

What on earth? the threat to the science underpinning conservation : the Government's response and the Committee's commentary : with evidence : third report session 2002-03.

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HOUSE OF LORDS

SESSION 2002–03
3rd REPORTSELECT COMMITTEE ON
SCIENCE AND TECHNOLOGY**WHAT ON EARTH? THE THREAT TO
THE SCIENCE UNDERPINNING
CONSERVATION: THE GOVERNMENT'S
RESPONSE AND THE COMMITTEE'S
COMMENTARY**

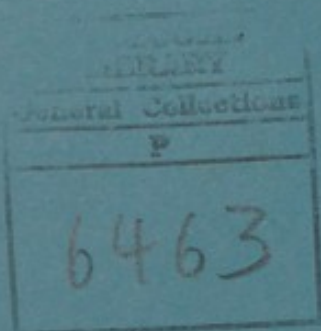
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SELECT COMMITTEE ON SCIENCE AND TECHNOLOGY

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WHAT ON EARTH? THE THREAT TO THE SCIENCE UNDERPINNING CONSERVATION: THE GOVERNMENT'S RESPONSE AND THE COMMITTEE'S COMMENTARY

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SELECT COMMITTEE ON
SCIENCE AND TECHNOLOGY

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THE SCIENCE UNDERPINNING
CONSERVATION: THE GOVERNMENT'S
RESPONSE AND THE COMMITTEE'S
COMMENTARY

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NOTE: Pages of the Report and Appendices are numbered in bold type; pages of evidence are numbered in ordinary type. References in the text of the Report are as follows:

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- Linnean Society
- Natural Environment Research Council
- Natural History Museum
- Public Health Laboratory Service
- Royal Botanic Gardens Edinburgh
- Royal Botanic Gardens Kew
- The Royal Entomological Society
- The Royal Society
- Royal Society of Edinburgh
- The Systematics Association

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THIRD REPORT

By the Select Committee appointed to consider Science and Technology.

ORDERED TO REPORT

WHAT ON EARTH? THE THREAT TO THE SCIENCE UNDERPINNING CONSERVATION: THE GOVERNMENT'S RESPONSE AND THE COMMITTEE'S COMMENTARY

Background

1. In May 2002 we reported on *What on Earth? The Threat to the Science Underpinning Conservation* (4th Report 2001-02, HL Paper 118(i)). We emphasised how important it is to understand the diversity of living things on the earth, and the crucial expertise that systematic biologists bring to this subject.

2. We made nine recommendations, two-fold in nature, relating to increasing financial support and concerned with collaborating and setting priorities. The Government response, which we received in December 2002, was circulated to the bodies and individuals who submitted evidence to the inquiry, and placed on the Committee's web site. We issued a request for comments on the response, which would help inform our reply to the Government. The Government response is appended to this Report, together with the comments received.

3. In general, we and our witnesses are disappointed with the Government's response, particularly where it concerns grant-in-aid to the major systematics institutions (Recommendation 1.1). We are also disappointed at the Government's failure to publish a clear, concise summary document regarding their policy on biodiversity conservation activity (Recommendation 1.3). However, we are pleased to note that DEFRA has agreed to take the lead in setting up a body bringing together representatives of the systematic biology community (Recommendation 1.8), and to increase funding for the Darwin Initiative (Recommendation 1.9). We call for the co-ordinating body to be set up without delay.

4. Below, we react to the Government's response on each Recommendation, and reflect the comments received where there was agreement between several bodies.

We are very grateful for the substantial comments received from:

- CABI Bioscience
- Linnean Society
- Natural Environment Research Council
- Natural History Museum
- Public Health Laboratory Service
- Royal Botanic Gardens Edinburgh
- Royal Botanic Gardens Kew
- The Royal Entomological Society
- The Royal Society
- Royal Society of Edinburgh
- The Systematics Association

Commentary on the Government's response

Recommendation 1.1: In view of the Government's commitments to biodiversity conservation we recommend that they increase grant-in-aid to the major systematics institutions. We envisage this as providing support to collections—the databases used by systematic biologists and conservationists. In accordance with the recommendation of the Dainton Report,¹ grant-in-aid funding should be increased to the level it would have been had the 1992 figures been maintained in line with inflation. This would allow further digitising of the collections.

5. The Government has responded to this call for increased grants by stating that it will not be possible to increase grant-in-aid funding to the level it would have been at, taking account of inflation since 1992, and pointed to "substantial new resources" that have been made available. There were varying degrees of dissatisfaction with the Government's increased funding from all respondents except Kew, which was "very grateful for this support" (p 6). Several bodies regarded the statement as "misleading" (p 2, p 4, p 11) given previous reductions in grant-in-aid, which the most recent increases do not fully reverse and regret the Government's statement that they will not bring funding back to 1992 levels. Some, including the Natural History Museum, pointed to the wider demands being placed upon them by Government as the result of the Convention on Biodiversity (for example).

6. We are most disappointed that the grant-in-aid will not be increased to the levels we recommended, and urge the Government to reconsider.

Recommendation 1.3: We recommend that the Government develop and publish a clear, concise summary document regarding their policy on biodiversity conservation activity in the United Kingdom and on the international stage.

7. The Government have not done so. Out of five respondents who offered comments, the Royal Botanic Gardens (RBG) Kew, the Natural History Museum and the Royal Entomological Society saw the response as insufficient, and called for the recommendation to be met. RBG Kew stated "there remains an urgent need for a concise document which summarises the UK's overall biodiversity policy" (p 6). RBG Edinburgh took the view that the strategies listed were not concerned with the international stage, and CABI thought that more resources need to be devoted to joined-up UK thinking.

8. We consider that the rather long list of separate documents given in the Government response highlights precisely the need for a summary document. This would enable the systematic biology and conservation communities to develop effective strategies in line with the Government's aims.

Recommendation 1.4: We recommend that the Higher Education Funding Councils should consider the role of the Research Assessment Exercise in the decline of systematic biology in universities and explore ways in which to support this subject, as they do with other minority disciplines.

9. There was widespread welcome of the review of the RAE from respondents, and belief that the RAE could go some way to arresting the decline in such a minority subject.

10. Despite the Government's response stating that "the issue of minority subjects and how best to assess and support them" would be considered as part of the review, there is no specific mention of minority subjects in the recently published report by Sir Gareth Roberts. We look to the systematic biology community to consider how the recommendations made in the Roberts Review will affect them, and to respond to the consultation exercise.

Recommendation 1.5: We recommend that the BBSRC should reconsider its decision not to award academic analogue status to Royal Botanic Gardens, Edinburgh and Kew.

¹ House of Lords, Select Committee on Science and Technology. 1st Report, 1991-92. *Systematic Biology Research*. HL Paper 22-I. ISBN 0 10 480692 3

11. The BBSRC has rejected this recommendation. There was agreement amongst five respondents, including from the Linnean Society and Royal Entomological Society, that BBSRC *should* give RBG Edinburgh and Kew academic analogue status. We see no reason why this should not be the case. The fact that they receive core funding from other government departments should not exclude them from obtaining such status, nor from the potential for further funding opportunities that comes with it.

Recommendation 1.7: We recommend that the United Kingdom should take the lead and propose to the Global Biodiversity Information Facility (GBIF) that the GBIF run a pilot with some priority species to form the basis of a trial for Professor Godfray's suggestion of making taxonomy primarily digitised and web-based. A trial would demonstrate the benefits and pit-falls of this approach before implementing it more widely

12. The Government's response to this point was that they support the work of GBIF and has successfully promoted a pilot project in the light of Professor Godfray's recommendation. There was some division on this response from respondents. RBG Kew and the Royal Society were sceptical about GBIF taking on this role. The Royal Society believed that a web-based pilot should be undertaken by a major museum or botanic collection (or group of suchlike). Some others, including CABI, welcomed the Government's support for it but point out that it is not overwhelmingly, financially, beneficial to institutions nor the UK. Several question the relationship of Professor Godfray's idea for a pilot project with GBIF funding – the Natural History Museum, when describing GBIF's calls for proposals said "It is not clear what, if any, connexion exists with Professor Godfray's ideas – our information suggests that GBIF have not adopted this approach at present" (p 5).

13. We are pleased to note that the Government have successfully pushed for a pilot project to "demonstrate GBIF's practical value and usage to the wider conservation community". We understand that whilst GBIF is not trialling the type of community on-line monographs that Professor Godfray has been arguing for, it is supporting the preparation of electronic catalogues and lists that will be essential for proper web taxonomies. This is a positive step forward.

Recommendation 1.8: We recommend that DEFRA takes the lead in setting up a body with the express purpose of bringing together representatives from Government departments, ecologists and conservationists and the systematic biology community, including those based at museums, universities and other institutions. DEFRA should provide funding for administrative support in the early stages, although we envisage that the body should eventually seek to become self-financing with all participants making a small contribution to running costs. The body's main remit would be to:

- (a) identify priority areas of biodiversity for which taxonomic research is most needed by the conservation community, and for other national purposes, such as health and agriculture.

Additional remits would be to:

- (b) assess the taxonomic impediment to conservation action—specifically to analyse the shortage of taxonomic specialists and gaps in taxonomic data;
- (c) campaign for resources for taxonomists researching in those priority areas.

14. Witnesses expressed almost universal praise for DEFRA's agreement to lead such a group. Many respondents have stated explicitly that they are keen to play a role. Some echoed the sentiments of RBG Edinburgh that they hope such a body "will not spend too much time and energy repeating work that was undertaken by the UK Systematics Forum" (p 6).

15. We look forward to DEFRA taking this Recommendation forward in the near future, noting that the Government Response set itself the target of convening a meeting by the end of 2003. We feel that it may be appropriate for the group to consider issues raised under Recommendations 1.3 and 1.7 above.

Recommendation 1.9: We recommend that the current level of spending on the Darwin Initiative, approximately £3 million per annum, should be earmarked specifically for

projects with a significant taxonomic component, to be used for conservation purposes. This would be used to help build taxonomic capacity in developing countries and should include projects to digitise UK systematics collections. Any additional funds to the Darwin Initiative beyond this core could have a wider remit to include projects with a major focus on development issues or poverty alleviation.

16. All five respondents on this point have welcomed the increased funding for the Darwin Initiative. However, three, including RBG Kew and the Linnean Society, regretted that there was no commitment to earmark funds for those projects with a significant taxonomic component.

17. We reiterate our recommendation and call on the Government to earmark funds for projects with a significant taxonomic component.

APPENDIX 1

Members of the Select Committee

Baroness Finlay of Llandaff
Lord Lewis of Newnham
Lord McColl of Dulwich
Lord Methuen
Lord Mitchell
Lord Oxburgh (Chairman)
Lord Patel
Lord Soulsby of Swaffham Prior
Lord Turnberg
Lord Wade of Chorlton
Baroness Walmsley
Baroness Warwick of Undercliffe
Lord Winston
Lord Young of Graffham

For membership and declared interests of the Sub-Committee which conducted the original inquiry, see the Committee's 4th Report 2001-02, HL Paper 118(i), p 26. For the interests of members of the Select Committee, see the Register of Members Interests, at www.publications.parliament.uk/pa/ld/ldreg.htm

APPENDIX 2

The Government's Response**Introduction**

1. The Government welcomes the Committee's report which highlights the important role of systematics in the conservation of biological diversity. The number of species in the world yet to be identified and classified represents a significant and important challenge to the systematics community.

2. This year, at the World Summit on Sustainable Development in Johannesburg, more than 180 Governments committed themselves to significantly reducing the rate of loss of biodiversity by 2010. Improving our knowledge and understanding of the forms of life which need to be conserved will be an important element in fulfilling this target. But the challenge cannot be tackled by one country alone, although the UK has an honourable tradition of contributing a significant part of the global systematics effort. The Government stresses too that conservation effort should not be dependant on a perfect knowledge and understanding of species yet to be identified, which may be unattainable. We can and should support conservation effort alongside the development of the science of systematics.

The Committee's Recommendations

1.1 In view of the Government's commitments to biodiversity conservation we recommend that they increase grant-in-aid to the major systematics institutions. We envisage this as providing support to collections – the databases used by systematic biologists and conservationists. In accordance with the recommendation of the Dainton Report, grant-in-aid funding should be increased to the level it would have been had the 1992 figures been maintained in line with inflation. This would allow further digitising of the collections.

3. The Government values the work of the three major systematics institutions, not only for their expertise in relation to UK and international systematics but also for their contribution to the country's educational and cultural goals.

4. It will not possible for the Government to increase grant-in-aid funding to the level it would have been taking account of inflation since 1992. However, the Government is making substantial new resources available to each of the three institutions as follows:

- **Royal Botanic Gardens, Kew:** Defra has awarded an additional £3 million towards Kew's operating costs in 2003/04, increasing its operating grant-in-aid baseline to £17.299 million. It has also been granted a capital allocation of £3.4 million in 2003/04; and further capital bids will be entertained should additional money become available during the year.
- **Natural History Museum:** An increase of 4% in 2004/05 and 5% in 2005/06 on the 2003/04 resource grant-in-aid has been provided, to a total of £37.98 million in 2005/06. In addition, £2.1 million has been allocated for capital expenditure in each of the years 2004/05 and 2005/06.
- **Royal Botanic Gardens, Edinburgh:** As noted by the Committee, the Scottish Executive has already increased its recurring grant-in-aid to the institution by some £300,000 per year and, following Spending Review 2002, it now plans to increase funding by almost £600,000 over the next three years to a level of just under £6 million by 2005/06.

5. These additional resources are intended to help the institutions to meet the totality of their functions, of which their work on systematics is of course an important part. It is for the institutions themselves to decide how to allocate the resources in accordance with the objectives set out in their Corporate Plans or Funding Agreements which are approved by Sponsor Departments.

6. Currently, the institutions invest in digitisation largely through use of their grant-in-aid or through project funding. As the Committee have noted, Kew made a successful application to the Capital Modernisation Fund for its electronic Plant Information Centre.

1.2 We recommend that the Government consider providing support to systematics collections as part of a bigger project to support biological resource centres, as recently highlighted by the OECD.

7. The Government supports the broad objective of the OECD initiative on Biological Resource Centres, which is to seek to ensure the conservation of biological resources and associated information in an efficient and effective way through the creation of a global network of biological resource centers and, through such a network, to provide improved access to biological resources of an appropriate quality to *bona fide* users in the fields of life sciences and biotechnology. Proposals on how this might be achieved are still under discussion in the OECD but could be completed by the end of 2004. The Government will not be in a position to take a firm view on those proposals until then.

1.3 We recommend that the Government develop and publish a clear, concise summary document regarding their policy on biodiversity conservation activity in the United Kingdom and on the international stage.

8. The UK is a party to all the major international agreements which aim to further biodiversity conservation, including the Convention on Biological Diversity, the Convention on the Conservation of Migratory Species of Wild Animals (also known as the Bonn Convention), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on Wetlands (also known as the Ramsar Convention). The UK has also signed the International Treaty on Plant Genetic Resources for Food and Agriculture which it hopes to ratify soon. The Government subscribes to the objectives of these conventions. It is an active supporter of their work programmes, as well as making substantial financial contributions to help developing countries participate in the work of these Conventions.

9. DEFRA has recently published a biodiversity strategy for England ("Working with the Grain of Nature", October 2002). The Scottish Executive will consult on a biodiversity strategy for Scotland in 2003. The Welsh Assembly Government will consult on the framework for biodiversity action in Wales later this year and the Northern Ireland Executive published its biodiversity strategy on 7 September 2002.

1.4 We recommend that the Higher Education Funding Councils should consider the role of the Research Assessment Exercise in the decline of systematic biology in universities and explore ways in which to support this subject, as they do with other minority disciplines.

10. The Funding Councils are currently reviewing research assessment in a process that is being led by Sir Gareth Roberts, Wolfson College, Oxford and managed by the HEFCE. The issue of minority subjects and how best to assess and support them will be considered as part of that review and more broadly in relation to the HEFCE's proposed funding for enhancing capability.

1.5 We recommend that the BBSRC should reconsider its decision not to award academic analogue status to Royal Botanic Gardens, Edinburgh and Kew.

11. At its July meeting, the BBSRC Council considered the background to, and procedures used by BBSRC in defining organisations as academic analogues eligible for responsive-mode funding from BBSRC. The Council agreed that the awarding of such status to organisations that enhance and extend the science base in biotechnology and the biological sciences should be the responsibility of Council, and that status should be reviewed biennially. Specifically, it agreed that the Royal Botanic Gardens Kew and Edinburgh should be eligible for responsive-mode funding when this was for a joint project in collaboration with an already eligible institution, such as a university or BBSRC institute. The Council regarded this as the appropriate way for the unique expertise in the institutions concerned to be made available to the existing wider science base.

1.6 We recommend that the systematic biology community, especially via the Systematics Association and the Linnaean Society, should continue to increase efforts to demonstrate the relevance and importance of systematic biology. This should have the effect both of improving its profile to funding bodies and of making it more attractive to potential professional taxonomists and volunteers. We also hope that systematic biologists who are

members of learned societies, such as the Institute of Biology and the Royal Society, will use their influence to promote the discipline.

12. The Government supports this recommendation.

1.7 We recommend that the United Kingdom should take the lead and propose to the Global Biodiversity Information Facility (GBIF) that GBIF run a pilot with some priority species to form the basis of a trial for Professor Godfray's suggestion of making taxonomy primarily digitised and web-based. A trial would demonstrate the benefits and pit-falls of this approach before implementing it more widely.

13. The Government supports the work of the Global Information Biodiversity Facility (GBIF). The UK has been involved in GBIF since its inception and became a full voting participant in September 2001. It is clear that the digitisation of taxonomy will be an important factor in achieving GBIF's goal of making the world's biodiversity data freely available, and resulting in the utilisation of the data by a wider range of disciplines. As such, GBIF has already identified the digitisation of biodiversity data, including taxonomic data, as one priority in achieving its goal. In support of this, GBIF's work programme includes initiating additional digitisation efforts, following a review of existing technologies and digitisation efforts. The "Catalogue of Life"; a joint initiative between the UK-based Species 2000 and North America's Integrated Taxonomic Information System will also contribute to the GBIF work programme. This aims to create a unified catalogue of the 1.75 million known species of living organisms on earth.

14. The Government agrees with the Committee that new approaches to digitising taxonomy to make it more accessible through the world wide web should be piloted. In the light of Professor Godfray's recommendation, the UK successfully promoted a pilot project at the recent Governing Board meeting to demonstrate GBIF's practical value and usage to the wider conservation community within a meaningful timeframe. We agree with Professor Godfray that this should be limited in scope, and believe that the pilot needs to be focussed on a restricted group of species or one ecosystem. The pilot now forms part of GBIF's two-year work programme. The digitisation of a particular group of species will be a core component of this pilot.

1.8 We recommend that DEFRA should take the lead in setting up a body with the express purpose of bringing together representatives from Government departments, ecologists and conservationists and the systematic biology community, including those based at museums, universities and other institutions. DEFRA should provide funding for administrative support in the early stages, although we envisage that the body should eventually seek to become self-financing with all participants making a small contribution to running costs. The body's main remit would be to:

(a) identify priority areas of biodiversity for which taxonomic research is most needed by the conservation community, and for other national purposes, such as health and agriculture.

Additional remits would be to:

(b) assess the taxonomic impediment to conservation action – specifically to analyse the shortage of taxonomic specialists and gaps in taxonomic data;

(c) campaign for resources for taxonomists researching in those priority areas.

15. The Government broadly accepts this recommendation and will be working with interested organisations to take it forward. The Government believes that the initial task of such a body should be to develop an overall strategic view of priorities for UK systematics policy within a clearly defined timescale, perhaps eighteen months to two years. At that stage, it may be appropriate for Government to step back. Responsibility for articulating the needs of UK systematics should primarily be the responsibility of the systematics community itself. In any event, it is not appropriate for the Government to participate in campaigns for additional resources for taxonomists. Defra plans to convene a meeting with interested parties next year to decide the next steps.

1.9 We recommend that the current level of spending on the Darwin Initiative, approximately £3 million per annum, should be earmarked specifically for projects with a

significant taxonomic component, to be used for conservation purposes. This would be used to help build taxonomic capacity in developing countries and should include projects to digitise UK systematics collections. Any additional funds to the Darwin Initiative beyond this core could have a wider remit to include projects with a major focus on development issues or poverty alleviation.

16. The Government welcomes the Committee's recognition of the role of the Darwin Initiative in furthering the conservation of biodiversity. The Initiative has done a great deal to help countries rich in biodiversity but poor in resources to meet their obligations under the Convention on Biological Diversity. A considerable proportion of the £27 million already committed to projects in nearly 100 countries has supported work on systematics. The Government is proud of the record of Darwin projects in delivering benefits beyond the resources put in and in leaving a lasting legacy in host countries after Darwin funding ceases. The Government therefore agrees with the Committee that an additional injection of funds for the Initiative is deserved. For this reason, the Prime Minister announced an increase in the Darwin budget to £7 million per year by 2005. The budget will rise next year from £3 million to £4 million. The additional money will double in each of the two successive years, bringing the budget for 2004/05 to £4 million and for 2005/06 to £7 million.

17. The Secretary of State for Environment Food and Rural Affairs is advised on awards to projects and on the development of the Darwin Initiative by the Darwin Advisory Committee. The Secretary of State accepts the Committee's advice that Darwin Initiative funds should not be earmarked for systematics work. Systematics is a significant component of many projects, and the increase in the budget will mean a proportionate increase in support for systematics work. But the Committee does not believe that earmarking will help sustain the pressure for excellence that the Darwin Initiative strives to achieve.

Department for Environment, Food & Rural Affairs

December 2002

WRITTEN EVIDENCE

Memorandum by CABI

Paragraph 1.1 The Report and Response concentrate on the three major systematics institutions, RGB Kew, NHM and RGB Edinburgh, but these organizations have minimal capacity in microbial systematics (the Kingdoms Fungi, Bacteria, Archaea and Protocista). These organisms play a crucial role in ecosystem function, have major effects (both positive and negative) on the nation's wealth, and drive the UK biotechnology industry. Increased grant-in-aid to the "big three" institutions has doubtless been well received, but UK core support for CABI has decreased in real terms by 74 per cent since 1992. This has had a devastating effect on systematics capacity, leading to reductions in taxonomic staff from 34 in 1992 to six in 2003 (a further post was lost in 2002 following CABI's initial submission to the Select Committee Report), despite substantial income generation through competitive funding. CABI also receives no Government support at all for curation of its globally important microbial collections, which currently costs the organisation nearly £200k annually. CABI feels that the Government has not undertaken sufficient consideration of the financial needs of UK microbial systematics organisations.

Paragraph 1.2 CABI welcomes the Government's commitment to the broad objectives of the OECD initiative on Biological Resource Centres; the benefits of such a global network are clear. But the Government is currently providing no funds to support participation in the planning process by UK institutions. If the UK is to play its rightful formative role, the stakeholders' meeting already promised should take place as a matter of urgency, and Government support for the necessary planning activities should be provided.

Paragraph 1.3 There are many Government initiatives on biodiversity conservation, but to date little developed policy integrating large-organism conservation, genetic resource initiatives, and microbial components of agrobiodiversity. The DEFRA policy document on Genetic Resources in Food and Agriculture is a valuable step in the right direction, but more resources need to be devoted to "joined-up thinking" for the UK biodiversity scene. This would lead to many benefits; for example the development of proper business plans for exploitation of UK biodiversity. The current split in Government responsibility for these issues between DEFRA, OST and DoH makes the development of integrated policy more complex.

Paragraph 1.4 CABI welcomes the HEFCE review, but is concerned that it will not be focused enough on systematics to lead to enhanced UK capacity in taxonomy. There are alternative models for training systematists using established partnerships between UK universities and systematics institutions, and there is no reason why further competitive grant programmes (in addition to that announced following the 1992 report) should not be established. Ideally, programmes need to be designed for long-term support, integrating academic and subsequent career development.

Paragraph 1.5 CABI would argue that it also deserves full academic analogue status with BBSRC; its interests and involvement in biotechnology are certainly at least equivalent to those of RBG Kew and RBG Edinburgh.

Paragraph 1.7 The Government's membership of GBIF is welcome, but the potential for financial support for UK systematics institutions from this source currently seems limited. For example, GBIF recently announced a small competitive grants programme for biodiversity information and herbarium digitization, but the funds available only cover 20 per cent of the total project costs. UK-based systematics organizations without major Government core funding are clearly poorly equipped to seek such support. Professor Godfray's initiative is also to be welcomed, but we do have some concerns. Establishing web-based identification and information systems for well-known organism groups with established classifications is straightforward—and there are many examples already in existence including CABI's Crop Protection Compendium (<http://www.cabi.org/compendia/>). But the taxonomic framework is yet to be properly established for many small-bodied organism groups (some of which are of major economic importance) and we do not see how the initiative will support this necessary initial stage.

Paragraph 1.8 CABI would contribute to a new umbrella organization for biodiversity in the UK, but its focus must be wider than that of the UK Systematics Forum. Specifically, it must address the interface between business and biodiversity, and place emphasis on bringing together systematists and users of biodiversity. CABI also considers that the Government, as the guardian of sovereign rights over UK genetic resources, is a major stakeholder of British biodiversity and as such must play an active role in managing its exploitation. A stakeholders meeting is needed with the Government to determine policy and mechanisms to underpin conservation and sustainable use of biodiversity.

Paragraph 1.9 CABI welcomes the increased Government spending through the Darwin Initiative, but has major concerns that some areas of systematics are not being adequately supported through this funding mechanism. Specifically, work to develop global capacity for identification of pests and pathogens is sidelined, due to the requirement that conservation is the immediate beneficiary. Agriculture and forestry are critically important to all developing nations, and their need for expertise in pest identification is becoming much greater due to the need for commodity exports to conform to the World Trade Organization's SPS (Sanitary and Phytosanitary) provisions. Improvements in food security will of course lead to conservation

of natural ecosystems due to reduction in the need for forest clearance for new food plots. CABI would welcome the opportunity to explore the need for such capacity building jointly with DEFRA and DfID.

Memorandum by the Linnean Society of London

1. Two key points underlie the Select Committee Report.
 - (a) That part of systematic biology which is concerned with the identification and description of species continues to be in decline, despite the publication of the "Dainton" Report in 1992.
 - (b) It is also the part of systematic biology which is fundamental to any comprehensive programme of biodiversity conservation.
2. The Select Committee Report made nine recommendations to remedy this situation. The Government's brief Response to the Report is deeply disappointing, being not only brief but also both superficial and dismissive.
3. The Government Response states that grant-in-aid funding of three major systematics institutions is to be increased. This is somewhat misleading since the Government also comments that it will not be possible to increase funding to the level it would have been taking account of inflation since 1992, so that the "increases" are really significant reductions in the level of reduction suffered over the last decade.
4. It is to be warmly welcomed that there will be a real increase in the level of funding for the Darwin Initiative, but it is to be regretted that no portion of this funding is to be earmarked for projects with a significant taxonomic component.
5. It is also to be regretted that in response to the Select Committee's recommendation that consideration be given to supporting systematics collections, the Government carefully avoids making any firm commitment.
6. The response to the remaining six recommendations suggest that the Government is largely content with the *status quo* and sees no need to take any other initiatives. For example, it seems content that the illogical situation should persist whereby NERC gives analogue status to the Natural History Museum (NHM), Kew and the Royal Botanic Gardens Edinburgh, but BBSRC gives such status only to the NHM. Again, while predictably expressing support for the work of the Global Biodiversity Information Facility (GBIF), the Government ignores the problem that 80 per cent of the funding of a GBIF project still has to be found locally.
7. This leads to the depressing conclusion that the decline in this key area of systematic biology, highlighted by both the "Dainton Report" of 1992 and the recent Select Committee Report, will continue.
8. In 2001 the Linnean Society wrote on behalf of 27 other Learned Societies to the Government Chief Scientist, Professor Sir David King, to express concern about the decline in systematic biology. In the course of this and subsequent correspondence, it was explained why it could no longer be left to the systematics community alone to arrest this decline. We were therefore disappointed to read in paragraph 15 of the Government Response that it is still considered that the responsibility for remedying the situation lies with the dwindling community of systematic biologists.
9. Unfortunately, the Government Response will reinforce the widely held impression that this area of environmental concern is regarded as of low priority—apart from the dictates of political correctness which require all governments to be seen to make statements in support of international initiatives to conserve biodiversity.
10. In paragraph 2 of its response, the Government points out that at the World Summit on Sustainable Development in Johannesburg, more than 180 governments committed themselves to reducing the rate of biodiversity loss by 2010. However, because there is no reliable method of measuring the rate of biodiversity loss, there is no means of knowing whether this target will be fulfilled. Unless more action is taken to improve the current state of systematic biology, it is very unlikely that any reliable method of measuring the rate of biodiversity loss will be available by 2010.
11. The Linnean Society holds to its firm belief that the Select Committee Report *What on Earth?* is an excellent and realistic document deserving serious and detailed consideration. The Society's own positive response to its publication was to set up a working group under the chairmanship of Professor Richard Bateman of the Natural History Museum to explore how the Select Committee's recommendations could be further developed. The report of our working group outlined eight projects as examples of new initiatives that would both fulfil some of the recommendations and address some additional issues regarded as of high priority by systematists.
12. The eight projects are distributed among different disciplines, different groups of organisms, different ecosystems and different research organisations. The deliberate aim was to maximise linkages among organisms and to distribute the benefits of any increased resourcing of the systematics community. Each project was estimated to require a minimum of five years to complete, have an estimated cost of £5 million each, and involve at least three different partner organisations.

13. Details of each of these projects are contained in the 20 page document which we sent earlier to the Select Committee as our response to their Report (and copied also the Government Chief Scientists). The titles of the projects were:

- lepidoptera "taxome" programme and related projects;
- digitisation and dissemination exchanges with developing countries;
- realising the potential of regional and local natural history collections;
- urban biodiversity surveys in the UK;
- monitoring changes of species distributions in the UK;
- assessing the rigour of species identification by automated DNA sequence analysis;
- determining how the remarkable diversity of tropical forests is maintained;
- understanding the processes of speciation, extinction and invasion on oceanic islands.

14. Finally, the Linnean Society welcomes the work being done to produce biodiversity strategies for England, Wales, Scotland and Northern Ireland and many of its members are contributing to these processes. However, we wish to emphasise the important international contribution made by taxonomists and other biodiversity scientists in the UK and the need to develop and support strategies for this work.

31 March 2003

Memorandum by the Natural Environment Research Council

The Natural Environment Research Council (NERC) welcomes the opportunity to comment on the government's response to the House of Lords Science and Technology Committee report "What on Earth? The Threat to Science Underpinning Conservation."

The Natural Environment Research Council (NERC) is one of the UK's seven Research Councils. It funds and carries out impartial scientific research in the sciences of the environment. NERC trains the next generation of independent environmental scientists. Its priority research areas are: Earth's life-support systems, climate change, and sustainable economies.

NERC's research centres are: the British Antarctic Survey (BAS), the British Geological Survey (BGS), the Centre for Ecology and Hydrology (CEH) and the Proudman Oceanographic Laboratory (POL). A list of NERC's collaborative centres is appended.

SPECIFIC COMMENTS

Recommendation 1.1

NERC welcomes the increase in funds for the major collections, but regrets that the government was unable to meet the recommendation in full.

Recommendation 1.7

NERC supports the involvement of GBIF in a trial of Professor Godfray's novel idea for using the web technology in taxonomic activities.

Recommendation 1.8

NERC is pleased that DEFRA is prepared to lead (initially) a group to define a strategy for taxonomic research in this country. Depending on the precise terms of reference, NERC would be prepared to join a working group with this aim if asked. However, we would expect it to have a limited life of perhaps two or three years.

April 2003

Memorandum by the Natural History Museum

PARAGRAPH NUMBERS REFER TO THE GOVERNMENT RESPONSE

Introduction: Paragraph 2

The UK does indeed have an "honourable tradition" of contribution to knowledge and understanding of biodiversity. However, much more than this, the UK has a unique responsibility and opportunity to play a leading role, stemming from its unparalleled collections, information resources, and systematic research expertise. These rely on UK Government commitment to development of expertise, infrastructures, access, and capacity building.

Nobody should claim that "perfect knowledge" is attainable or necessary. Conservation, as any applied science, depends on provisional knowledge used to greatest effect, which demands ongoing involvement of systematists. The issue is not only new description, as implied, but also improving and making best use of existing knowledge resources, and giving access to them, all of which require UK systematic expertise.

RECOMMENDATION 1.1: PARAGRAPHS 4, 5 AND 6

The Government statement on resources for the Natural History Museum is misleading in that it does not refer to the ongoing decline in baseline funding in real terms. The grant in aid baseline allocations for 2003–06 are: £36.103 million for 2003–04, £37.547 million for 2004–05 and £37.980 million for 2005–06. Compared with the 2002–03 baseline (the first full year of free admission) the increases are 1.46 per cent, 4 per cent and 1.15 per cent year on year which represents a fall in real terms over the period by 0.96 per cent (using Treasury inflation target of 2.5 per cent per annum), which equates to c£340k per annum real decrease by 2005–06.

In addition to baseline allocations there is £3.5 million for the Palaeontology building in 2003–04, and a capital allocation of £2.1 million in both 2004–05 and 2005–06 (ie total £4.2 million) which includes an allocation of £1.25 million in both years for Darwin Centre Phase Two (ie total £2.5 million), and £850k in both years (ie total £1.7 million) for major capital repairs.

In addition to the fundamental issue of real terms decline in grant-in-aid funding raised by the 1992 and 2002 inquiries, the Museum is responding to wider demands by Government and its agencies for support for biodiversity action under the CBD, improved information resources in electronic form and online, and increased access to all aspects of its work. Government rightly notes in Paragraph 6 that digitisation is supported from grant-in-aid, but does not go on to note that increased investments in digitisation and other initiatives, coupled with declining funds in real terms, mean less funding for systematic research.

RECOMMENDATION 1.3: PARAGRAPHS 8 AND 9

The list of biodiversity-related agreements in the Government response does not meet the recommendation of the Select Committee for a policy statement on biodiversity policy that covers the international stage. Such a policy statement would serve to set the various country-level strategies for the UK within a wider framework, would point to UK objectives and enable effective planning and resource allocation for systematic and other science that could meet the UK's requirements.

RECOMMENDATION 1.6: PARAGRAPH 12

In response to this recommendation, the Museum will work with other major systematics institutions, learned societies and others to:

- (i) Address the issues raised at a meeting of stakeholders;
- (ii) Develop our outreach and information activities to enable wider use and appreciation of systematic science; and
- (iii) Develop an advisory capacity on systematics within the science base and to elements of Government. Integrate discussion on systematics with wider debates on the development of science (including but not limited to biodiversity) and sustainable development commitments.

Government indicates a simple stance of verbal support, but something more active is needed. It is essential that improved dialogue develops between systematics interests, Government and related agencies. We will pursue the outcomes of the actions above in direct discussion with ministers and staff from OST and DEFRA.

RECOMMENDATION 1.7: PARAGRAPH 13

While Government has given initial support to GBIF, there is a lack of clarity over responsibility and ongoing commitment for financial contributions within Government.

In its growing contributions to GBIF and other international and UK initiatives, the Museum's activities in access, information resources, and biodiversity conservation are founded on systematic science. With declining GIA in real terms, the Government's policy agenda can not be vigorously pursued or consolidated without continual erosion of the scientific foundation on which its success ultimately depends.

RECOMMENDATION 1.7: PARAGRAPH 14

Pilots are a first step, and funding needed for development of projects and maintenance of developed resources has not been committed by Government. Funds can not come from the NHM and its peers on current levels of support without further erosion of the systematic science that delivers the content and ensures quality and relevance to the needs of users.

The Government's statement on GBIF digitisation is unclear. GBIF has made a call for outline proposals for digitisation of collections—some candidates will be asked to make full proposals in May 2003. A call for

proposals for larger demonstration projects is anticipated but has not yet been made. It is not clear what, if any, connexion exists with Professor Godfray's ideas—our information suggests that GBIF have not adopted this approach at present. However, the Museum remains committed to development and provision of information resources via GBIF, and will continue to engage in active discussion with UK and international partners to this end.

RECOMMENDATION 1.8: PARAGRAPH 15

We welcome the Government's proposal for the development of a UK systematics strategy and policy, which should cover both the specific policy interests of different sectors and stakeholders, and the needs of the UK and international science base. The NHM is committed to play an active role in the definition and development of this policy initiative and has been seeking clarification of DEFRA's proposal.

11 April 2003

Letter from the Public Health Laboratory Service

Thank you for inviting the Public Health Laboratory Service to comment on the Government's response on "biodiversity". It would not be particularly appropriate for the PHLS to comment on the basic content of either the report or the feedback as the report is restricted to microbiology, ie higher organisms, and our concern is with the agents that cause infectious diseases. In principle, of course, we are very supportive of the need to preserve and encourage biodiversity and to ensure effective conservation measures. We were also pleased to see the Committee's recommendation for support of research in academic institutions aimed at supporting biodiversity.

Nevertheless, we welcome the opportunity to add to the debate on biodiversity by pointing out that many of the same arguments apply to microbiological diversity. Micro-organisms (bacteria and viruses in particular) are not only important as the causes of a wide range of infections in man and animals, and therefore pose various threats to health, but the great bulk of the microbial world has no relationship with disease and is essential for driving all the food cycles on which the diversity of macro-organisms depends. The capacity of micro-organisms to break down complex biological molecules and recycle them in to the food chain is essential to the continued existence of life on this planet. The fact that these are minute organisms that can multiply rapidly and adapt to a wide range of ecological niches, means that the microbial world holds great capacity for genetic change, re-assortment and adaptation. For these reasons, it is equally important that we recognise the need for conservation and study of biodiversity in the microbial population. To this end, the maintenance of culture collections of well defined species of micro-organisms and support for taxonomic work on the microbial population should be seen as vital to our efforts for biological conservation.

7 March 2003

Letter from the Royal Botanic Garden Edinburgh

The Royal Botanic Garden Edinburgh (RBGE) welcomes the Report and considers that it provides a thorough and comprehensive treatment to an area of science that not only underpins conservation but is at the interface between all human activities that depend upon biodiversity and is therefore fundamental to the notion of a sustainable future.

We note, however, that the Report emphasises how little has been achieved to support this branch of science since the Dainton Report of 1992. This is particularly depressing given that the decade between the two Reports has been characterised by growing awareness of the vital importance of biodiversity, the threats posed to it by unsustainable development and by changes affecting the global environment, ranging from the destruction of habitats to climatic change. The environmental challenges facing humankind are increasing, not diminishing. At national and international levels we have strategies to address these issues, for example, those developed under the Convention on Biological Diversity (CBD). However, these strategies cannot possibly be delivered if we do not strengthen our scientific capacity to respond. Environmental imperatives demand that this should be an era of urgent growth in systematic biology, not continuing decline.

The first recommendation of the What on Earth? report, concerning government expenditure, is the most important. It is disappointing (paragraph 4) that the government says it is not possible to implement the recommendation. To achieve this fully for RBGE would cost about an additional £1.5 million per annum, a substantial sum, but one that would allow RBGE both to recruit specialists in groups where there is a critical deficiency, especially in fungi and lower plants, and to address public awareness issues (enabling commitments under the CBD to be met). Following the Spending Review 2002 the increases awarded provide an additional £229,000 in 2003–04, £169,000 in 2004–05 and £174,000 in 2005–06 (when recurrent grant in aid will be £5,987,000). These additional resources are, of course, much appreciated, but they are at a level which will continue the trend of long term decline in real terms. Surely it is better to address this properly now than allow a Select Committee investigation in another 10 years to draw the same conclusions.

In relation to recommendation 1.3 (paragraph 9) it is important to recognise that the strategies being developed by DEFRA, the Scottish Executive (in which RBGE is an active participant), the Northern Ireland Executive and the Welsh Assembly Government are concerned with the UK and dependent territories, not the wider international stage. No process is yet in train to establish an international strategy although the OST sponsored report *The Web of Life* (published by the UK Systematics Forum) identified important elements of such a priority and the UK's major taxonomic institutions are, in effect, defining such a policy through participation in such international initiatives as the Consortium of European Taxonomic Facilities (CETAF), the Global Taxonomy Initiative of the CBD and the Global Strategy for Plant Conservation (also under the CBD).

In relation to recommendation 1.4 (paragraph 10) we agree that something needs to be done about undergraduate teaching in systematics. RBGE would be very willing to appoint appropriate specialists onto its staff in order to deliver systematic biology teaching to undergraduates across the Scottish Universities, if additional funding is forthcoming.

Paragraph 11 implies a change in eligibility status of RBGE in seeking responsive mode funding from BBSRC that has not happened. RBGE is now only permitted to apply jointly with a leading university partner (something that any citizen of the UK is eligible to do).

Recommendation 1.8 calls for a body to take forward further work (paragraph 15). An overall strategic review of the priorities for UK systematics was undertaken for OST as recently as 1999. Its report, the *Web of Life*, has largely been ignored, as has the work of the UK Systematics Forum which (despite evidence to the contrary in certain submissions to the present review) did undertake a demographic study of the taxonomic community and propose national priorities. RBGE welcomes the proposal for further efforts in strategy development given that the *Web of Life* failed to stimulate a response and looks forward to playing an active part in any such body. We hope, however, that this body will not spend too much time and energy repeating work that was undertaken by the UK Systematics Forum, some of which continues under the auspices of the Linnean Society and some through the National Node for the Global Taxonomy Initiative, at the NHM.

The emphasis on "articulating the needs of UK systematics" in paragraph 15 is unclear to us. These needs are clearly articulated in the *What on Earth?* report and earlier reports, but they are not self-seeking needs, as seems to be implied, they are the needs of conservation, of sustainable development and of many other branches of science that rely on precise identifications and sound taxonomy. The prospect of the Government stepping back from its responsibilities for supporting UK systematics (which is mostly delivered through Non-Departmental Public Bodies) would be alarming. As *What on Earth?* makes clear, the need is for more active support and involvement from government, not less.

We will be happy to provide any further information you may require.

31 March 2003

Memorandum by the Royal Botanic Gardens Kew

1.1 We are very pleased with the significant increase in grant-in-aid awarded by Defra for 2003–04. Our new operating grant-in-aid baseline of £17.299 million will greatly ease our budgetary situation. We would hope to achieve increases in line with inflation in coming years so as to avoid a recurrence of the funding difficulties that occurred when the operating grant-in-aid did not increase for seven consecutive years. We are very grateful too for our capital allocation of £3.4 million. We will seek opportunities to submit further capital bids for the coming years in order to maintain momentum on our Site Development programme linked to our World Heritage Site nomination. We believe that the increases demonstrate a significant commitment to the future studies of plant diversity in the UK, and will also help RBG Kew retain its international pre-eminence. We are very grateful for this support, especially in the context of Defra's financial difficulties and the current economic climate.

We continue to seek opportunities to expand and accelerate our digitisation through grant-in-aid and other funding mechanisms. Work on the electronic Plant Information Centre funded through the Capital Modernisation Fund is progressing well and we have had some preliminary success in the first round of applications (pre-proposals) to GBIF for digitisation projects (see under 1.7 below).

1.2 We have not seen the outcome of the consultation process to date, but we consider it important that the government should apply a broad definition of biological resource centres so as to explicitly include collections of non-living material from which DNA and other valuable products can be obtained.

1.3 The existing and planned biodiversity strategies for the UK are important and welcome but not in themselves sufficient. Given the UK's importance in biodiversity issues on the international stage there remains an urgent need for a concise document which summarises the UK's overall biodiversity policy. This is particularly important in the light of the open-ended nature of the Convention on Biological Diversity, the recognition of the "taxonomic impediment" to achieving the goals laid out in the Convention, the UK's unique collection resources which are a vitally important international resource and the UK's long history of punching above its weight in the area of systematic biology.

1.4 We look forward to the outcome of the review by Sir Gareth Roberts of the research assessment process and we trust that any recommendations designed to support systematic biology as a "minority subject" will

take into account the need not only to curb the decline in the subject but also to increase the availability of practitioners in biodiversity identification and assessment in order to meet the biodiversity challenges of the 21st century.

1.5 We consider that the BBSRC's recent ruling awarding academic analogue status to RBG Kew and Edinburgh under rather restrictive conditions is a step in the right direction but we fail to see any justification for the restrictions imposed. We feel strongly that we should be allowed to compete on a level playing field with other academic analogues rather than being offered access only via 'collaboration with an already eligible institution'. We look forward to BBSRC's review of this situation and trust that the anomaly will be fully rectified at that time.

1.6 We welcome the government's support for increased emphasis on making biodiversity data more readily accessible via the web and the need to do this quickly in ways that demonstrate the relevance and importance of such information for conservation. However we would caution against any approach which relies on GBIF as the panacea for this situation. The restricted scale and scope of the first programmes announced by GBIF do not offer hope for rapid progress in the immediate future.

The government's declaration of support for GBIF overlooks the fact that the funds required for the UK subscription were in fact assembled hastily at the eleventh hour (by the then DETR) and relied heavily on somewhat reluctant contributions from the already overstretched major systematics institutions.

In the case of RBG Kew, we have recently learned that our two pre-proposals in the DIGIT programme have been shortlisted for the next round of the process. Worldwide, 40 pre-proposals were selected from a field of 102. We are advised that some 15–20 of these projects will eventually be funded, thus it is unlikely that both of our shortlisted projects will be successful. Should just one of our projects be funded the monies awarded to Kew would be almost exactly equivalent to the £30,000 contribution Kew made to the UK subscription. We remain committed to this collaborative global venture but cannot help but feel that the current situation is scarcely cost-effective for UK institutions which have a disproportionate amount to contribute to Global biodiversity information resources.

1.7 We welcome Defra's commitment to convene a meeting in 2003 to bring together interested parties and discuss next steps. We are very keen to support this process and to ensure positive conservation outcomes from any effort expended. However, we continue to have concerns as to whether the "coordinating body" can actually achieve anything—given the general shortage of funds and the fact that the agenda of the different institutions is driven by their different funding sources. It is also vitally important that any such process focuses on the global needs of the conservation community, rather than simply national needs.

1.8 We welcome the increased funding to the Darwin Initiative over the next three years but regret the decision not to earmark some part of the total for projects with a significant taxonomic component. However, the assertion that the increase in budget will mean a proportionate increase in support for systematics work is not supported by our experience to date. Changes to assessment criteria and the emphasis of the programmes have clearly resulted in reduced support for projects that include a significant component of baseline biodiversity work. We believe that positive action is needed to halt and reverse this trend.

Memorandum by the Royal Entomological Society

The Council of the Royal Entomological Society (RES) welcomes the opportunity to comment on the Government response to the House of Lords' Select Committee on Science and Technology Report "What on Earth? The Threat to the Science Underpinning Conservation."

The Government response is generally positive in tone, expressing broad support for the view of the Select Committee and the systematics community that the science of systematics provides essential and indispensable underpinning for the conservation of biodiversity. However, the details of the response suggest that the Government does not acknowledge the evidence—such as that concerning insect taxonomy, presented to the Committee by the RES in January 2002—that UK investment and expertise in taxonomy and systematics have been in decline for many years. The response makes some generic commitments to increased resources for conservation and biodiversity, but it makes no specific commitments to the resources for taxonomy and systematics that were the focus of the Committee's Report. Thus, the response fails to address the issue of redressing the past decline in these resources and, indeed, full implementation of the commitments and actions proposed by the Government in its response may still allow further decline.

The RES, with a membership of about 1,800 professional and amateur entomologists worldwide, concurs with the Government's view that biodiversity conservation and the underpinning science of systematics are global issues. We are also mindful that, historically, British naturalists—such as former RES Fellows Charles Darwin and Alfred Russel Wallace—have been world leaders in their field and that throughout the past century biologists in many countries, especially those of the Commonwealth, have looked to British taxonomists as key players in this global science. Unfortunately, the UK's former pre-eminence in this area has been greatly weakened over the past two decades, as the RES described in its earlier evidence to the Committee. The Government's argument that perfect knowledge of all as-yet-undescribed species may be unattainable is an irrelevant truism (though we would have said "is", not "may be"); the Committee's concern was not about perfect and complete taxonomic knowledge but about sufficient knowledge to support informed decisions and actions in the conservation of biodiversity.

We note the increased grant-in-aid to three of the UK's systematics institutions: the Natural History Museum, and the Royal Botanic Gardens at Kew and Edinburgh. We note, however, that there is no requirement from Government for these additional resources to be used to support the collections, which is what the Committee recommended. The focus of new resources on these three institutions is understandable, not least because of the size and importance of their existing collections. Nonetheless, we feel that the Government should be mindful of the resources needed by other institutions contributing to systematics: the national museums in Cardiff and Edinburgh, and small specialist centres of expertise in various research institutes and universities. The support of specialist centres is especially important for the newer multidisciplinary approaches to systematics, with small teams of systematists, ecologists and molecular geneticists (with concomitant capital resource needs) focusing on specific taxa or on particular habitats.

The Committee recommended that the Government should publish a clear concise summary of their policy on biodiversity conservation. The response lists five international conventions to which the Government subscribes, and refers to the four separate national biodiversity strategies for England, Scotland, Wales and Northern Ireland. This illustrates precisely why the Committee asked for a single clear summary document.

The request for the HEFCs to consider the role of the RAE in the decline of systematic biology has been answered by a non-specific reference to a review of minority subjects. There is a circularity of argument here, since the point was that systematics has become a *de facto* minority subject because of a progressive decline in public funding. The RES, representing scholarly and practical interest in insects, which are variously estimated as comprising 55 per cent to 65 per cent of all living species, would argue robustly that the Government cannot afford to view systematic biology—whether by morphological taxonomy or by molecular analysis—as a minority subject since it underpins most of biological science and is pivotal in addressing major issues such as conservation and exploitation of biodiversity, impacts of global environmental change, and integrated management of pests, vectors and diseases.

Since most insect species are herbivorous, and many of these feed on one or very few plant species, much entomology is also dependent on the state of botanical systematics. We cannot understand the argument for BBSRC not giving academic analogue status to the Royal Botanic Gardens. The encouragement of joint institutional projects is to be applauded when there is academic benefit to be gained by multidisciplinary partnerships. Where there is no such benefit, joint projects often increase transaction and administration costs and thus dilute the scientific effort.

We note the positive response to the recommendation that DEFRA should take the lead in developing a strategic view of priorities for UK systematics. We also note that the Government takes the view that DEFRA should step back after an initial period and that the responsibility for articulating the needs of UK systematics should lie with the systematics community itself. We might perhaps be forgiven for pointing out that the Committee's 2002 report, and the 1992 one prepared under Lord Dainton's chairmanship, are the result of precisely this process, whereby the systematics community through their institutions and learned societies gave evidence to the House of Lords' Select Committee.

Throughout the Government's response there is an unwillingness to reverse the decline in systematic biology by exercising any conditionalities or guidance on Government funds provided to the three major institutions named, or distributed via the HEFCs, the BBSRC or the Darwin Initiative. Without such conditionalities or guidance it seems probable that investment in systematic biology will continue to decline, since it is the funding priorities of these agencies over past years that has led to the threat to systematic science identified by the Select Committee in its Report. There has been a lack of "joined-up thinking" between the Government departments and funding agencies that are either responsible for generating taxonomic knowledge or dependent on such knowledge, and there is no clear evidence in the Government's response to suggest that this situation will change.

The RES Council hopes that the Select Committee will continue to press the Government on those recommendations where the response has been somewhat equivocal. We take heart from the generally positive attitude of the Government response to the identified problems, and in spite of our misgivings that they may be "too little, too late" we hope that the medium-term initiatives that are being pursued will slow or halt the decline in the UK's systematics science base.

11 April 2003

Memorandum by the Royal Society

The Royal Society welcomes the opportunity to comment on the Government's response¹ to the House of Lords (HoL) report on systematic biology and biodiversity (entitled *What on Earth? The threat to the science underpinning conservation*)². The Royal Society submitted evidence to this inquiry³. We are generally disappointed with the Government's response to the HoL's report. In particular, recent funding increases neither repairs the damage done to the field by the previous 10 years of under funding nor ensures the long-term stability that would prevent further decline. And, while we welcome the Government's implicit support

¹ <http://www.parliament.uk/documents/upload/GovECEarth.pdf>

² <http://www.publications.parliament.uk/pa/ldselect/ldscitech/118/11801.htm>

³ The Royal Society's contribution to this study can be found at: <http://www.royalsoc.ac.uk/policy/>

for the development of an internationally agreed web-based taxonomy as proposed by Professor Godfray FRS and others, we do not share its confidence that the Global Biodiversity Information Facility can deliver the pilot.

INCREASE IN GRANT-IN-AID FUNDING (1.1)

In our submission to this HoL inquiry we noted that core funding for the three major systematics institutions had declined in real terms over the last decade and we recommended a reversal in this decline. We welcome the recent increase in funding for Royal Botanic Gardens Kew, Royal Botanic Gardens Edinburgh and the Natural History Museum, which goes some way towards addressing the decline in funding that has occurred over the last decade. However we are disappointed that it is not sufficient to compensate for the previous failure to maintain core funding in line with inflation. We are also concerned that, despite the recommendations of both this HoL report and the Dainton report⁴, the Government has made no commitment to ensure that future increases in core funding for these institutions will at least be in line with inflation.

IMPACT OF THE RESEARCH ASSESSMENT EXERCISE ON SYSTEMATIC BIOLOGY IN UNIVERSITIES (1.4)

We welcome the Funding Council's review of the Research Assessment Exercise (RAE) being chaired by Sir Gareth Roberts FRS and have provided evidence to the initial consultation⁵. It is vital that an analysis of the impact of the RAE on minority subjects such as systematics, is based on quantitative data. We suggest that the next stage of the consultation explicitly requests such data as we note that the issue of minority subjects was not mentioned in the initial consultation for the RAE review⁶.

The well being of the systematics research base and that of the wider biological sciences requires taxonomists in both universities (particularly so that the next generation of taxonomists can be inspired) and other institutions. However, as we have highlighted previously, research into baseline systematic biology (alpha-taxonomy) has been disappearing from universities and is now mainly concentrated in non-university institutions. Changes in the RAE (if indeed they are proved to be a causal factor) are unlikely to prevent the continued disappearance of taxonomy as an academic subject in the short to medium-term. It is therefore vital to maintain and promote links between universities and the relevant non-university institutes. This could include posts shared between universities and major systematics institutions as well as joint PhD studentships and training courses such as the MSc in Systematics and Biodiversity established by Imperial College and the Natural History Museum.

ROLE OF SYSTEMATIC BIOLOGISTS IN PROMOTING THEIR DISCIPLINE (1.6)

We are confident that systematic biologists, including those who are Fellows of the Royal Society, will continue to promote their discipline. The important role of systematics and taxonomy in facilitating the measurement of biodiversity for conservation is being addressed in the current Royal Society policy study on measuring biodiversity⁷. We expect the report of this study to be published in the summer.

DIGITISATION OF TAXONOMY AND ITS DISSEMINATION VIA THE INTERNET (1.7)

We strongly support the ideas put forward by Professor Charles Godfray FRS to turn descriptive taxonomy into a 21st century information science⁸. In particular we recognise the need to provide a single web location where the internationally agreed taxonomy for a given group can be found—a unitary taxonomy. We do not share the confidence expressed by both the HoL report and the Government that the Global Biodiversity Information Facility (GBIF) is an appropriate body to take this forward. While we are aware that GBIF is developing a number of web initiatives including specimen level databases and electronic species name catalogues, it does not have the resources, mandate or aim to construct the unitary taxonomy that is required. We believe that the pilot (the production of a unitary taxonomy for a major group) should be led by a major museum or botanic collection (or consortium of institutions) and that additional resources should be made available to them. If the pilot is successful we would envisage the taxonomy of each of the other groups being produced by the most relevant institution or groups of institutions. We therefore believe that the Government would be wrong to assume that this is a recommendation that can be fulfilled by GBIF.

⁴ House of Lords, Select Committee on Science and Technology. 1st Report, 1991–92. Systematic Biology Research. HL Paper 22-1 ISBN 0 10 480692 3

⁵ The Royal Society's response to this consultation can be found at: <http://www.royalsoc.ac.uk/policy/>

⁶ <http://www.ra-review.ac.uk/>

⁷ Details of this study can be found at: http://www.royalsoc.ac.uk/policy/meas_bio.htm

⁸ Godfray, H.C.J. (2002) Challenges for taxonomy. *Nature* 417, 17–19.

NEW BODY TO IDENTIFY PRIORITIES FOR TAXONOMY AND CONSERVATION (1.8)

We look forward to discussing the Government's proposals for a new body to identify areas where taxonomic research is most needed and to assess the taxonomic impediment to conservation action. We are particularly keen to involve members of our working group on Measuring Biodiversity⁹ (which comprises both Fellows and non-Fellows) who have been considering these issues in a national and global context. We have the following initial comments:

- (a) In the past, bodies such as the UK Systematics Forum have had a similar remit to that being proposed here. Before considering the establishment of a new body it will be important to examine the strengths and weaknesses of similar groups to ensure that time, money and effort are not wasted.
- (b) There is a need for an overall strategic view of priorities for UK policy to be based on quantitative information. We have been concerned, for example, at the lack of quantitative data to support the general view that systematics funding and expertise are declining.
- (c) Given the UK's international responsibilities, any new body must focus on those priorities that meet the international (not only national) needs of the conservation community. It is crucial to identify those areas where we can make the most useful contribution most quickly (ie on time scales appropriate to the conservation needs).

INCREASED FUNDING FOR THE DARWIN INITIATIVE (1.9)

The Darwin Initiative has led to real benefits in conservation and sustainable use, as well as for the UK systematics institutions and their partners in the richly biodiverse countries. In July 2002, prior to the World Summit on Sustainable Development, the President of the Royal Society wrote to the Prime Minister recommending new funding for this important programme. We therefore welcome the announcement of this increase in funding for the Darwin Initiative.

April 2003

Memorandum by the Royal Society of Edinburgh

1. The Royal Society of Edinburgh (RSE) is pleased to respond to the request for comments on the Government Response to the House of Lords' Select Committee on Science and Technology Report "What on Earth? The Threat to Science Underpinning Conservation". This response has been compiled by the General Secretary, Professor Andrew Miller and the Research Officer, Dr Marc Rands, with the assistance of a number of Fellows with extensive knowledge of systematics and conservation.

2. Despite the Government's recognition of the important role of systematics in the conservation of biological diversity, there is little action to support these sentiments in the response to the Select Committee's Report. Comments on the Government's response to some of the individual Select Committee recommendations are addressed below:

RECOMMENDATION 1.1 IN VIEW OF THE GOVERNMENT'S COMMITMENTS TO BIODIVERSITY CONSERVATION WE RECOMMEND THAT THEY INCREASE GRANT-IN-AID TO THE MAJOR SYSTEMATICS INSTITUTIONS

3. While the Department of Environment, Food and Rural Affairs (Defra) has responded with an additional award to the Royal Botanic Gardens, Kew, the other responsible branches of government, for example the Department for Culture, Media and Sport (DCMS) and the Scottish Executive Environment and Rural Affairs Department (SEERAD) seem not to have accepted the importance of responding to the issues identified by the Select Committee. The notified grant in aid to the Royal Botanic Gardens, Edinburgh (RBGE) has been increasing by 2.5 per cent per annum and as a result of Spending Review 2002 this has been increased to 3 per cent, however, this level of funding is insufficient to meet the running costs of the institution, let alone enable the Gardens to remain a leader in the world, or even to provide an example to the rest of the world. While these organisations are winning new resources from elsewhere, it is difficult to get private funding for such things as curation of collections, or the improvement of infrastructure.

RECOMMENDATION 1.8 WE RECOMMEND THAT DEFRA TAKES THE LEAD IN SETTING UP A BODY . . . TO IDENTIFY PRIORITY AREAS OF BIODIVERSITY FOR WHICH TAXONOMIC RESEARCH IS MOST NEEDED BY THE CONSERVATION COMMUNITY, AND FOR OTHER NATIONAL PURPOSES, SUCH AS HEALTH AND AGRICULTURE

4. The Society believes that Defra's plans to convene a meeting with interested parties to decide the next steps to setting up such a body is a useful starting point. The time scale of "next year", however, does not convey any sense of urgency. Care will also need to be taken to take forward, rather than repeat, the work of the UK Systematics Forum, which was set up by the OST and which published its report "The Web of Life" in 1999 (http://www.nhm.ac.uk/hosted_sites/uksf/web_of_life/index.htm)

⁹ Details of this study can be found at: http://www.royalsoc.ac.uk/policy/meas_bio.htm

RECOMMENDATION 1.9 We recommend that the current level of spending on the Darwin Initiative, approximately £3 million per annum, should be earmarked specifically for projects with a significant taxonomic component, to be used for conservation purposes

5. The RSE welcomes Government's increase in funding to the Darwin Initiative.

April 2003

Memorandum by the Systematics Association

Paragraph numbers refer to the Government's response

INTRODUCTION: PARAGRAPH 2

UK institutions and societies have made, and continue to make, substantial contributions to national and international knowledge and interpretation of biodiversity. Furthermore, the UK is in a unique leading role due to its massive collections, databases and systematic expertise. Since the mid 20th century, which was more about the acquisition of information, the role of organisations such as the museum and organisations like ours specialises on information and technological expertise, especially in maintaining and boosting new interests in a wide range of taxonomic groups.

Conservation depends on authoritative knowledge used to ensure that best practice is put into place. This demands comprehensive involvement of systematists and a commitment to train new ones. Although the UK institutions have to work with organisations at international, national and local levels the UK is considered one of the most important countries in systematics and conservation. Conservation is not based on perfect knowledge but the best that is available—the UK is in a position to provide the best information and theoretical underpinnings to conservation science.

RECOMMENDATION 1.1: PARAGRAPHS 4, 5 AND 6

The Government statement on resources appears to us as totally misleading, largely because nowhere does it refer to the rapid decline in baseline funding in real terms in all grant-in-aid projects. Despite the belief that there is sufficient funding to restore us to 1992 levels this is simply not true. The idea that digitising information will solve the problems is naive as data processing is just a very small part of an enterprise within systematic research, and indeed without the correct funding will draw funds away from fundamental research on the organisms themselves.

In addition to the problems of systematics research the Systematics Association is responding to a number of other demands for support for biodiversity action under the CBD, through improved resources for students, new works on particular groups of organisms in both paper and electronic formats and the bringing together of interested parties on an international scale.

RECOMMENDATION 1.6: PARAGRAPH 12

- (i) In response to this recommendation, the Systematics Association has already entered into negotiations with regard to the funding of research grants and bursaries. We already work with other major systematics institutions, learned societies and others to hold joint conferences and produce joint publications.
- (ii) We address the issues of the day at all of the council meetings.
- (iii) Develop education and information activities to enable wider use and appreciation of systematic science. We are particularly concerned with the way that systematic biology is taught in schools and universities and we try to develop a general policy on these matters.
- (iv) We have a very good record on advisory matters on systematics both within the context of our science and with regard to Governmental demands. We hold regular meetings on systematics with wider debates on the development of biological science.

It seems to our members of council that the Government has distanced itself on the importance of systematics at a time when it is essential that improved dialogue takes place between systematists, Government and NGOs.

RECOMMENDATION 1.7: PARAGRAPH 13

Although we accept that the Government supports GBIF, there are no indications of Government responsibility, financial input and key agencies with whom to work. We do not understand the importance of the reference to Godfray's contribution as there are many organisations around the world, ourselves included, heavily committed to research, storage of information and dissemination of information using electronic means.

The main role of the Systematics Association is to provide the primary data and syntheses of taxonomic works. It is all very well encouraging massive data-base projects under the general rubric of "A catalogue of Life" but the impediment to progress is basic research and all of the accompanying activities that entails.

RECOMMENDATION 1.7: PARAGRAPH 14

Systematics, as with any data-rich system generally is capable of initiating pilot projects. The key to successful projects in our opinion however is in the maintenance and longer-term management of good taxonomic enterprises. Consequently there has to be a modicum of growth in budgeting for such activities if funding is not going to draw from existing central activities.

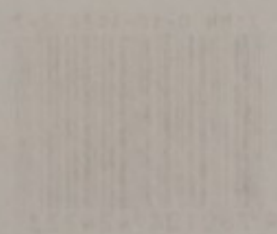
The Government's statement on GBIF digitisation is not at all clear. GBIF has made a call for outline proposals for digitisation of collections—which are currently being prepared by individuals of our membership. A call for proposals for larger projects has yet to be made and the relevance of Godfray's ideas is hard to see. The two proposals in no way relate to one another.

RECOMMENDATION 1.8: PARAGRAPH 15

We welcome the Government's proposal for the development of a UK systematics strategy and policy. We see our Association as one of the main sectoral interests in the UK and Europe with special reference to securing systematic research on all groups of organisms worthy of investigation. The Systematics Association is a focal point for systematists of all persuasions and we hope that the new proposed strategy and policy would seek information from our officers and councillors.







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