

Technology Foresight: Natural Resources and the Environment

The Technology Foresight programme is a major initiative which was announced in the 1993 White Paper 'Realising our Potential'. The programme brings together industry, academia and government to consider how the UK can best take advantage of opportunities to promote wealth creation and enhance the quality of life. The programme is driven forward by 16 separate Foresight Panels.

Professor Jane Plant CBE of the BGS is co-chair of the Sustainable Resources and Environment Sub-group of the Natural Resources and the Environment Panel. The sub-group is concerned with the complete life-cycle of resource and environment management in both the UK and international markets. Topics covered by the sub-group range from resource assessment and mineral working, including oil, gas and coal, through extractive metallurgy to waste disposal, installation and decommissioning, and the remediation of contaminated land.

The natural resource and environment sectors of UK industry have an excellent track record of continuous technological progress and improvement, and of marketing their skills world-wide. However, there are still important opportunities for the future, based on the development of new technologies for natural resource and environmental management, to further enhance wealth creation, quality of life and sustainable development.

Coring in the Antarctic

The BGS's Petroleum and Marine Geology Group's Marine Operations section have just returned from a very successful project in the deep south. Working with the British Antarctic Survey (BAS) in the area of the northern Antarctic Peninsula and the Weddell Sea they mobilised and operated high resolution shallow seismic equipment and obtained rock and soil cores using the BGS Rockdrill/Vibrocoring in previously poorly surveyed and unsampled areas.

The work was carried out from the BAS ice-strengthened survey vessel the RRS 'James Clark Ross' which has been fitted with dynamic positioning. This computer control of propeller and thrusters allows the Bridge Officers to hold the vessel stationary with respect to the seabed, without anchors, for long periods of time. Thus BGS deployed their sampling equipment in water depths from 60 to 1600 m with a high measure of confidence, despite the hostile conditions of working in uncharted waters among moving ice.



Deploying the BGS Rockdrill from the RRS 'James Clark Ross' with King George Island, Antarctica in the background.

The project leader was Dr Richard Dingle of BAS; scientific details can be obtained from Dr Mike Thompson, Head of the Geoscience Division at BAS, Cambridge. Information on the seismic and sampling equipment used on the project can be obtained from Colin Brett or Alister Skinner at BGS Edinburgh.

The next project for the Edinburgh-based team is on the same vessel in a very different environment. By the time you read this the BGS Rockdrill and the prototype, BGS-built, BRIDGE orientated core drill, will be plumbing the depths to Atlantis Bank in the Indian Ocean as part of a combined National Science Foundation (NSF)/NERC

project to obtain palaeomagnetic and other cores from the gabbroic rocks of the Bank. Icebergs are not expected.

For further information contact:

Alister Skinner, BGS, Edinburgh
Tel: 0131 650 0399
Fax: 0131 668 4140

Meeting of Commonwealth Directors

The Directors of Geological Surveys from 27 Commonwealth countries met at the headquarters of the BGS in May 1998. The event was a working meeting, to discuss common problems and to explore the possibility of re-forming a previous liaison group sponsored by the Commonwealth Science Council, the Department for International Development and the BGS.

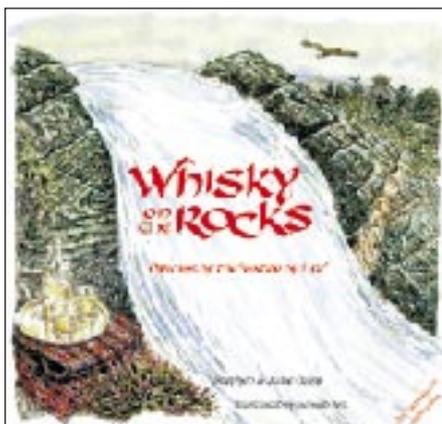
BGS International, the group within the BGS that deals with overseas programmes, is the descendent of the Directorate of Colonial Geological Surveys which was founded in 1947 and, in turn, established many of the Geological Surveys of Commonwealth countries whose current Directors attended the meeting in Keyworth.

The Directors have many experiences in common and each brought an individual insight into problems shared the world over. The Directors, from all parts of the world, met with advisors, end-users and international scientists. The programme followed suggestions made by the Directors and consisted of four plenary sessions and a series of workshops.

'This is an opportunity for social and cultural bonding, as well as science.' Points out Tony Reedman, Head of BGS International. 'Cooperative links between scientists and politicians, between developed and developing nations, and between peers of whatever nationality are of equal importance.'

For further information contact:

Dr Tony Reedman, BGS, Keyworth
Tel: 0115 936 3465
Fax: 0115 936 3474



Whisky on the Rocks, the latest 'Earthwise' publication.

Whisky and the BGS

Inspired by *Terroirs et vins de France* (Wines and winelands of France — geological journeys), the BGS has published *Whisky on the Rocks* — origins of the 'water of life' in the Earthwise series of popular books. The authors, Stephen and Julie Cribb, augment the magic and mystique of malt whisky by describing the geology of the rocks which source the local process waters and influence the character of the spirit. Their tour of the malt whisky distilleries starts with the geologically oldest on Islay and ends with the youngest: the 'volcanic' whiskies of Talisker, Tobermory and Bushmills. In between we sample malts from the Lowlands to Orkney. The local flavours are enhanced by over 100 commissioned watercolours by Richard Bell, the *Yorkshire Rock* artist, whose most recent appearance was on TV's *Fossil Roadshow*. *Whisky on the Rocks* is written for lovers of malt whisky; no previous knowledge of geology is required. At £6.50 it is the ideal gift.

All BGS publications are available from the Sales Desk: **BGS, Keyworth, Nottingham, NG12 5GG**
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Environmental statement

The British Geological Survey has made a commitment to the environmental integrity of every part of its nation-wide operation including the local headquarters at Keyworth and all regional offices.

With immediate effect every staff member, all contractors, consultants and suppliers will be encouraged to raise their personal and professional awareness of the environmental consequences of their working lives. The BGS includes in this commitment the welfare of neighbours and the local community, from whom it invites comment and suggestions for future involvement. It is considered important that these policies should be made public.

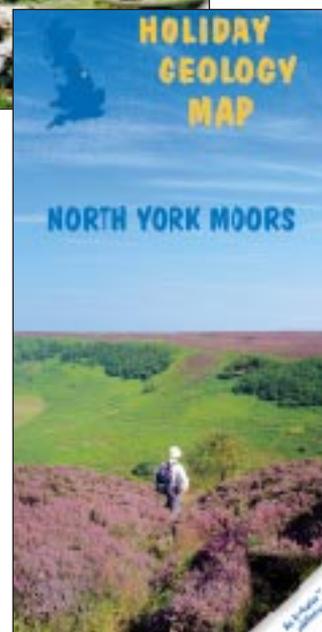
'It is BGS policy to provide goods and services that cause as little damage as possible,' says Director, Dr David Falvey. 'We are engaged in work that relates to almost every facet of industrial, commercial and domestic life, and it is important for us to take a leading role in environmental awareness. At every level, from the advice we give to the paper we use, we are working to improve our standards.'

Geological Society honour

Dr Tony Reedman, Head of BGS International, has been awarded the Geological Society's Major John Coke Medal for 1998. He first studied geology at Leeds and went on to work for the Geological Survey of Uganda. After a PhD at the Research Institute of African Geology in Leeds he joined the BGS (then known as the IGS). His career has included mapping work in northern England and North Wales as well as a return to Uganda and a very fruitful spell in Korea. He became Head of BGS International in 1990. The Geological Society cited Tony's keen interest and experience of a wide spectrum of earth science disciplines, and his professional representation of British Geology on the international scene as making him a worthy recipient of the Major John Coke medal.

More for holidaymakers

Visitors to west Cornwall who are fascinated by the ruined engine houses which dot the landscape can find all they want to know in *Mining in west Cornwall*, another in the **Holiday Geology Guide** series. Those who go walking in Yorkshire around Whitby and Scarborough will be able to understand the ground beneath their feet by purchasing *North York Moors*, another in the **Holiday Geology Map** series, which includes illustrations by Richard Bell.



Mining in west Cornwall and North York Moors, the latest BGS Holiday Geology publications.

Making an exhibition of ourselves

An exhibition of photographs from the archives of the BGS has been on display in the Keyworth reception area during March and April. The exhibition, entitled 'Hard Times', is a collection of 20 images selected from the photographic archives in both the Keyworth and Edinburgh offices, and includes photographs dating from between 1904 and 1937.

The exhibition received a good response from both academic and non-academic staff, and also from visitors to the site. It was also displayed at the Rock and Fossil Show held in the Oxford Centre, in March.

The BGS photographic archives, maintained by the Photography Units in both Keyworth and Edinburgh, contain in excess of 100 000 catalogued and described images dating back to 1894, with over 22 000 of the earlier images captured on glass plate negatives. The exhibition demonstrates a diverse range of themes charting our social and economic history through the past century and covers subjects such as engineering, architecture, manual labour and agriculture as well as geology.

A number of institutes and organisations have expressed an interest in the exhibition,



The photographic exhibition at the BGS.

and it is planned to tour the exhibits over the next 18 months or so. Copies of images from the exhibition, or the collections generally, can be obtained in a variety of formats.

For further information contact:

Paul Tod, BGS, Keyworth
Tel: 0115 936 3360
Fax: 0115 936 3200



J Horne, B N Peach and C T Clough, working in the north-west Highlands c. 1912.

New airborne survey

The BGS has launched a collaborative project with industry to fly a series of detailed airborne surveys over Britain to collect new environmental and geological data. The project is known as Hi-RES (High-resolution airborne Resource and Environmental Survey).

The first survey (Hi-RES-1) is being carried out in partnership with World Geoscience UK Ltd. It covers an area of around 14 000 km² over central England, extending from Lincoln in the east to Wrexham in the west and from Sheffield in the north to Shrewsbury in the south. The data are being collected from a fixed wing aircraft flying at low altitude along flight survey lines 400 m apart. The instrument package on the aircraft consists of a spectrometer to measure gamma radiation, a magnetometer to measure the magnetisation

of the underlying rocks and an electromagnetic receiver to map electrically conductive zones. The resulting high-resolution data will have a variety of beneficial environmental and resource applications including:

- Contributing to an understanding of the concealed geology of the region.
- Providing information which will aid decision-making for land use planning, mineral development planning and geological hazard assessment.
- Providing data which will assist in mapping the coal, oil and mineral resources of the UK.
- Mapping areas of above background radioactivity which may indicate radioactive industrial waste related to industrial activity dating from the 19th to mid 20th centuries.
- Identifying areas which may be prone to high radon levels.
- Measuring baseline levels of natural radioactivity against which any future radioactive contamination can be assessed.

Results from the survey will become available in mid 1998 and are likely to take the form of processed digital data and valued added products released in digital or hardcopy formats.

For further information contact:

Jon Busby, BGS, Keyworth
Tel: 0115 936 3440
Fax: 0115 936 3145

Record memoir production

With the release of *Geology of the country around Northallerton* at the beginning of May, a total of 12 memoirs will have been published by the BGS over the last eight months. All memoirs are produced in-house by Publication Services Group to plate-ready film stage. The figures are drafted in digital format and the photographs are scanned to a high resolution on the Group's scanner. The illustrations are

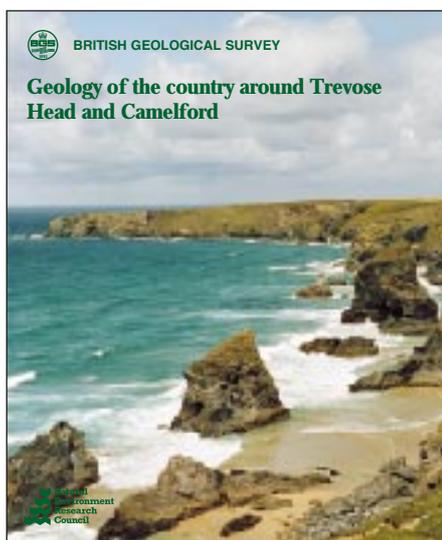
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merged with the text on Apple Macs running Quark XPress.

The memoirs and their accompanying geological maps provide complete accounts of the geology of the districts they cover. They also present geological information that is essential for planning and development proposals, engineering projects, pollution studies and conservation surveys. In addition, they contain a guide to other sources of information and geological data.

The 12 memoirs are:

- *Geology of Rum and the adjacent islands*
- *Geology of the country around Inverurie and Alford*
- *Geology of the Invermoriston district*
- *Geology of the Glen Roy district*
- *Geology of the Glasgow district*
- *Geology of the Hamilton district*
- *Geology of the country around Northallerton*
- *Geology of the west Cumbria district*
- *Geology of the country around Stoke-on-Trent*
- *Geology of the country around Snowdon*



Trevoze Head and Camelford memoir.

• *Geology of the country around Llanilar and Rhayader*

• *Geology of the country around Trevoze Head and Camelford*

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In addition they can be obtained from the sales points at BGS Edinburgh and the London Information office plus Stationery Office and other selected booksellers.

Professional and academic links

Professor Jane Plant, Assistant Director, and Head of the Minerals, Environment and Geochemical Surveys Division of the BGS will deliver one of two keynote papers to be given at the industry professional's event for Minerals '98 in London in June. The paper considers the sustainable development of energy, metallic and non-metallic minerals and considers the new technologies that are needed to further improve the environmental performance of the industry into the 21st century. In an addition to her existing academic links, Professor Plant has recently been appointed to the position of external examiner for the Environmental Science BSc course at Lancaster University.

New minerals related publications from the BGS

The 5th edition of the *Directory of Mines and Quarries 1998*, is now available, price £55. The Directory lists over 2000 onshore mineral workings in the UK by mineral commodity produced.

The directory is arranged in three main sections:-

- commodity, with location, basic geology and uses

• Mineral Planning Authority, with commodity and operator

• operator, listing operator address and pit address

A statistical overview on mineral production in UK is also provided.

Among the commodities covered, there are over 800 sand & gravel workings producing aggregates and over 800 hard rock quarries producing crushed rock and building stone. Other commodities include chalk, coal, china clay, fluorspar, gypsum, gold, potash, oil & gas and silica sand. The information is now also available in digital format on CD-ROM, price £300 plus VAT.

World Mineral Statistics 1992-96 provides a reliable, comprehensive and continuous set of data on the majority of economically important and internationally traded minerals, metals and other mineral-based materials. Production, export and import statistics have been compiled in consultation with major producers, traders and other international organisations. Maps of world production and charts showing trends in production for selected commodities are included. Price £80.

The *United Kingdom Minerals Yearbook 1997* contains comprehensive statistical data on minerals production, consumption and trade to 1996, estimates of production in major mineral commodities for 1997 and a commentary on developments in the UK's minerals industry during 1997. Price £35.

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For further details contact:

Don Cameron, BGS, Keyworth

Tel : 0115 936 3489

Fax: 0115 936 3520