwyth University)

Sub-ice volcanism, ice sheets and global change

John Smellie (University of Leicester)

Darker, wetter and faster: recent and projected trends of mass balance over the Greenland Ice Sheet and linkages to surface and sub-surface processes

Marco Tedesco (City College of New York)

Challenges in modeling future sea level rise from melting glaciers

Valentina Radic (University of British Columbia)

Inland thinning of West Antarctic Ice Sheet steered along subglacial rifts

Rob Bingham (University of Aberdeen)

Polar Social Science and Humanities seminars, including:

Why is sound central to religious ritual? Performing a disruption of time in Ojibway shamanistic séances
Polina Dessiatnitchenko

An environmental anthropologist discovers spirits in Siberia

Florian Stammer (Arctic Centre, Rovaniemi, Finland and SPRI)

Unaccountability among the Evenki of East Siberia
István Sántha and Tatiana Safonova (Research Centre for Humanities, Hungarian Academy of Sciences)

Plural world interpretations: the case of the Tuvans in Siberia

Anett Christine Oelschlägel (Max Planck Institute for Social Anthropology, Halle)

Of beauty pageants and Eskimo dancing: performing indigeneity in Iñupiaq, Alaska

Barbara Bodenhorn (Pembroke College, Cambridge)

Pop, poetry and the gods: landscape, beauty and spirituality in Sakha community life

Eleanor Peers (Max Planck Institute for Social Anthropology, Halle)

Mortuary rites and bone extraction in the Baikal Region

Kate Faccia (Department of Biological Anthropology, Cambridge)

Mental health in the Norwegian Arctic

Tania Kossberg (SPRI)

Polar Information and Historic Archives

Library and Information Service

The international focus on the Scott centenary made 2012 a particularly busy year for the Library. We continued to offer service and research support to students and academic staff from many University departments, with regular users coming from the Department of Geography and the Institute itself. The Library received over 800 visits from external readers during the year, but also hosted many film and television crews and a larger than usual number of visiting groups. Library staff provided induction sessions and information literacy training for postgraduate students. The Librarian provided tours for a wide range of groups, including University College London, CAMCREES, the Cambridge graduate library trainees and Stig Tore Lunde and his staff from the Sandefjord Museum and Archives in Norway. Georgina Cronin assisted with the organisation of this year's Festival of Ideas events by displaying material from the Library collections in the Museum. The Library also mounted a display in the Friends' Room of Liz Jackson's work on the colour of glaciers.

A total of 2987 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 2012. *Polar and Glaciological Abstracts* was published in-house with three issues 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 on the web at <http://www.coldregions.org/dbtw-wpd/antinfo.htm>.

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 Department	£10,000
Ferring Pharmaceuticals	£50,000

Heather Lane continued to represent the Institute on the Journals Coordination Scheme Consultative Committee for the School of Physical Sciences, the Departmental and Faculty Librarians' Group and the Cambridge Libraries Advisory Group. She represented the Institute at meetings of the Antarctica 100 committee and at the British Antarctic Territories stakeholders meeting, as well as continuing as a member of the General Board Museums Committee and the Cambridge Museums Steering Group. Due to ill health, she was unable to attend the Polar Libraries Colloquy in Boulder, Colorado, but SPRI was represented by Antarctic Bibliographer Hilary Shibata. Georgina Cronin represented the Library as a member of the William Mills Book Prize Committee and continued her postgraduate qualification in Information and Library Management by distance learning from Northumbria University.

Janey Huber Reacher and Niamh O'Mahony were appointed to temporary cataloguing posts to assist with the Glaciology and Russian collections, respectively, and considerable progress was made towards the planned migration from the Library's current Muscat cataloguing system to the Voyager system used throughout the University's libraries. Suzan Griffiths, Ann Keith, Jacqueline Bell, Marie Purdy and Sandra Linton provided cover in the Library Office for absent staff. We were very sorry to see Shirley Sawtell leave for early retirement in October. Shirley has been with the Institute for over 20 years and has assisted countless researchers and students with their work.

The continuing efforts of our volunteers are vital in helping the library to provide research support. Percy Hammond and Jean Cruttwell continued their excellent work with the map collection. The Library also offered two work placements for school pupils during the year.

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. The expertise of the Data Centre Manager as a glaciologist is also invaluable in enabling the Library to answer the wide range of questions received from the polar community and the general public. The WDC is in recipient of up to 2000 enquiries a year. The WDCGC is central to SPRI's involvement in the International Polar Year Publications Database (IPY-PD) consortium.

As part of this initiative, the WDC is committed to capturing, abstracting and indexing the published output of IPY research into glaciology worldwide, as well as any associated education, outreach and communications materials, not just for the duration of the Polar Year, but for the fifteen years which follow. The IPY Publications Database will make a significant contribution to achieving the legacy targets of the IPY. Exploratory talks began in 2012 to convert the WDC to membership of the World Data System. The SPRI LIB catalogue received almost 50,000 page requests during the academic year 2011-12.

Rick Frolich and Heather Lane

Picture Library

The activities of the Picture Library continue to be dominated by the centenary of Captain Scott's British Antarctic Expedition 1910-13. Whilst assisting many visitors and enquirers from all over the world with their research of photographic material for use in a variety of publications, television programmes, lectures and museum exhibitions, emphasis has been placed strongly on Scott's 'Terra Nova' expedition. Photographic material has been supplied for a number of exhibitions and Scott Centenary commemorative events, including those at Cheltenham College, Gloucester Cathedral, The National Museum – Czech Museum of Music, The Natural History Museum, Northampton Museum and Art Gallery, McLean Museum and Art Gallery, Greenock, St Paul's Cathedral and the Wildfowl and Wetlands Trust, Slimbridge.

Media interest has been widespread and, in addition to numerous BBC and ITV news items, images have been supplied for a variety of television programmes including:

S4C Welsh Language Channel; 'Words of Captain Scott' (ITV); 'Der Wettlauf Zum Sudpol', a television documentary by the German film company Loopfilm GmbH; 'Antarctica' by Emilio Pacull, a television programme for French TV by Grand Angle Productions; 'Cold sweat' by Danie Ferreira, a television documentary made by the South African film company Urban Brew Studios; a television programme entitled 'in der Holle des Eismeeres' by ORF/ZDF Austrian Broadcasting company; and 'Met de kennis van Nu' Scientific year overview 2012, for the Netherlands television company NTR.

Huge tabular iceberg in a stormy Amundsen Sea, Antarctica



Images have appeared in many publications from academic theses, conference papers and journals to local and national newspapers and magazines including Inuit Art Quarterly, Physiological Reviews, Journal of Molecular Biology, Canadian Geographic Magazine, The Historian, Cambridgeshire County Life Magazine, and the Scotsman Magazine. Images have also been supplied for a number of books including '1912 The Year the World Discovered Antarctica' by Chris Turney; 'National Geographic 125 Years' by Mark Collins Jenkins; 'In touch with the World, Volume 12, Antarctica – Penguin Paradise', Readers' Digest Germany; 'Shipwreck at Cape Flora: The Arctic Expeditions of Benjamin Leigh Smith' by Peter Capelotti; 'Antarktida' by Prof. Pavel Prosek, Czech Republic; 'Women's work, Women's Art: Nineteenth Century Northern Athapaskan Clothing' by Judy Thompson and 'Scottish Explorers' a National Museums of Scotland publication. The Picture Library is also pleased to have provided images for Isle of Man postage stamps and the Stamps and Coins yearbook.

The Picture Library acquired an important group of 109 photographs, known as 'The Lost Photographs' taken by Captain Robert Falcon Scott on his journey towards the South Pole on the 'Terra Nova' expedition. The purchase of these photographs was enabled by a substantial grant from the Heritage Lottery Fund, combined with additional support from the UK Antarctic Heritage Trust, the Staples Trust and Dr John C Taylor OBE. Also acquired by donation from Michael Swales of the Tristan da Cunha Association was a significant number of photographs taken during the Gough Island Scientific Survey 1955-56. In addition, an extensive group of photographs from Edwin Mickleburgh depicting whaling stations on South Georgia during the 1970s has been received. These photographs, generously given to the Institute, are welcome additions to the collection and will compliment material the Institute already holds from these areas. The Picture Library would like to acknowledge the invaluable help given by Angela Haines and Nelly Berger for their dedicated voluntary work throughout the year.

Lucy Martin

The Thomas H Manning Polar Archives

During 2012, the archive welcomed a number of the descendants of *Terra Nova* expedition members who came to view the many letters and diaries in the Institute's collection. Throughout the Scott centenary many items from the archives have been quoted or reproduced in publications; for example, SPRI's collaboration with J. and S.L. Bonham produced the final volume, with critical apparatus by Ann Shirley, of the *South Polar Times* (SPT IV), the expedition newspaper of both Captain Scott's *Discovery* and *Terra Nova* expeditions, which completed publication of the full set. Volume IV was written during the second Antarctic winter of the *Terra Nova* expedition and, unlike the earlier editions, was not published on the expedition's return. This year the Folio Society has also brought out a facsimile version of the separate monthly issues. New additions to the archival collections included material relating to the Discovery Investigations, a

fifty-eight page letter from Frank Wild written during Scott's first Antarctic expedition and papers relating to the British Arctic Air Route expedition. Researchers from universities in the UK, Europe, America and New Zealand visited the Archive along with writers, broadcasters and those undertaking family research. The archive has also been working with the Antarctic Treaty Secretariat on a digitisation project to make the papers of their meetings more widely available.

Volunteers Sally Stonehouse, Deirdre Hanna and Michael Laughton have, as ever, provided excellent support; in 2012 they were joined by Judy Skelton, Sarah Greswell and Laura Kirby. Volunteer projects have included work on Greenlandic art, Shackleton's *Endurance* expedition and the papers of Hugh Robert Mill and Michael Barne.

Naomi Boneham

Polar Record

Four issues of *Polar Record* were published by Cambridge University Press during 2012. The journal continued as an internationally refereed journal of polar research for the sciences, social sciences and humanities. Forty articles appeared during the year together with eight notes, twenty-five book reviews and other contributions, including two obituaries. One of the issues was devoted to the proceedings of the 11th Circumpolar Remote Sensing Symposium held at the SPRI in September 2010. The July 2012 issue was also 'themed' in that articles were published

arising from the 'Contested borders and identities' symposium held at the University of Tromsø, Norway, in September 2009. All accepted papers are published on the journal website maintained by Cambridge University Press. A further point is that book reviews and obituaries now only appear in the web version and not in hard copy. Fifty-one 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

Much of the work for the SPRI website this year has been 'behind-the-scenes' in preparation for changes to the Library's cataloguing system. The new SPRI

Museum website is also in preparation and will be launched in 2013.

Martin Lucas-Smith

Teaching, Learning and Understanding

University Teaching

Academic members of the Institute's staff coordinate and deliver undergraduate lecture courses, and run laboratory classes, 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 more than twenty doctoral students, registered to study topics which range from measurements and modelling of ice-sheet change to the culture of Siberian reindeer herders. Each student works within one of our research groups, providing a strong and integrated research culture.

Julian Dowdeswell

The Polar Museum

Visitor numbers have continued to grow and we welcomed almost 52,000 visitors to the new displays and exhibitions during 2012. The Polar Museum benefited from the publicity surrounding the Scott centenary, which helped attract this record number of visitors. The museum was nominated for European Museum of the Year and received a commendation at the awards ceremony in Penafiel, Portugal in May.

The museum mounted five temporary exhibitions during the year: *These Rough Notes: Capt. Scott's Last Expedition* (Dec. 2011 to May 2012) commemorated the Terra Nova expedition and was an opportunity to display the wealth of archive material relating to the expedition held in the Institute; many of the manuscripts had never been exhibited before and the exhibition attracted over 27,000 people; *The Edge of Beyond: Daphne Scott's Antarctic paintings* (May to June) conveyed her response to the landscape and wildlife of the Antarctic during her time as the Friends of SPRI Artist in Residence on board HMS Scott in 2011; *Reflections on Ice: David Smith in Antarctica* (Aug. to Oct.) was a retrospective of work from SPRI's art collections and from the British Antarctic Survey, to whom we extend thanks for the loan of one of Smith's paintings; *An Expedition in Porcelain* (Aug. to Oct.) showcased the work of ceramic artist Jacqui Chanarin, reflecting her response to Captain Scott's British Antarctic Expedition of 1910-13; and *Robert Falcon Scott: A Century On* (Oct. 2012 to Feb. 2013) explored the impact of Captain Scott's achievements, Antarctic science and exploration, a century of art and literature and the wider cultural legacy of his expeditions.

We are grateful to the UK Antarctic Heritage Trust for their continuing support, which has enabled us to recruit Sophie Rowe and Christina Rozeik jointly to the post of Conservator, with complementary expertise in organic and inorganic materials. After Sophie Weeks' departure for Australia, Naomi Chapman and Rosie Amos provided cover for Education and Outreach, developing new resources and events during the Michaelmas Term. The Keeper chaired a number of meetings of the recently formed University of

Cambridge Museums Steering Group and she and Documentation Assistant, Willow Silvani continued to take part in discussions on collections rationalisation and Mrs Lane spoke on the subject at the SHARE Museums conference in Ipswich.

Acquisitions during the year included the purchase of Sir Vivian Fuchs' Graphlex reflex camera. Charles Swithinbank donated a cribbage board of marine ivory and a partially lithified mammoth tusk from Alaska and also several Alaskan walrus tusks and soapstone carvings. Jonathan Wager donated Greenlandic material which included wooden artefacts such as bow drills, fire boards, bird darts and children's games, relating to Lawrence Rickard Wager, British geologist on expeditions in the 1930s and 1950s. Julien Courtauld donated a sledging flag used by Augustine Courtauld and a Union Flag which flew over the ice cap station on the British Arctic Air Route Expedition 1930-1931. Esther Grizel Ross bequeathed a ship's (writing) desk taken by Sir James Clark Ross to the Antarctic and the Director donated a bottle of 'Rare Old Highland malt whisky' produced to commemorate Shackleton's British Antarctic Expedition 1907-09. A silver coin commemorating the centenary of Captain Scott's British Antarctic Expedition 1910-13 was gifted by the Pobjoy Mint and the South Polar Race Medal, which commemorates those who raced to attain the South Pole, was given by Sim Comfort Associates. We were grateful to receive on loan to the Institute, from HRH The Duke of Edinburgh's private collection, an oil painting *Whale chase by whale catcher* by Edward Seago, painted during the Duke of Edinburgh's 1956/57 World Tour.

Behind the scenes, our conservators and collections care staff, ably assisted by a number of volunteers, began the rehousing and detailed photography of our polar footwear collection. This was followed by the start of a project to reorganise storage of the textile collection, placing each garment in a Tyvek cover and arranging the material in its own separate store. We were pleased to welcome Flavia Ravaioli from University College London as conservation intern,

a post shared with the Fitzwilliam Museum. Flavia undertook a project to plan the rotation of textiles on display and to conserve materials from the Wager gift.

The Museum lent material for display to a number of institutions, including the Natural History Museum in London for their exhibition, *Scott's Last Expedition*, which then toured to the Canterbury Museum, Christchurch, New Zealand. Objects, watercolours and photographic portraits from our collections were exhibited at the National Museum of Wales, Cardiff and objects and artworks from the *On Thin Ice* touring exhibition went to the Plymouth Museum and Art Gallery. The loan of one of Captain Scott's boots was made to the Northampton Museum and Gallery and the Museum continued its longstanding collaboration with the Fram Museum in Oslo, with loans into their major summer exhibition, *Amundsen - First to the South Pole*.

The 109 photographs taken on the *Terra Nova* expedition by Captain Scott, together with his personal camera, were put on display in the House of Commons at a one-day event sponsored by the Heritage Lottery Fund (HLF), to highlight the major

award from the HLF to the Institute that enabled the acquisition of the photographs. On 5 July, Dr Edward Wilson's sledging flag was transported to Gloucester Cathedral where it featured prominently in his service of remembrance. Throughout 2012, the Wildlife and Wetlands Trust displayed the panels from SPRI's touring exhibition *On Thin Ice* at nine of their venues nationwide. The panels from the Scott centenary exhibition *These Rough Notes* were borrowed in September by the Gestingthorpe Historical Association and then in November by the Shackleton Autumn School in Athy, Eire, where they were displayed alongside a range of objects from SPRI's collection.

The museum continues to benefit enormously from the help and enthusiasm of its volunteers. Thanks go especially to the large group of front of house volunteers, looked after by our volunteer manager Grant Rabey, who staff the museum and shop during opening hours and provide a welcome to visitors. The museum staff are also grateful for the assistance of their colleagues in the General Office, whose help in enabling the museum to run smoothly is much appreciated.

Heather Lane

Playing a game about Antarctica in the Polar Museum



Education and Outreach

The Scott centenary provided the impetus for many schools which had not previously visited the Museum to do so. Numbers of school pupils participating in museum visits rose from 2500 in 2010-11 to 3800 in 2011-12. In addition, visits by students engaged in Further or Higher Education rose from 100 to 290 in the same period. *Twilight at the Museum*, held in February half-term, attracted record numbers, with well over 700 visitors exploring the displays by torchlight. The theme for 2012 was Arctic stories, with a storyteller and film shows to entertain the crowds. Poet Kaddy Benyon, who has been awarded an Arts Council England grant to prepare her new book on the theme of the Snow Queen, worked with museum staff on a series of very successful poetry workshops for children.

Academic staff and research students continued to contribute to Education and Outreach activities. Cool Club, initiated in 2011, made innovative, participatory presentations to primary-school age children on permafrost, atmospheric optics and bathymetry. Public lectures were given by Ian Willis (Who pulled the plug? Who or what is causing dramatic drainage of surface lakes on the Greenland ice sheet?) and Gareth Rees (Are trees invading the Arctic?), as part of the Science Festival, and an all-day outreach activity, 'science on ice', was run in the SPRI car park on the same day as the lectures. Here, children could learn about the behaviour of glaciers and how to measure them, how to move across sea ice, and how to measure trees. SPRI continued to develop partnerships with local schools, through the facilitation of a polar-themed 'thinking skills' programme and through the development of 'Snow Lab', a crowd-sourced project to measure snow cover across Cambridgeshire. David Pearce and Chris Hill from BAS gave a public lecture on the Lake Ellsworth Mission and Liz Morris (SPRI), Clive Oppenheimer (Geography) and Simon Morley (BAS) took part in a panel discussion on Extreme Science and Scott's British Antarctic Expedition. On 23 March, at an event organised in collaboration with the South Georgia Heritage Trust, BBC Producer Alistair Fothergill gave an illustrated lecture on the making of *The Frozen Planet*. Other outreach events included a performance of the love letters of Con and Kathleen Scott on 14 February, a reading of selected letters for Valentine's Day, presented to a capacity audience by distinguished actors Angela Pleasence and Oliver Cotton.

On 17 January 2012, children from around the world were invited to make a flag for Pole Day, by downloading a Union Flag from the web site to colour in and return to us with a message to commemorate the achievement of Scott and the Polar Party. The resulting flags were planted in front of the Institute and made a wonderful display enjoyed by the many guests who visited during the centenary celebrations. On the following day, Jenny

Coverack performed her one-woman play on the life of Kathleen Scott, *A Father for My Son*, to an audience of over 100, including a number of Scott's descendants. The artistic events held at SPRI around the centenary concluded on 27 March 2012 with *Last Words*, an evening of poetry and songs inspired by Captain Scott's last expedition, at which poet Kiran Millwood Hargrave read from her new collection, *Last March*, and guitarist and singer-songwriter Jake Wilson performed a song for each member of the Polar Party from his album, *All's Well*.

Festival of Ideas activities (24 Oct. to 4 Nov.) included visitor exploration of a trail of polar dreams and nightmares, developed by Dr Shane McCorristine in collaboration with museum staff, and creative activities based on the history of exploring, living and imagining the polar regions. Other Festival events at SPRI included an illustrated talk by Shane McCorristine on the paranormal and irrational aspects of polar exploration, and an extreme sci-fi social evening with a screening of *The Thing* (1982) and book readings by Dr John Ash. In November and December, the Museum staged *The Legacy of Captain Scott*, a cultural programme to accompany the special exhibition *Robert Falcon Scott: A Century On*. Musician Jake Wilson returned to talk and perform songs from his album *All's Well*; the Polar Museum's latest publication, *The Last Letters* was also launched at this event. Richard Pierce gave a reading from his new novel *Dead Men*, followed by a talk on using Scott's last expedition in a fictional context. Dr Max Jones (University of Manchester), talked on the development of Scott's reputation after 1945 and composer Dr. John Biddulph gave the world premier of *Terra Nova*, a work inspired by Scott's expedition, using acoustic, electronic and sampled sounds. Beyond the Institute, SPRI collections staff worked in collaboration with the City of London Sinfonia (CLS) to create a landmark concert tour entitled *Conquering the Antarctic*. The tour, which received glowing reviews in the national press, took place in February and March and included five venues (Birmingham, Cambridge, Cardiff, Cheltenham and Cadogan Hall in London). Under conductor Stephen Layton, the concert retraced the steps of Captain Scott's expedition to the South Pole in music, images and words. Excerpts from Vaughan Williams' film score *Scott of the Antarctic* were interwoven with moving readings from Scott's diary and Herbert Ponting's expedition photographs. The programme included the premiere of Cecilia McDowall's new piece *70 Degrees Below Zero*, commissioned by SPRI and the CLS for the centenary, setting music to words by poet Seán Street. Both Cecilia and Seán worked in the archives and used Scott's own letters as their inspiration.

Heather Lane

Projecting the Significance of the Polar Regions

Institute staff continue 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. Several of our staff made appearances on radio and television, including BBC and ITV news programmes. The amount of filming taking place in the Institute reached record levels in 2012, related to very strong media interest in the centenary of Captain Scott's last expedition to Antarctica. Views and quotations on polar topics, many of which include an emphasis on polar environmental change issues, have also appeared in broadsheet newspapers

both in Britain and internationally, and on the increasingly visited websites of media organisations. A number of our staff have given external talks at primary and secondary schools, in addition to academic seminars at UK 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 80. These external activities are time consuming, but are important in ensuring that the work of the Institute, in terms of both its scholarship and heritage 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, 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 2012, from the Gino Watkins Fund and the Arctic Club:

Expedition	Award
John Lyon School - Greenland Expedition	£800
NW Greenland Climb 2012	£1,250
Timmiarmiut, East Greenland 2012	£2,000
Arctic 2012 – Tilman Again	£1,750
Trans Antarctic Winter Traverse	£1,750
Greenland Expedition 2012 - Eton College	£1,300
West Lancashire Scouts - East Greenland 2012	£2,000
Greenlandic Over-Winter Expedition 2012	£1,250
Alaska 2012 Expedition - Imperial College	£2,000

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:

- Vice-Chair and UK representative on the International Arctic Science Committee (IASC) Working Group on the Cryosphere; J.A. Dowdeswell
- UK representative on the International Arctic Science Council (IASC) Working Group on the Humanities and Social Sciences; M. Bravo
- 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
- Member of the NERC Peer Review College; N.S. Arnold, J.A. Dowdeswell
- Vice-President, Geological Society of London; C.P. Summerhayes
- Treasurer, International Glaciological Society; I.C. Willis
- UK Delegate to the International Science Initiative for the Russian Arctic; W.G. Rees
- Member of the Advisory Council, European Union Arctic Forum Foundation; M. Bravo
- Member of the international steering group for the Tundra-Taiga Initiative; W.G. Rees
- Trans-Antarctic Association; P.D. Clarkson (Chair); K.A. Hogan, R.K. Headland, E.M. Morris (UK Advisory Committee members).
- Permanent UK representative of the Association of Marine Mammal Hunters of Chukotka; P. Vitebsky
- Trustee: Sutasoma Trust - P. Vitebsky; Fuchs Foundation - J.A. Dowdeswell
- Steering Committee Member, Polar Libraries Colloquy; H.E. Lane
- Steering Committee Member, EU Arctic Information Centre; H.E. Lane
- Editorial Board members: *Polar Record*, *Transactions of the Royal Society of Edinburgh*, *Archaeology*, *Ethnology and Anthropology of Eurasia*, *Anthropology and Archaeology of Eurasia*, *Anthropology and Medicine*, *Earth's Cryosphere*, *Cultural Geographies*, *Journal of the Institute of Conservation*, *Worldviews: Environment, Culture, Religion*.

International Glaciological Society (IGS)

The International Glaciological Society (IGS) is based at SPRI. Its aim is to serve the worldwide community of glaciologists through its publishing activities, the organization of symposia and actively promoting the exchange of information and ideas on all aspects of snow and ice. During 2012, the IGS published six issues of the *Journal of Glaciology* containing a record number of pages; 1252 in all. Three issues of *ICE*, the IGS news bulletin, and three issues of the *Annals of Glaciology* were also published. The first *Annals* impact factor was published in June 2012 and

was a very respectable 1.8. The IGS organized two international symposium in 2012. One on 'Seasonal Snow and Ice', was held in Lahti, Finland, in May-June. The second was held in Fairbanks, Alaska, USA, towards the end of June. In addition, the Society co-sponsored several IGS branch meetings and other meetings by separate organizations. Details on the IGS and its activities are available from its website (www.igsoc.org), 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 such as the IPCC, and to bring emerging issues to the attention of policy makers. In 2012 Professor Jerónimo López-Martínez (Spain) was elected as the new SCAR President. SCAR also gained two new Vice-Presidents: Professor Karin Lochte from the AWI in Germany and Professor Bryan Storey from the University of Canterbury, New Zealand.

From a science perspective SCAR approved several new science groups, including five new SCAR Scientific Research Programmes (SRPs, SCAR's marquee science programmes): State of the Antarctic Ecosystem (AntEco); Antarctic Thresholds - Ecosystem Resilience and Adaptation (Ant-ERA); Antarctic Climate Change in the 21st Century (AntClim21); Solid Earth Response and Cryosphere Evolution (SERCE); and Past Antarctic Ice Sheet Dynamics (PAIS). A major update to the Antarctic Climate Change and the Environment (ACCE, www.scar.org/publications/occasional/acce.html) was submitted to *Polar Record* and will be available in early 2013.

SCAR continued to work on its commitment to provide independent advice to the Antarctic Treaty with papers on subjects such as non-native species, anthropogenic sound, communication of climate change and a plan for Antarctic Conservation in the 21st Century (<http://www.scar.org/treaty/atcmxxxv/>). Dr Steve Rintoul was awarded the 2012 Martha T Muse Prize for Science and Policy in Antarctica, a \$100,000 unrestricted prize sponsored by the Tinker Foundation and coordinated by SCAR (www.museprize.org). Looking forward, SCAR will also hold its Biology Symposium in Barcelona this July (<http://www.icm.csic.es/XIthSCARBiologySymposium/>). The next SCAR Open Science Conference, Business and Delegates' meetings will be held in Auckland, New Zealand in August 2014 (<http://www.scar2014.com>). SCAR will also organize a 'Horizon Scan of Antarctic Science' to identify the most compelling questions that will improve understanding of Antarctica and the Southern Ocean and connections to the Earth System over the next 20 years. For further information on SCAR see: www.scar.org. SCAR is also available on Facebook and LinkedIn.

Dr Mike Sparrow (Executive Director)

Fundraising and the SPRI Appeal

Friends of the Scott Polar Research Institute

Drawing on a very hackneyed simile, centenaries it would seem are a bit like buses; you don't see one for ages and then, suddenly, you've got two of them. So no sooner had Scott's Centenary drawn to a close after a remarkable series of events, commemorations and gatherings (crowned, of course, by the service in St Paul's Cathedral on 29 March 2012), than the Antarctica 100 forum met again in November to sketch out plans for Shackleton's *Endurance* Centenary. The Friends of SPRI will play a full role in Shackleton's celebrations, just as they did in Scott's, so the Committee has already allocated time and resource to the task. Our programme promises to be exciting and fulfilling, and details will be published shortly. Looking back, our AGM marked the close of 2012 with an outstanding presentation by Elizabeth White, one of the amazing professionals behind the BBC's *Frozen Planet* series, who entranced us

with recollections of extreme filming and the daily challenges of life in the Polar regions. Those challenges will no doubt have been faced to some degree by our artist in residence on board HMS *Protector* deployed in the Antarctic Peninsula during the Austral summer in 2013. We very much look forward to hearing Emma Stibbon's stories and viewing the results of her labours in due course. I should also express the Friends' sincere gratitude to Mr Robert Brooks of Bonhams whose company has sponsored the artist in residence programme for a three-year period. It remains for me to thank everyone at SPRI for their support, and especially Kate Gilbert, Heather Lane and Celene Pickard who underpin the work of the Friends with great dedication.

Nick Lambert (Chair, Friends of the Scott Polar Research Institute)



Arctic tern eggs in a rudimentary nest just above the shoreline in Spitsbergen

The 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.

Now that the project for the redesign and refurbishment of the Institute's Polar Museum is complete, we 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 endowment 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. We also wish to build up endowment funds for the support of research students at the Institute (now initiated as the Scott Polar Scholarships Fund), and to enable increasingly expensive polar fieldwork to continue to take place on a regular basis.

The generosity of a number of individual donors, together with private trusts and foundations, is gratefully acknowledged. Particular thanks are due to Sir Humphry Wakefield for his 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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