

BUSH TELEGRAPH

The House Magazine of the Edinburgh Centre for Rural Research

Web Watch ...

ECRR

View the ECRR web site at
www.ecrr.org.uk

Science strategy

Following publication of its strategic review of R&D in Scotland the **Scottish Science Advisory Committee** is seeking new members.
www.scottishscience.org.uk

SNIFFER

Scottish & Northern Ireland Forum for Environmental Research is one of two new ECRR member organisations.
www.sniffer.org.uk

UHI

University of the Highlands & Islands Millennium Institute is the second new ECRR member organisation.
www.uhi.ac.uk/research

Not just for the birds

The **Royal Society for the Protection of Birds** is celebrating 100 years of working for Scotland's wildlife.
www.rspb.org.uk/scotland

Distilling the facts

R&D at **Heriot Watt School of Life Sciences** ranges from brewing and distilling to marine biotechnology and the environment
www.sls.hw.ac.uk

Inside ...

A Tribute to a Friend

An appreciation of Peter Wilson – an exceptional leader and a good friend.
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Spotting bird habitats

Satellite images of vegetation cover are being used by **RSPB Scotland** to identify appropriate habitats for grouse and other bird species.
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SAC growing away

2004 sees **SAC** celebrating 100 years of support for land-based industries with a strong and varied programme of activities.
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Strength in numbers

A scientific review of **Biomathematics & Statistics Scotland's** operations over the past seven years praises its unique contribution in the application of mathematical and statistical methods in the biological sciences.
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And more ...

Caring for Animals

Another active year of meetings is being organised by the **Scottish Centre for Animal Welfare Sciences**
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Tropical forests

A consortium of Scottish institutes under the banner of the **Edinburgh Centre for Tropical Forests** is making an impact on the development of forestry in the tropics.
> **Page 16**

People & Events

Professor Mark Woolhouse of **Edinburgh University's Centre for Infectious Diseases** has been appointed to an influential DEFRA Science Advisory Committee.
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Conferences & Meetings

Spring heralds a wide-ranging programme of rural-related scientific meetings:

- Countryside at crossroads?
- Agricultural history
- Scotland's biodiversity
- Biometry in science
- Plants as animal foods
- Genetic diagnostics
- Agriculture and landscape
- Energy & natural heritage

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EDITORIAL

There is quite a good deal of comment in this edition of the Bush Telegraph on the environment. From Lord Peter Melchett's Lecture in February through the RSPB article on the relationship between upland vegetation and bird conservation to the recent SEPA/SAC conference that looked at the implications of European legislation on water use by farmers and others in rural areas.

The environment is likely to play an even bigger role in the lives of rural inhabitants in the future. 2004 will see significant changes in the way Scottish agriculture is supported by subsidies. Farmers and their advisers will have to make difficult decisions about how they run their businesses in line with the new financial regime whilst taking into account the environmental aims of those running governments in Edinburgh and Brussels. The knock-on effect for research on rural issues is not yet clear but changes are inevitable. We must not however be pessimistic but look for the opportunities that will exist for scientists working to produce a better Scottish environment.

There is also much about Peter Wilson who will be missed as a friend of and as a good correspondent for the Bush Telegraph.

Remember to let colleagues know the electronic version of Bush Telegraph is available at www.ecrr.org.uk

Mike Steele
Editor

**Deadline for copy for the next issue is
May 31st 2004.**

**All contributions, comments and
suggestions can now be e-mailed to
M.Steele@ed.sac.ac.uk with copies to
m.talbot@bioss.ac.uk please.**

ROTA OF SOLICITED CONTRIBUTIONS TO BUSH TELEGRAPH

SPRING

British Geological Survey
Biomathematics & Statistics Scotland
University of Edinburgh, School of Biological Sciences
Royal Society for the Protection of Birds
SAC
Edinburgh Centre for Tropical Forests

SUMMER

University of Edinburgh, Institute of Cell, Animal & Population Biology
Centre for Ecology & Hydrology
MRC Human Reproductive Sciences Unit
University of Edinburgh Royal (Dick) School of Veterinary Studies
Royal Zoological Society of Scotland
Napier University, School of Life Sciences

AUTUMN

DEFRA Lasswade Veterinary Laboratory
National Museums of Scotland
Roslin Institute
Royal Botanic Garden Edinburgh
Scottish Natural Heritage
University Marine Biological Station, Millport
University of Edinburgh, School of Geosciences

WINTER

University of Stirling, Institute of Aquaculture
Moredun Research Institute
Forest Research Northern Research Station
University of Edinburgh, School of Social & Political Studies
Scottish Agricultural Science Agency
Scottish Centre for Animal Welfare Sciences
Scottish Crop Research Institute

SCIENTIFIC DIRECTOR'S NOTES



Dr Chris Browitt

EVENTS

Annual Lecture: The 2004 ECRR Lecture, supported jointly by the Institute of Biology (Scotland) and the Royal Society of Edinburgh took place on 20 February. It was delivered by Lord Peter Melchett, Policy Director of the Soil Association, organic farmer in Norfolk, and a leading figure in nature conservation and wildlife NGO's, including Greenpeace. His subject was "The Future of Food and Farming – what role for science?" It focused on issues concerning production in Western Europe and North America; including overproduction, dumping, public and political concerns, wildlife impacts, quality and diet, and called into question whether company-sponsored scientists and publicly-funded scientists were, any longer, sufficiently to be trusted by the public and whether the latter, at senior levels, were prepared to challenge Government policy. Of course, these are all important issues that the brief debate following his lecture could only touch upon. The lecture evoked some heartfelt dissent and some support, all of which was conducted in a manner befitting the occasion. The floor is now open for suggestions for next year's lecturer, the subject of which may cover hard science, policy, ethics, social impacts, funding; almost anything related to our sciences.

Recognising the influence that Peter Wilson had on so many of us, through ECRR, IOB and the RSE, David Atkinson has put to me the idea that we should celebrate his life in science, and commemorate him, by naming our joint annual lecture, **the Peter Wilson Lecture**. The ECRR Board has endorsed this idea and I will be consulting as appropriate to take it forward.

Ministerial visit: The planned VIP visit of Ross Finnie, Minister for the Environment and Rural Development, to the ECRR Directors' lunch at Heriot Watt University on 1 December 2003, had to be rescheduled, at the Minister's request, to 5 April 2004. Then, owing to illness and surgery, it has been delayed further to 7 June. The theme will be "Rural Development – Challenges and Opportunities", within which we might include discussion on the implications of CAP reform and on the new SEERAD Research Strategy, when it will be hosted by Bob Hay at the Scottish Agricultural Science Agency (SASA). Bob announced at the ECRR March Board meeting that he will be taking early retirement in August this year, so this high profile visit to his laboratories, is particularly appropriate.

Summer Reception: This year's event will be held once again at the John McIntyre Centre in the Pollock Halls, and will follow the traditional format of an informal, early evening gathering of Directors, colleagues, invited guests and graduate students. Some of the latter will discuss their work in front of posters; members' nominations are invited. Wilson Sibbett, chairman of what will be a new Scottish Science Advisory Committee, with a new remit, has agreed to join us and address us briefly during the evening. There will be an opportunity for some discussion on the direction and issues for Scottish Science.

SSAC visit. The Scottish Science Advisory Committee has agreed to hold one of its forthcoming meetings at an ECRR venue; with David Sugden offering the School of GeoScience. The committee was attracted to the BGS last year, and there will be opportunities for other Board members to

nominate their organisations for the future. For 2004, the timing could be as early as June or July; no SSAC meetings will be scheduled for the year until the new mission has been agreed with the Scottish Executive and the new committee formed – probably in April.

NEW MEMBERS

At the November Board Meeting, we welcomed, as guest observers, Dr Martin Price, Director of the Centre for Mountain Studies in Perth, and his colleague Dr Rhys Evans. The Centre's close links with the University of the Highlands and Islands, has enabled Martin to achieve agreement that the **UHI Millennium Institute** accept our invitation to join the ECRR community. He will be the contact point.

Ruth Wolstenholme, who has joined us in recent months as an observer, has confirmed that **SNIFFER (Scottish and Northern Ireland Forum for Environmental Research)** has also agreed to become a full partner in ECRR. We welcome the new perspective this association will bring in environmental research together with the wider geographical link with Northern Ireland.

ECRR CHANGE OF NAME

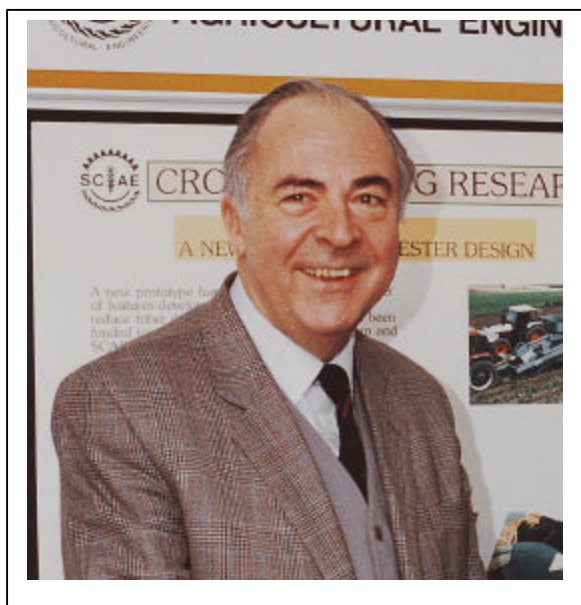
For some years, the idea of changing the name of ECRR to better reflect the organisation's current role and membership has been on the agenda without resolution. At the November Board meeting, several options were put forward for consideration. It was felt that the word "Rural" encapsulates the broad theme to which all members can relate and, furthermore, it has become fashionable once again. There are benefits, therefore, in retaining it. Members based outside Edinburgh were canvassed in relation to that city's name remaining, and it was seen to be very acceptable given the historical reason for its position in the title. As a consequence, only one alternative was short-listed: to replace "Centre" with "Consortium" in the "Edinburgh Centre for Rural Research" (or retain "Centre" and the status quo). By the time of the March Board meeting, respondents to the ongoing poll favoured the new name but, with only a 60% return, that position is not yet conclusive.

ECRR EVENTS - 2004

Apr 30	Executive Committee	SAC, King's Buildings	09.00
May 12	Summer reception	John McIntyre Centre, Pollock Halls, Edinburgh	17.00
Jun 7	Directors' lunch	SASA, East Craigs, Edinburgh Host: Dr Bob Hay	12.30
Sep 6	Directors' lunch	Scottish Crop Research Institute Invergowrie, Dundee Host: Professor Wayne Powell	12.30
Oct 4	Directors' lunch	Venue – Royal (Dick) School of Veterinary Studies, Summerhall Host: Professor Elaine Watson	12.30
Nov 3	Directors' lunch Main Board meeting Winter reception	Venue TBA	
Dec 6	Directors' lunch Executive Committee	Venue TBA	

PROFESSOR PETER WILSON - ECRR'S FIRST SCIENTIFIC DIRECTOR

AN APPRECIATION



Professor Peter Wilson, who died on 29th January 2004, had a pivotal role in the emergence of ECRR in 1989 as an outward-looking voluntary association of science-based organisations linked by an involvement in one or more aspects of 'rural research'. On his retirement from the University of Edinburgh in 1990 he accepted an invitation to become ECRR'S Scientific Director, one of the many roles he fulfilled in what continued to be a very active period of his life. During his tenure ECRR grew in membership and reputation to the extent that the consortium was regularly recommended as a model that other clusters should try to emulate. ECRR demonstrated that seemingly disparate scientific organisations could come together on a regular basis to their mutual advantage and much of the credit for this development was due to the lead that Peter gave in making it happen. In the context of this appreciation it is worth recalling how it was that Peter and ECRR came together.

Peter came to Edinburgh in 1984 as only the ninth holder of the University of Edinburgh's Chair in Agriculture and Rural Economy since its establishment in 1790, an appointment that carried with it the Principalship of the then East of Scotland College of Agriculture, the other arm of the conjoint Edinburgh School of Agriculture of which he was *de facto* Head. (In a sense, however, it was a homecoming to an alma mater from which he had obtained a postgraduate diploma in animal genetics in 1950). He brought to the Chair an established international reputation in the science and practice of tropical agriculture gleaned from 13 years in academic centres in Uganda and Trinidad coupled, significantly as it turned out, with a further 19 years scientific and commercial experience with Unilever, principally in its agricultural businesses, in which he was recognised as an influential leader. To some, perhaps many, it was a surprise that a senior businessman should be tempted to return to the comparatively austere realms of academia but Peter had a life-long affinity for learning and communication at all levels and, for him, the time for a change was right. Fortuitously, his business background and acumen came to the fore almost as soon as he took up his new post and the squeeze on government funding of research, particularly that deemed 'near market', began to bite. The University, the School of Agriculture and ECRR were all beneficiaries of Peter's guidance during this difficult time. 'Cometh the hour, cometh the man' was most apposite.

One of Peter's responsibilities as Professor of Agriculture was to be Vice Chairman of the Board of the Edinburgh Centre of Rural Economy (ECRE), a body established in 1947 to foster scientific interaction amongst its constituent organisations, at that time exclusively those with a locus on the Bush

Estate, and to manage the Estate and Bush House. For its management roles ECRE employed a sizeable full-time staff whose salaries, together with estate running costs, were a charge on member organisations. Together with others Peter recognised that ECRE was placing an over burdensome financial demand on its members and, at the behest of the Board, he convened a Working Group to review ECRE and to recommend a way forward. The Group's findings and proposals were endorsed by the Board with the result that by 1988 ECRE had relinquished its role as employer and devolved estate management to individual member organisations. These steps dramatically reduced members' subscription rates and allowed the consortium and its Board to focus on science-oriented activities under the new banner of ECRR, which was formally launched in 1989. The Board decided that to co-ordinate these activities ECRR should have a part-time Scientific Director and with Peter's early retiral from the Chair of Agriculture he was the natural and unanimous choice. He readily accepted the offer and fulfilled his role with enthusiasm and distinction during his tenure from 1990-1997.

From the outset Peter ensured that ECRR exercised a facilitating role in promoting collaboration, creating opportunities rather than directing alliances. To this end he introduced monthly working lunches of ECRR Directors that rotated round member institutions in order to raise mutual awareness of the spectrum of scientific resource and expertise embedded in ECRR. To enhance the profile of ECRR he arranged periodic visits by people of influence from the scientific, industrial and political communities and was instrumental in establishing the Annual ECRR Lecture, co-sponsored by the Institute of Biology and the Royal Society of Edinburgh and now an acknowledged prestigious event in the yearly calendar. Equally important was his encouragement of expansion of ECRR beyond the boundaries of Bush Estate and indeed of Edinburgh by

attracting other 'rural research' organisations into membership. By 1996 the number of members had doubled giving ECRR a wider geographical spread and a greater register of scientific expertise with which to foster collaborations and to engage with the public on scientific issues.

When he stood down as Scientific Director in 1997 Peter did so because he felt that 6-7 years was about the right spell in the post given the natural turnover of senior staff in member organisations, the ever progressing nature of science and its governance with which he felt that he might be getting out of close touch. Though these contentions were arguable his wishes were respected. His insight and commitment had ensured a smooth transition from a Bush-focussed ECRE to a more outward-looking successor body. He set ECRR on a sure foundation as a facilitating consortium of scientific institutions unique within the UK, the EU and probably more widely. That is Peter Wilson's legacy in but one field of his many endeavours but it is the one closest to us.

Other tributes have been paid to Peter Wilson for his distinguished contributions in professional spheres –as an agriculturist, an academic, a consultant, scientific adviser, committee member and chairman and for his services to the Institute of Biology and to the Royal Society of Edinburgh among others, several of which were recognised in his lifetime by prizes, medals and awards. As a person Peter was an instinctive, persuasive and congenial networker who thrived on bringing people together to explore and develop common interests and opportunities, something he did equally well in a variety of settings be they scientific or social. He remained a warm supporter of ECRR and its activities after 1997 and attended its public events whenever possible. He will be missed.

Ian D Aitken

PEOPLE & EVENTS

Professor Mark Woolhouse, Director of Edinburgh University's Centre for Infectious Diseases, and member of the ECRR Main Board, has been appointed to serve on DEFRA's new Science Advisory Council.

The 12-strong Science Advisory Council will help guide DEFRA's scientific priorities and work, including horizon-scanning and long-range planning as well as dealing with immediate risks and opportunities.

DEFRA spends more than £300 million a year on science and research underpinning a broad range of policies including environmental protection, farming and food, animal and plant health, and sustainable energy.



ROYAL SOCIETY FOR THE PROTECTION OF BIRDS - SCOTLAND

The application of satellite images for mapping upland vegetation and aiding bird conservation



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UK uplands and blanket bogs are of national and international conservation importance, and hold important numbers of birds. The extent of these habitats, together with physical problems of access and the nature of terrain, make these areas very difficult to survey. Remote sensing has previously been used successfully to map upland vegetation, although such work has generally focussed on broad habitat types. Mapping individual plant species may be more biologically meaningful when studying birds, especially since particular plants can be important predictors of bird abundance. The association between red grouse and heather is one well-known example. In collaboration with Scottish Agricultural College, we have recently undertaken a pilot study to examine the potential of using satellite images to produce extensive habitat maps of moorland vegetation, identifying the cover of individual species where possible. We then tested the applicability of this information in predicting bird abundance using bird-habitat association models.

We undertook a supervised classification of a Landsat 7 image of south-east Scotland using point sample vegetation data. These data, collected as part of another project, consisted of 100 point samples, 1 m in size, taken across 2km² plots, rather than large, homogenous stands of vegetation that are more conventionally used. At each point the dominant vegetation type and height of plants was recorded. The accuracy of the resultant classification was tested using the plots that the classification was based on (training plots) and a new set of plots from the area covered

by the satellite image (test plots). This showed that we were successful in identifying the cover of the commoner species (heather, purple moor grass) while we were less successful at classifying the scarcer vegetation types (e.g. tall rushes, moss). Habitat structure can be as important to birds as composition, and we found that by using linear regression to relate reflectance to the height of dwarf shrubs and grasses we were able to extract some information on vegetation height from the satellite images.

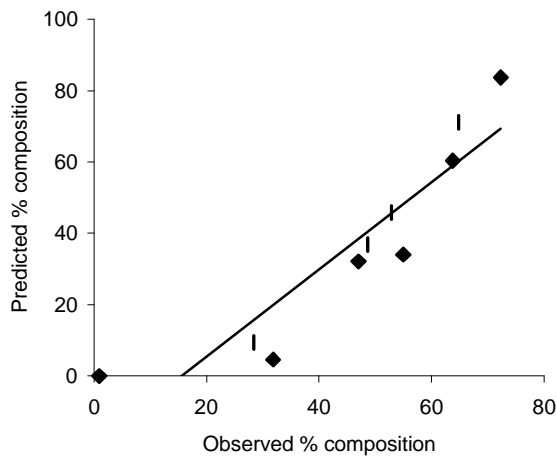
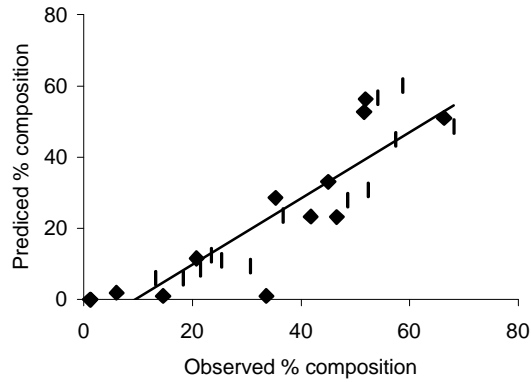
Encouraged by these results, we tested whether the information could be used to predict the abundance of two typical upland birds (red grouse and golden plover) over both the training and the test plots. Predictions of abundance based on the satellite derived data were of similar accuracy to those produced using the actual vegetation data for red grouse, but inclusion of the satellite data in the golden plover model produced inaccurate abundance predictions, due to over prediction of dwarf shrub height. This suggested that more refinement was needed. We are now using similar methods to study the distribution of black grouse and ring ouzels, and to identify potential reasons for



declines in the populations of these two birds.

The application of satellite images for mapping upland vegetation (continued)

Relationship between observed heather cover and that predicted from a supervised classification of the satellite image across the training plots (top figure) and the independent test plots (bottom figure). Trend lines are least squares regression.



SCOTTISH AGRICULTURAL COLLEGE



Janette Elder

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Global Conference on Animal Welfare

Professor Alistair Lawrence of SAC's Sustainable Livestock Systems Group presented a paper on "Food, water and malnutrition: Perspectives on nutrient requirements for health and welfare in farm animals," at the Global Conference on Animal Welfare held in Paris, 25 February 2004. Over 450 participants from more than 70 countries attended the three day event which was organised by the World Organisation for Animal Health (OIE) [<http://www.oie.int>].

Authors of the paper were A B Lawrence, B Tolkamp, C J Ashworth, C Dwyer, and G Simm of SAC and M S Cockram, of the Royal (Dick) School of Veterinary Studies, University of Edinburgh.

Geoff Simm Appointed to Chair of Farm Animal Genetics Resource Committee

Professor Geoff Simm, Head of SAC's Sustainable Livestock Systems Group has been appointed chair of a new National Steering Committee on Farm Animal Genetic Resources. The group has been set up to advise relevant UK government departments on matters relating to farm animal genetic resources, both rare and 'mainstream'.

Milk From Grass to Glass

As part of National Science Week in March, SAC's Crichton Royal Farm, near Dumfries, has been hosting farm visits for schools which will show how a dairy farm operates. Visitors will have a chance to follow the whole

process of milk production including a dairy parlour in operation. They can learn how important milk is to the human diet, and what factors are essential in producing, and high quality milk.

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Rural Tourism Conference Publication

The 'New Directions in Rural Tourism' conference hosted at Oswald Hall, Ayr Campus in 2001 is now bearing fruit in terms of publications. A book of the same name, edited by Derek Hall, Morag Mitchell and Lesley Roberts was recently published by Ashgate.

As well as drawing together some of the better Western and Eastern European and Australasian contributions from the conference, by emphasising linkages between research, education, training rural tourism management practice, the volume well articulates knowledge transfer within and from SAC.

A second conference volume, 'Rural Tourism and Sustainable Business', edited by Derek Hall, Morag Mitchell and Irene Kirkpatrick, will be published later in the year by Channel View. Again it involves contributions from seven current or former SAC colleagues and a

range of experiences from Canada, the USA, the Caribbean, New Zealand and Taiwan, as well as from closer to home.

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SAC Announces Selection of Monitor Farm for Perthshire

In February, Pitroddie Farm, Perthshire, was selected by SAC as the second of its Monitor Farms in Scotland. The farm is owned by Messrs M.A.Steele & Co and managed by Douglas Allan. Monitor Farms are basically normal commercial farms with enterprises, which are representative of the local area and where the farmer is prepared to allow other farmers from the area access to the farm. Monitor Farm community group members are able to assess the success of changes made on the monitor farm and are encouraged to make similar improvements on their own farms.

SAC has been contracted by SEERAD to set up Scotland's first two Monitor Farms; in the Borders and Perthshire. The first of SAC's Monitor Farms was selected last October and is located in the Borders.

Perthshire Monitor Farm
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Email: m.munro@ed.sac.ac.uk

Borders Monitor Farm
Iain Riddell 01835 823322
Email: i.riddell@ed.sac.ac.uk

SAC Pilots Farm Advice by Text Messaging

A new scheme 'SAC FarmText', currently being piloted by SAC and the Leader Programme in Lanarkshire, makes use of mobile phone messaging facilities to deliver up to the minute information directly to

farmers at their own workplace. With the majority of farmers in Scotland now using mobile phones to conduct their business, the 'SAC FarmText' system provides on the spot information about technical and business matters relevant to their needs. The SAC team providing the information includes, amongst others, well known industry figures such as Brian Hosie who specialises in livestock health issues, Basil Lowman whose expertise is well known to beef producers and crop disease expert, Simon Oxley.

120 users are now enrolled in the Lanarkshire pilot project, including, more than 90 farmers. SAC is looking at adapting the scheme so that it can be rolled out as a Scotland-wide service.

For further information contact:
SAC Farm Business Services (Lanark Office)
Tel: 01555 662562, Fax: 01555 663166,
Email: AOLanark@ed.sac.ac.uk

Agriculture and the Environment: Water Framework Directive and Agriculture Joint SEPA and SAC Biennial Conference 24 - 25 March 2004, Edinburgh

The impact of The Water Framework Directive 2003 (WFD) on the agriculture industry and agricultural practices and how these impacts can be measured and mitigated by best management practices were highlighted at the Joint SEPA (Scottish Environment Protection Agency) and SAC Biennial Conference 24 - 25 March 2004.

This ambitious legislation aims to raise water quality standards through effective co-ordination of water environment policy and regulation across Europe and is one of the most wide-ranging pieces of European environmental legislation to affect land managers in recent years.

Speaking prior to the conference, NFU Scotland President John Kinnaird said:

"Greater concern about what impacts on the environment around us has fostered political and public recognition of the environmental benefits farming continues to deliver. The industry's environmental role is central to both the Scottish Executive's Forward Strategy for Agriculture and the recently reformed Common Agricultural Policy.

"Farmers have a considerable role to play in helping to achieve the environmental objectives of legislation such as the Water Framework Directive. The priority of

Government must be to ensure regulation is workable and appropriate for Scotland. There must also be recognition of the important part voluntary programmes can play.

Developments such as the 4 Point Plan and Voluntary Initiative promote steps that can be taken on-farm that will benefit the industry and environment to the advantage of wildlife and habitats."

For further information about the conference see www.sac.ac.uk/SacSepaConf

BIOMATHEMATICS & STATISTICS SCOTLAND



David A Elston

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By far the most important event since BioSS's last contribution to the Bush Telegraph has been the unexpected death of Rob Kempton. An obituary appeared in issue number 48 of Bush Telegraph.

David Elston, who was Deputy Director, has been appointed Acting Director. He is based in Aberdeen, where he is Head of Group at the Macaulay Institute.

The British Region of the International Biometric Society will be hosting a memorial meeting for Rob at the Royal Society of Edinburgh on 16th April. Details can be found in the **Meetings & Conferences** section of this issue.

On a more positive note, Chris Glasbey has received an Honorary Chair in the School of Mathematical and Computer Sciences at Heriot-Watt University. Chris has worked in BioSS and its preceding organisations since 1977, and is known internationally for his work on image analysis and as Editor of the Royal Statistical Society's prestigious journal 'Applied Statistics'. Chris is now principal BioSS contact for ECRR.

Organisationally, BioSS received a very positive report from its recent Visiting Group. Unfortunately, this has not led immediately to the recruitment of a new Director. Instead, SEERAD are to commission another review of BioSS's work, as part the ongoing review of their science strategy. This additional review will look specifically at the optimal

provision of bioinformatics support for the SEERAD-sponsored research organisations, and more generally at the provision of underpinning statistical and mathematical expertise.

BioSS's international perspective has been enhanced by increasing contacts with our equivalent organisations in The Netherlands (Biometris) and France (INRA-MIA). We are shortly to host a tripartite workshop on risk. We have also been fostering links with our New Zealand counterparts in AgResearch, where statisticians and bioinformaticians have a shared cross-site management.

More locally, BioSS is involved in an increasing number of collaborative projects with ECRR organisations. One important development has been the BioSS-SAC collaboration on X-ray CT scanning of sheep, which allows body composition to be estimated from live animals. This has advanced from interpreting 2-dimensional images, recorded as pixels (picture elements), to interpreting 3-dimensional images, recorded as voxels (volume elements). Another important development is the increasing interaction with Edinburgh University School of Informatics, in conjunction with Scottish Centre for Genomic Technology and Informatics, on the estimation of gene expression using microarrays and subsequent modelling of gene function.

BioSS Training Courses

BioSS operates a programme of intensive one and two-day training courses aimed at raising the quantitative skills and understanding of scientists. The goals are to give scientists the ability to analyse their own data and to recognize when they need to seek help.

The courses mix formal teaching with computer-based practical sessions and cover:

- Elementary and specialist statistical techniques;
- The principles of mathematical modelling;
- Bioinformatics and statistical methods in molecular biology.

Courses are run at locations around Scotland. In-house courses have also been commissioned by, amongst others, DEFRA Central Science Laboratory, York and BBSRC John Innes Centre, Norwich. BioSS also contributes to courses run by Edinburgh University and Strathclyde University.

Information on the current programme of courses can be viewed at www.bioass.ac.uk .



Participants on a BioSS bioinformatics course held at the Moredun Research Institute

SCOTTISH CENTRE FOR ANIMAL WELFARE SCIENCES

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REPORT TO ECRR BOARD

Activities during 2003

Following the AGM at SAC Edinburgh in December Françoise Wemelsfelder (SAC) gave a talk on "Holistic assessment - where science and ethics meet" which generated a long and lively discussion.

In March a meeting was held at the Easter Bush Vet Centre on the subject "Companion animals and wee furries". The speakers were Donna Brander, Anne Gallagher and Shirley Seaman (Easter Bush Veterinary Centre) who gave papers on dog (and owner) behaviour and the cage environment of laboratory rabbits.

The Venue moved to the Roslin Institute in July for a meeting on "Poultry welfare". Dorothy McKeegan, Christine Moinard and Emma Jones (Roslin Institute) presented papers on their recent research on aspects of chemoreception in birds and their welfare and alternative systems for laying hens. John Savory (SAC) gave his swan song with a review of the effects of long-term selection for broiler traits with associated welfare benefits.

In October a meeting was held in conjunction with the Association of Veterinary Teachers & Research Workers at the Veterinary School in Glasgow on "Pain: assessment and alleviation". This was a full day meeting with papers by Mike Serpell (Gartnavel Hospital) on assessing and treating pain. In the afternoon Helen Whay (Bristol Vet School) spoke on pain and mastitis in cows and Sharon Dolan (Glasgow Vet School) on

models of inflammatory pain. All papers were very interesting and contributed to a most successful meeting.

Proposed programme for 2004

The Steering Committee met on 13th February and set out the programme for the year. The following meetings were proposed:

- Legs and Feet - Poultry and Cattle Welfare
- Laboratory Animal Welfare
- Zoo Conservation and Welfare
- Postgraduate Student presentations
- Changes in Farming Practice following the Mid Term Review of the CAP and Animal Welfare

It is also proposed that a one-day conference on welfare (topic yet to be decided) that will be of interest to a wide audience, be held in Edinburgh and to be organised and financed by SCAWS.

Correspondence

Following the establishment of contacts with New Zealand MAF some years ago, SCAWS continues to receive information from and respond to the National Animal Ethics Advisory Committee. During the year a number of reports and consultation papers were received from FAWC and SEERAD. These documents are held by the Secretary for consultation by members.

Once again this year, we are most grateful for the generous financial support from the British Veterinary Association Animal Welfare Foundation.

EDINBURGH CENTRE FOR TROPICAL FORESTS

Sadie Watson

ECTF, Pentlands Science Park, Bush Loan

Penicuik, Edinburgh EH26 OPH

Email: mail@ectf-ed.org.uk



What is ECTF?

The **Edinburgh Centre for Tropical Forests** is a partnership of five Edinburgh based member organisations, which takes advantage of their strongly complementary missions and close proximity to share experience and work, together on projects. They are:

- Centre for Ecology & Hydrology
- Forestry Commission
- LTS International
- Royal Botanic Garden, Edinburgh
- University of Edinburgh.

ECTF News

ECTF has had an active start to 2004 with the submission of a successful *Expression of Interest* for a medicinal plants project in Bhutan; putting together a proposal for a Marie Curie Early Stage Training Site, and the submission of two bids under the EU Tropical Forests Budget Line (see details below).

There have also been a number of changes on the Management Committee. Julia Wilson (CEH) will take up post as the new Chairperson from June 2004. A big “Thank You” to Paul Van Gardingen (UoE) who has been the chairperson for the past 18 months, and has put a lot of time and effort into developing ECTF and into finding new opportunities for us to work on. His energy has certainly kept us on our toes.

The ECTF Management Committee Representative for LTSI, Kirsti Thornber, will be taking maternity leave from the end of May, and Alex Forbes will take her place for

the duration. Marcus Sangster is now representing the Management Committee for the Forestry Commission. He is replacing Tim Rollinson who is now the new Director General of the FC.

ECTF Projects

Darwin Initiative – Monitoring and Evaluation (M&E) Project

At present, people from all of the ECTF member organisations as well as some associates and independent reviewers, are involved in the review process of Darwin project reports, with nearly a 100 project reviews (annual and final) commissioned since the start of our new contract in April 2003. In addition, 3 in-country Mid Term Evaluations of Darwin projects, introduced under the previous ECTF M&E contract, are being carried out.

We also published a first joint Defra/ECTF Darwin Newsletter, featuring news from projects and on the theme of Protected Areas, which is available from our website. A second newsletter is planned and contributions from projects have been invited recently.

Another new aspect is the development of the “Darwin network”, with the possibility to register online either as “Darwin Friend” for receiving our newsletter, information on application and other announcements; or as “Darwin Alumni”, an email forum to incorporate past and present Darwin project teams. The latter is meant to be a place to exchange information, discuss difficulties, seek advice and thus benefit from the wide

expertise within the Darwin community, and also advertise Darwin vacancies. Currently, project teams are invited to register, and the inaugural event will be a first online discussion on “Exploring best practices for Protected Area Management”. Please see the Darwin website “Networks” for more information.ⁱ

Two Darwin events took place last year that are worth highlighting: a Darwin workshop in London on 22 October, for Darwin project leaders and the wider Darwin community, and a reviewer day in Edinburgh on 6 November to discuss ways of improving the Darwin project review process. Both events received very positive feedback: the proceedings for the workshop in London are on the Darwin website; and a document summarising the outcome of the reviewer day and inviting further suggestions was circulated to all reviewers early this year. This document, together with communications with both reviewers and project leaders, will feed into our revisions of reporting and reviewing formats and further recommendations to Defra on the review process.

If you would like any further information on the Darwin Monitoring and Evaluation Project, please contact stefanie.halfmann@ed.ac.uk or go to www.darwin.gov.uk.

Sustainable Management of Tropical Forests (SEMAFOR) early stage training site

ECTF will apply for an EU Marie Curie Grant, and plan to offer joint structured training in aspects of Sustainable Management of Tropical Forests from the genetic to the global scale. The aim will be to produce scientists equipped with skills in state-of-the-art analytical techniques and with the necessary understanding of policy development and resource management to effect positive outcomes on the ground. If successful, approximately 6 PHD and 4 MSc Students over will be funded over 4 yrs in the RBGE, CEH and University of Edinburgh.

Medicinal Plants Project Phase II

ECTF has been invited to tender for a project in Bhutan that has two main aspects: the conservation and cultivation of medicinal plants and their marketing and commercialisation. ECTF will provide consultants for technical input, and will manage the project funds. We are currently in the process of putting this proposal together with the help of the RBGE, LTSI, the University of Edinburgh and The University of Strathclyde.

Making the Links: Putting Forests into Poverty Reduction Strategies in dryland Africa.

A proposal has been submitted to the EU Tropical Forest Budget Line by CIFOR with ECTF as a partner. Its objective is to ensure that forest-dependent people benefit fully and equitably from economic opportunities offered by forests goods and services through better policy formulation and implementation by facilitating poverty alleviation strategies, policies and programs that take into account the full value of forests goods and services in a way that improves rural livelihoods and reduces poverty. ECTF will provide international consultants on training and dissemination.

Dendrogene - Valuation of forests in local development

Another Proposal has been submitted to the Tropical Forest Budget Line for a project that will be based in Brazil and Bolivia and will work with local communities to develop their capacity to establish the true value of the forest resources in their territory applying traditional and scientific knowledge. ECTF will manage the administration and provide international consultants and technical input.

If you would like any further information on any of these projects or proposals, please do contact Sadie Watson (mail@ectf-ed.org.uk).

ECTF Workshops

ECTF will be organising a short training course for ECTF members to build skills in

putting together collaborative proposals/bids for funding on 25th May at 2pm (venue to be determined). If you are interested in attending this event, please contact Sadie.

Project Development Fund

ECTF supports members wishing to develop ideas for collaborative projects through its Project Development Fund. These funds are available for members who want to do a scoping study, put together a proposal, or develop a collaborative piece of work. Contact Sadie with your ideas and she will help you to access the fund.

Members' News

LTS has recently been collaborating with the Regional Community Forestry Training Centre (based in Bangkok) to deliver a training course on Decentralised Forest Management Planning. The course has been extremely well received by participants from a number of Asian countries. It focuses on developing capacity at the local government level to manage planning processes that ensure SFM and rural development. For more details contact kristin-olsen@ltsi.co.uk

Support to the Forest College Curriculum Revision in Malawi, Tanzania and Zambia –

LTS consultant Karen Edwards has begun work in Malawi, working with the Malawi College of Forestry and Wildlife and with the government Forestry Department. The project seeks to improve the training of forestry students to reflect new national priorities for community involvement in forest management. The work is funded by the Finnish Department for International Development Co-operation.

In the last couple of years LTS has facilitated a number of 'lesson learning and sharing' exercises at the end of projects. These have provided the opportunity for teams to reflect on what they have learned, and to share that learning with local, national and international audiences - through posters, policy briefs and practical guidance notes.

Toby Pennington from the RBGE has recently co-authored a user-friendly guide to the useful trees of the Peruvian Amazon. This marked the final phase of a major Darwin Initiative project based at the RBGE: "Tree diversity and agroforestry development in the Peruvian Amazon". The handbook is designed for local foresters, farmers and students and is the first of its kind in the region. It will serve as a vital source of information about the identification, propagation, care and harvesting of 140 economically useful Amazonian trees – sustainable sources of fruits and timber which could provide much needed income to small-scale farmers. For further information contact t.pennington@rbge.org.uk

A team from CEH is involved in The Desert Margins Program (a GEF project) which aims to address issues of global environmental importance in the desert margins of sub-Saharan Africa, in particular the loss of biological diversity, reduced sequestration of carbon, and increased soil erosion and sedimentation associated with land degradation. CEH activities will develop understanding of carbon and nitrogen cycling in desert margin ecosystems in order to evaluate the potential of land use management options to control land degradation, sequester carbon and limit climate forcing gas emissions. Field work has commenced in Mali and Senegal, where seasonal emissions of N₂O and CH₄ will be monitored on cropping systems including leguminous and non-N fixing cereals under a range of organic and mineral nutrient treatments. A second area of involvement from CEH is the investigation of growth and long-term effects on soil condition of a number of important tree species found in the Sahelian zone of West Africa. CEH will explore the potential of agroforestry systems in dryland sub-Saharan Africa to sequester carbon in woody biomass and to generate revenue from opportunities available through the trade of Greenhouse Gas Credits.

For further information please contact Nicola Hall hall@ceh.ac.uk or go to http://www.edinburgh.ceh.ac.uk/tropical/desert_margins_programme.htm

MEETINGS & CONFERENCES

The Scottish Countryside: at a Crossroads?

2nd Kitchside Academic Conference

offers the opportunity to hear influential representatives of the agricultural academic community debate on this subject.

Saturday 3rd & Sunday 4th April 2004

Museum of Scottish Country Life,
Kitchside, Philipshill Road, East Kilbride

Programme

- | | | |
|----------|-------------|--|
| Saturday | 10.30-11.10 | How has industry physically impacted on the countryside?
Speaker: John Gall, North of England Open Air Museum |
| | 11.15-11.55 | The case for preserving the countryside
Speaker: Professor Aubrey Manning |
| | 12.00-12.40 | The case for changing the countryside
Speaker: Maitland Mackie |
| | 14.05-14.45 | Declining labour force and the impact on social life in Scotland |
| | 14.50-15.30 | Agricultural subsidies and profitability
Speaker: Ian Kenny |
| | 15.45-16.25 | The countryside as factory or playground?
Speaker: Gavin Sprott |
| Sunday | 10.30-11.10 | Is co-existence with GM cropping possible in European arable farming?
Speaker: Dr Geoff Squire |
| | 11.15-11.55 | Foot & Mouth: is the disease epidemic exacerbated by modern society?
Speaker: Karl Linklater |
| | 12.00-12.40 | The energy deficit: from horsepower to jumbo jet.
Speaker: Catherine Wilson |

For further information please contact the Museum of Scottish Country Life, Kitchside, Philipshill Road, East Kilbride. Tel: 0131 247 4373

MEETINGS & CONFERENCES

**British Agricultural History Society
and
School of History and Classics Edinburgh University**

SPRING CONFERENCE 2004

5-7 APRIL, Pollock Halls, University of Edinburgh

Programme

Prof. Robert Dodgshon (University of Wales, Aberystwyth)

Beyond the clearances: Livestock farming in the Scottish Highlands, 1580-1880

Research funding opportunities in rural and agricultural history

- a discussion led by Prof. John Beckett.

Dr Susanna Wade Martins (RCAHMS)

' "The most fruitful spot in Britain" (1798): East Lothian and Agricultural Change.

New Researchers session

Catherine Douglas (Nuffield College, Oxford)

Enclosure in Scotland

Mark Rothery (University of Exeter)

**The Social Transformation of a "Traditional" Elite in Modern England;
The Landed Gentry of Devon, Hertfordshire/Lincolnshire c. 1870-1939**

Barbara Linsley (University of East Anglia)

**Homes for Heroes - Housing Legislation and its Effect on Working Class
Housing in Rural Norfolk, 1918-39**

Prof. Jan Bieleman (University of Wageningen, Netherlands)

Dutch Cattle Breeding and Dairy Farming 1850-2000: An Overview.

Excursion to explore aspects of High Farming in East Lothian

Dr Heather Holmes (Scottish Executive)

**For the Encouragement of Agricultural Improvement in Scotland in the
1780s: Ownership of the Agricultural Books of David Young**

Prof. T. C. Smout (University of St. Andrews)

Scottish Farmers and Woods 1600-1850

Dr Leigh Shaw-Taylor (University of Cambridge)

The English Peasantry in the Eighteenth Century: Dead or Dying?

Details and application forms from Dr. Ewen Cameron, Scottish History, School of History and Classics, University of Edinburgh, 17 Buccleuch Place, Edinburgh, Scotland EH8 9LN or Dr. John Broad, at j.broad@londonmet.ac.uk/ Charles Jedrej at mjedrej@staffmail.ed.ac.uk

MEETINGS & CONFERENCES

SCOTTISH BIODIVERSITY FORUM S

CELEBRATING SCOTLAND S BIODIVERSITY

WEDNESDAY 14 APRIL 2004

WILD ABOUT NATURE										05.00 17.00
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MEETINGS & CONFERENCES

SCOTTISH BIODIVERSITY FORUM S

SCIENCE FOR BIODIVERSITY

THURSDAY 15 APRIL 2004

A

10.00 - 10.45	INTRODUCTION	M G
10.45 - 10.15	DISTURBING THE ANCIENT PINWOOD WITH COWS AND FIRE	M H RSPB
10.15 - 10.45	WHAT'S HAPPENING WITH LICHENS	B C C E RBGE
10.45 - 11.15	T	
11.15 - 11.45	SUB-ARCTIC WILLOW BIODIVERSITY IN SCOTLAND	M RBGE
11.45 - 12.15	BURNET MOTHS	M Y U A
12.15 - 12.45	CAN WE PREDICT CLIMATE CHANGE IMPACTS ON BIODIVERSITY	S A C E H B
12.45 - 14.00	L	
14.00 - 14.00	THE IMPORTANCE OF WORMS TO THE OIL AND GAS INDUSTRY	S C N M S
14.00 - 15.00	THE SIGNIFICANCE OF MAERL BEDS	G M U M B S M
15.00 - 15.00	T	
15.00 - 16.00	INTROGRESSION - A THREAT TO CONSERVATION IN MAMMALS	A NMS
16.00 - 16.00	PLANT GENETIC BIODIVERSITY IN SCOTLAND - WHAT DO WE KNOW NOW	P H RBGE
16.00 - 16.45	CONCLUSION	C SEPA

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C N S

MEETINGS & CONFERENCES

International Biometric Society British Region

205th Ordinary Meeting in memory of Rob Kempton

Friday 16th April, 2004, 9.30 - 17.30

The 205th Ordinary Meeting of the British Region will be a special meeting held in memory of Rob Kempton, past President and Secretary of the Region, who died in May 2003, shortly after election as President-Elect of the International Biometric Society. This one-day meeting will be held at the Royal Society of Edinburgh, of which Rob was a Fellow, starting at 9.30 (registration from 9.00) and finishing at about 17.30. For further information please email dave.waddington@bbsrc.ac.uk

09.00 Registration

09.30 Tribute: Rob and Biomathematics and Statistics Scotland
Gavin Gibson (Heriot-Watt University)

10.00 Tribute: Rob and the International Biometric Society
(Including the presentation of the IBS Honorary Memorial Award)
Andrew Mead (IBS British Region Secretary)
& *Geert Molenberghs (IBS President)*

10.20 The statistically diverse environment
Ron Smith (Centre for Ecology and Hydrology, Edinburgh)

11.25 Design of field experiments in the presence of interference between treatments
Rosemary Bailey (Queen Mary College, University of London)

12.10 Crop cultivar breeding and evaluation: a review of current statistical methods
Brian Cullis and Alison Smith (Wagga Wagga Agricultural Institute, NSW, Australia)

13.55 Applications of Markov random fields in biometry
Julian Besag (University of Washington, Seattle, USA)

14.40 Modelling neighbour effects with plant height in variety trials
Olivier David (Unité BIA, INRA, France)

15.10 Modelling neighbour effects (title and abstract to be confirmed)
Fabian Nabugoomu (Makerere University, Kampala, Uganda)

16.00 *Multivariate analysis of ecological communities*
Cajo ter Braak (Biometris, Wageningen University and Research Centre, Wageningen, The Netherlands)

16.45 Estimation and Presentation of Risk
Robert Curnow (Emeritus Professor of Applied Statistics, University of Reading)

MEETINGS & CONFERENCES

Plants as animal foods: a case of catch 22?

**Royal Botanical Gardens in Edinburgh
19 April 2004**

A joint conference by Nutrition Society and British Society of Animal Science.

The meeting will focus on the role of plant secondary metabolites in animal nutrition, through addressing their:

Role in mammalian herbivory	Dr Glenn Iason, MLURI
Biochemistry	Dr Tom Acamovic, SAC
Plant breeding perspectives	Dr Phillip Morris, IGER
Antimicrobial properties	Dr John Wallace, RRI
Antiparasitic properties	Dr Spiridoula Athanasiadou, SAC
Use in practical animal nutrition	Dr Andy Chesson, RRI

The registration fee is only £45.

Please visit the following to view full programme and to book.

Meeting programme:

<http://www.nutrition society.org/!Docs/NewDocs/Meetings/ssm2004programme.pdf>

Online Booking Form:

<http://www.nutrition society.org.uk/register/bsas/regform.cfm>

Printable Booking Form:

<http://www.nutrition society.org/!Docs/NewDocs/Meetings/ssm2004bookingform.pdf>

For more information contact the local organizers:

- Dr Jos Houdijk: j.houdijk@ed.sac.ac.uk
- Dr Mauvis Gore: mauvisgore@netscape.net

MEETINGS & CONFERENCES



Thursday 13 May 2004: 'Genetic Diagnostics'

This workshop will be of interest to both industry and the research community alike and will include:

- testing for inherited diseases of livestock and humans
- new genetic tests for disease causing pathogens
- the potential for breeding livestock for disease resistance
- the latest genetic testing tools and how the cost of volume tests is likely to fall

You can download a booking form from www.genesis-faraday.org/diagnostics.htm.

Monday 27 September 2004: 'Beginners Guide to Genomics'

As genetics is a rapidly developing area of science some of the terminology used can be a challenge to those outside the specific subject area! In response to requests from some of Faraday's partners a half-day 'Beginners Guide to Genomics' interactive workshop is likely to be organised if sufficient demand is shown. The workshop will aim to cover the basics in applying the latest technologies to business or research.

Tuesday 28 September 2004: The Annual Genesis - Faraday Conference

This should be an excellent opportunity to catch up with some of the latest developments in genetics and genomics applied to animal breeding and health.

Background

The Genesis FP is the result of a bid, led by the Roslin Institute, to the 2002 competition for new Faraday Partnerships. Genesis FP works to improve the co-ordination of the use of genetic and genomic technologies by the livestock breeding and animal health industries.

It promotes and co-ordinates basic research, assists with technology transfer and organises and promotes relevant training activities. The results of this activity will be a more sustainable livestock industry with better animal production, health and welfare, together with thriving livestock breeding and animal health companies.

Ownership and Governance

The Genesis Faraday Partnership was established as a Company Limited by Guarantee in November 2002, and commenced operations from 1 January 2003. The Company is 'not for profit'. The owners of the Company are:

- Roslin Institute (Edinburgh)
- Royal Veterinary College (London)
- Meat and Livestock Commission (Milton Keynes)
- University of Edinburgh

Sygen Ltd (Oxfordshire)

For all details go to the Genesis-Faraday website www.genesis-faraday.org

MEETINGS & CONFERENCES

To celebrate its Centenary year the **Association of Applied Biologists** has organized three conferences whose details can be found at:

<http://aab.org.uk/meetings/mtgs2004/mtgs2004.htm>

The first meeting will be held at the Society of Chemical Industry in London and the second one at St Catherine's College, Oxford.

- **25-26 May 2004:** Agriculture in future rural landscapes: visionary perspectives of opportunities through innovative research in applied biology.
- **15-17 December 2004:** The multi-disciplinary programme of the Centennial conference will be released soon.

MEETINGS & CONFERENCES

SNH CONFERENCE – PITLOCHRY FESTIVAL THEATRE, PITLOCHRY WEDNESDAY 10 and THURSDAY 11 NOVEMBER

SNH's annual conference will be held in Pitlochry in November 2004 and will address the subject of "Energy and the natural heritage". This two-day conference will take a wide look at the impacts of energy use on the natural heritage and options for the future.

Society's demand for energy and fuels has long had consequences for our natural heritage, whether from the harvesting of firewood, the extraction of coal and other fossil fuels, or the development of hydro-power. Within the last few years, concern about the effect of continuing CO₂ emissions on the global climate has led to challenging targets being set for their reduction, and a determination to replace use of fossil fuel with renewable energy sources. Government has an ambition of reducing current carbon emissions by 60% by mid-century. Energy efficiency schemes have been developed, an emissions trading scheme is being introduced, and targets for renewable electricity have been set. One visible outcome is the large number of proposals for wind farms and new small-scale hydro schemes throughout Scotland.

Energy developments often have a significant impact on the natural heritage. SNH is a major player in the planning and development process and its views are sought by the Scottish Executive, local authorities and developers on the effects of proposals on the natural heritage and of their acceptability. Finding the right balance between protecting the natural heritage, and supporting the desire to reduce carbon emissions, is a key challenge for SNH.

Conference programme

Day 1 will cover:

- Overview of energy use in Scotland
- Legacy from the past – a review of past energy use
- Present and future energy options

Day 2 will focus on renewable electricity, with sessions on the natural heritage effects of:

- Hydro
- Biomass
- Onshore wind
- Marine technologies

In addition to the Conference sessions on 10 and 11 November, it is hoped to arrange an evening lecture, open to the public, on the evening of Tuesday 9 November. More information will be available shortly.

If you'd like to receive a copy of the First Announcement leaflet (available end March/early April), please contact:

Mrs Helen G Forster
"Energy and the natural heritage" Conference Administrator
Scottish Natural Heritage
2 Anderson Place, Edinburgh EH6 5NP

Tel: 00 44 (0)131-446 2420 Fax: 00 44 (0)131-446 2406
E-mail: energyconference@snh.gov.uk

ECRR MEMBER ORGANISATIONS

University of Edinburgh

Heriot-Watt University

Napier University

University of Stirling

University of the Highlands & Islands Millennium Institute

Scottish Agricultural College

Biomathematics & Statistics Scotland

British Geological Survey

NERC Centre for Ecology & Hydrology Edinburgh

Forest Research Northern Research Station

CVL Lasswade Veterinary Laboratory

Moredun Research Institute

MRC Human Reproductive Sciences Unit

National Museums of Scotland

Roslin Institute

Royal Botanic Garden Edinburgh

Royal Society for the Protection of Birds

Royal Zoological Society of Scotland

Scottish Agricultural Science Agency

Scottish Crop Research Institute

Scottish Natural Heritage

Scottish & Northern Ireland Forum for Environmental Research

University Marine Biological Station Millport

ECRR web site : www.ecrr.org.uk

