

# Roberts Review of the RAE

## Submission from the Royal Society: 29 November 2002

1. The Royal Society welcomes the establishment of the review of the Funding Councils Research Assessment Exercise (RAE) chaired by Professor Sir Gareth Roberts, and the opportunity to comment during the initial stages of the review. It will study the review's final report and may well wish to comment further on its recommendations during the formal consultation stage in the middle of next year. This submission makes some general comments on the RAE, and then provides responses to the various issues set out in annex B of the review's call for evidence.
2. The Royal Society's most recent statement on the RAE was contained in its January 2002 submission to the House of Common's S&T Committee's inquiry into the RAE(1), the report of which was published in April 2002. A copy of this submission is attached. Other relevant comments from the Society were included in some earlier publications (2, 3, 4 and 5), which together with the submission to the Select Committee can be viewed on the Society's website [www.royalsoc.ac.uk](http://www.royalsoc.ac.uk).
3. This submission takes as its starting point the two basic premises that the current review will not challenge:
  - a. The dual support system will continue. There will thus be an ongoing need for a method of allocating funds selectively. Research assessment of some description will continue to be used for this purpose.
  - b. The quality of research will continue to be considered in a global context. It will therefore need to be assessed at a national and international level.
4. The Society believes that it is crucial to the health of university research for there to be an adequate level of underpinning support, and that the level of this support should be determined by quality. Furthermore, any system for determining quality should be robust, transparent and consistent for all the disciplines, although it needs to take into account the differences across the research spectrum and could well be tailored to the characteristics of particular disciplines.
5. The two widespread main criticisms of the current arrangements for the RAE are the burden that it places on researchers and the possible distortions it encourages. It is therefore important to explore ways of reducing the burden on the community and a greater use of metrics may help, although there is a need to retain peer review panels. Furthermore, moving to a profiling system may reduce some of the undesirable consequences of institutions "playing the system".

### Funding Council Support for Research

6. Under the current dual support arrangements, Funding Council grants are used to support the basic permanent infrastructure of university research, such as the salaries of permanent members of academic staff while they are undertaking research, the buildings, fittings and consumables, and the cost of some exploratory research until it is at a stage where it can

attract Research Council or other funding. In the arts and humanities, a significant proportion of the research will be funded in this way. The Society welcomes the move to return to Funding Council capital grants on a more permanent basis. Research Council grants fund the additional cost of undertaking the funded programme of work including a contribution to indirect costs (calculated as 47% of staff costs in grants) and again the Society welcomes the additional £120 million pa that has been made available to the Research Councils from 2005-06 to increase their contribution to indirect costs.

7. It follows from the difference between the purposes of the two arms of the support system that the two streams should have relevant ways of calculating the grant. Basing Funding Council income on a simple automatic algorithm using Research Council or total grant income would not be appropriate, as the relationship of basic underpinning research to grant income varies from discipline to discipline, and even within disciplines. Furthermore, because of the different research portfolios of institutions, algorithms based on whole institutions are no more reliable. However, it may be possible to devise an algorithmic based system, with the capability of devising **different parameters for each discipline** based on one or a few metrics, such as peer reviewed grants, access to central facilities and charity grants. If such a mechanism proved a robust way forward it would be considerably less costly to implement than a full expert-review based RAE.

## **RAE**

8. The main concern about the RAE is the workload that it places on the universities, both centrally and on individual researchers. Furthermore, the peer review arrangements place a significant workload on those researchers and others who contribute to the process. Hence the review needs to consider whether it is possible to reduce this burden on universities and to the arrangements within the Funding Councils. As far as university submissions are concerned, it seems likely that institutions and individual researchers do far more work than is actually required, but this is probably because the severe penalties of just missing a particular rating band leads them to play safe. Moving away from a quantised banding system to a profiling system as suggested in the next section should reduce this pressure. Nevertheless, it is important to consider whether there are other changes that could further reduce the burden of the assessment.
9. There are also claims that the RAE causes other significant problems to individual researchers and to institutions as a whole, including that it:
  - a. leads to distortions in university research by discouraging:
    - i. long term research;
    - ii. inter-institution collaboration;
    - iii. interdisciplinary research;
    - iv. working on non-research activities such as writing textbooks;
    - v. the natural symbiosis between research and teaching;
  - b. encourages poaching of top quality research staff;
  - c. disadvantages young and women researchers;

- d. encourages game playing with who to exclude from the exercise, which itself creates problems, such as:
    - i. generating lack of motivation and unity in departments
    - ii. encouraging the distinction between researchers and teachers and may devalue the latter.
10. The evidence for many of these is anecdotal, and some commentators have certainly overplayed them. In some cases, such as claims about staff poaching, it is arguable that the current level of staff movement within the university system, and between the university system and other sectors is if anything too low. Furthermore, in many disciplines it is becoming increasingly necessary to collaborate with other research groups in order to maintain international standing. Nevertheless, these are all issues that should be considered as part of the review.

### **Unit of Assessment and the Ratings**

11. For the 2001 RAE, university research was divided in 69 units of assessments (UoA), some of which were further split into sub-units with their own panel reporting to the main UoA committee. While in principle it should be possible to brigade disciplines into a smaller number of larger units, peer review would be difficult without splitting these into sub-divisions.
12. Currently there are seven rating groups, only the top four of which are funded by HEFCE. Furthermore the majority of university research active staff are now located in 5 and 5\* departments, and hence the discrimination is poor. The 4, 5 and 5\* ratings could be further sub-divided, but this becomes increasingly difficult and we strongly recommend that the review consider the practicality of moving to departmental **profiles** rather than **ratings**. One such arrangement would assign **all** members of academic staff to one of three research groupings, international, national, and sub-national/non-research active. Then funding could be calculated by suitable weightings to the number of persons in each of these three groups. The reasoning behind this arrangement is set out in a paper in Science in Parliament (6), a copy of which is attached at attachment 2.
13. In some disciplines or sub-disciplines profiling at the group level rather than individually might be more appropriate, and the decision could be left to the relevant panels to decide whether to allow or perhaps encourage group submissions.
14. This proposal has a number of advantages over the present seven rating baskets including:
- a. it is able to distinguish between departments within particular ratings;
  - b. it is more robust and stable, without the discontinuities that can happen with the present system from the movement of even a single research team to another university, or the retirement of a key member of staff;
  - c. the stability should reduce the undesirable consequences of universities playing the system, not least reducing the pressure to undertake unnecessary additional administrative work in an attempt to make sure of achieving a target rating, and

the detrimental effects on staff morale over declaring certain staff not research active;

- d. It should also reduce the perceived pressure on researchers, which, it is claimed, result in discouraging collaboration and interdisciplinary research.

### **Use of metrics**

15. The various metrics available as quantitative and qualitative measures of research output are valuable, but have to be treated with care. Certainly there are significant difficulties using them as direct input to an automatic algorithm based system. The available metrics are:

- a. number of publications – even restricting the papers to peer reviewed publications does not in itself say anything about the quality of the research;
- b. measures of peer appreciation of quality:
  - i. citations;
  - ii. invited lectures, medals, prizes etc;
  - iii. Research Council grants;
  - iv. time on central facilities;
  - v. other peer reviewed grant income;
- c. other outside research funding such as commissions from public bodies and research contracts;
- d. number of research students successfully completing their PhD over a specified period.

All of these measures are highly discipline dependent, and some, particularly citations, are also dependent on other factors such as the time-window taken and the length of time a researcher had been in the field.

16. It is the Society's view that it would not be appropriate to input some or all of these measures into an automatic algorithm across all disciplines in order to determine the level of Funding Council grant. Rather, that the metrics should form one of a number of inputs to a discipline based peer review adjudicated system able to evaluate them in the particular discipline in question.
17. It is essential that any weightings used in a particular discipline should be made available well in advance, or the process could well be the subject of judicial review. It has to be recognised also that the use of metrics as a significant input to the funding decisions is likely to lead to changed behaviours by researchers in order to maximise income, possibly more so than the current arrangements. Furthermore there is always a danger that, unless the chosen metrics are very carefully defined, there will be scope for careful packaging of these in university returns.

18. The review should explore how much discretion should be given to discipline areas over the use of metrics in the quality assessment.
19. Citation analysis may also be of value in checking the overall outcome of peer review panels, for example, relative citation impact of a discipline, by comparing with world citations in that discipline may help to check that comparable standards are being used.

### **The Introduction of a Prospective Element**

20. A prospective element could be input into the assessment process, possibly through a short corporate vision provided at the departmental level. However, the execution of prospective plans will depend largely on success in obtaining project funding, and it is not clear how a prospective element could be easily incorporated into a block grant funding system, especially for established research institutions and disciplines. Nevertheless, the review should consider whether special funding arrangements need to be developed to aid the emergence of new disciplines or the development of new research facilities in the less research-intensive universities.

### **References**

- 1) "Continuing to develop the excellence of UK university research" - Royal Society submission to the House of Commons Science and Technology Committee inquiry into the Research Assessment Exercise; January 2002
- 2) "Research policy and funding" – Royal Society Response to the HEFCE Review of Research; January 2001.
- 3) Use of the policy factor in research funding – Royal Society response to HEFCE consultation 98/54; December 1998.
- 4) Royal Society's submissions to the Dearing Review (National Committee of Inquiry into Higher Education) November 1996 and May 1997.
- 5) The research capability of the university system: Summary of report compiled by the National Academies Policy Advisory Group (NAPAG); April 1996.
- 6) J Enderby Science in Parliament **59**(4) 24-25 2002

## Comments on the Questions Posed in Annex B of the Invitation to Contribute to the Review

### 1. Expert Review

- a) ***Should the assessments be prospective, retrospective or a combination of the two?***

This is considered in paragraph 19 of the introduction.

- b) ***What objective data should assessors consider?***

The quality not quantity of publications and other outputs of research should be the main criterion for judging basic and strategic research, including, especially in the social sciences and humanities, books and contribution to books, and in the arts, artefacts where these demonstrate research quality rather than professional ability. Evidence could include information on citations to the submitted works.

There should however be other input into decisions, such as those set out in paragraph 15 of the introduction, including the number of research students successfully completing in a specified period for each member of staff, measures of peer recognition including peer reviewed grants, and other outside income.

The weight that each of these criteria carry in each Unit of Assessment will rightly vary, and this needs to be decided, defined and publicised by the expert subject panel well in advance of the assessment exercise.

- c) ***At what level should assessments be made – individuals, groups, departments, research institutes, or higher education institutions?***

This is highly dependent on the subject and hence the level should be decided on a subject-by-subject basis by the relevant review panel (or could be left to the discretion of the department). For example, in mathematics the assessment of individual researchers may be appropriate, whereas in particle physics and other areas where teams involve a number of members of academic staff, the group is probably best considered as a whole.

- d) ***Is there an alternative to organising the assessment around subjects or thematic areas? If this is unavoidable, roughly how many should there be?***

The need for panels to give an informed judgement on each university submission sets a limit to the breadth of each unit of assessment.

**e) What are the major strengths and weaknesses of this approach?**

The main strength of the current system is that decisions on the quality of research are taken by peer groups looking across all departments in the UK.

The main problem is that the exercise is undoubtedly a significant workload on both the universities and the Funding Councils. While, over the period covered by the relevant funding associated with the assessment, this is less than the overall load of grant proposals or the teaching quality assessment, the review needs to explore whether it is possible to reduce the burden of the RAE on the academic community.

There are concerns over the mapping of the peer review decisions on individual researchers onto the present RAE departmental ratings 1 to 5\*, and there is now a need to discriminate better within the top three ratings.

Other problems that have been raised include those set out in paragraph 9 of the introduction; the evidence for these is largely anecdotal, and it is difficult to quantify them.

The establishment of a departmental profile should reduce significantly the disadvantages of expert review (paragraphs 12 – 14 of the introduction and attachment 2).

*Further points:*

Although it has been suggested in the notes that a variant of the expert review system would be a combined assessment of teaching and research, this is not an approach that the Society would support. It would generate an enormous workload for staff and be complicated to implement.

## **2. Algorithm Only**

**a) *Is it, in principle, acceptable to assess research entirely on the basis of metrics?***

No, the differences between subjects and within subjects make a simple and automatic algorithmic arrangement without peer review moderation unreliable, although metrics can help inform a peer review system arrangement, and might on a discipline-by-discipline basis be a major input to the process.

**b) *What metrics are available?***

These are set out in paragraph 15 of the introduction and include citations, publication rate, income, number of research students successfully completing their PhD, lectures, prizes. The weighting of each metric would need to be clearly defined for each discipline – a difficult but essential job.

**c) *Can the available metrics be combined to provide an accurate picture of the location of research strength?***

While for a handful of subjects there is a reasonable correlation between RC income and RAE rating, this is not so for the majority of Units of Assessment, some of which show an almost random scatter. A similar scatter is also obtained at an institutional level using either Research Council grant or total research grant income.

Hence judgements have to be made on how these metrics might translate into an accurate assessment on a discipline-by-discipline basis, and in many cases within the discipline. Furthermore, metrics are often highly dependent on the time window in which they are measured, and also on the subject and the age profile of the researchers in a department. It is difficult to see how an accurate and consistent picture can be developed without peer review.

**d) *If funding were tied to the available metrics, what effects would this have upon behaviour? Would the metrics themselves continue to be reliable?***

If anything, there would be greater scope for playing the system than with the current peer review based system.

**e) *What are the major strengths and weaknesses of this approach?***

The potential advantage of an algorithm-only approach is that if a robust system could be devised, it would significantly reduce the burden on both institutions and Funding Councils.

Unfortunately it is unlikely to result in a robust measure of quality, without significant peer review adjudication. It is also a system that lays itself open to distortions of research behaviour, and care would have to be exercised to ensure that it does not disadvantage women and younger researchers.



### **3. Self-assessment**

**a) What data might we require institutions to include in their self-assessments?**

This is subject dependent, but should include the same measures as expert review and algorithmic assessment, set out in paragraph 15 of the introduction:

- Quality of papers and other output
- Number of postgraduate students that graduate over a period;
- Measures of peer recognition (paragraph 15b of the introduction):

**b) Should the assessments be prospective, retrospective or a combination of the two?**

This is considered in paragraph 19 of the introduction.

**c) What criteria should institutions be obliged to apply to their own work. Should these be the same in each institution or each subject?**

Criteria for research quality need to be consistent across departments and institutions. Their application for determining funding might take account of institutional circumstances.

**d) How might we credibly validate institutions' own assessment of their own work?**

It would be difficult to do this transparently without at least some form of peer review of each department's input. It may be possible to compare the self-assessment against a basket of metrics, and to use this as a trigger for special review. Alternatively there could be a percentage sample audit.

**e) Would self-assessment be more or less burdensome than expert review?**

It might well turn out that self-assessment would not be significantly less burdensome than expert review if departments are rigorous. In order to have a robust system there would need to be an audit process, possibly coupled with a metrics based surveillance arrangement to flag up apparent anomalies.

**f) What are the major strengths and weaknesses of this approach?**

It is difficult to see how this method would reduce the workload significantly if it were to be undertaken robustly and transparently.

## 4 *Historical ratings*

Presumably this option is to extend significantly the time between major reviews, and to look at ways of adjusting funding in cases where departments have changed significantly. This is, of course, much easier to do when a department improves than when it is in decline.

**a) Is it acceptable to employ a system that effectively acknowledges that the distribution of research strength is likely to change very slowly?**

The present system is not stable enough for a significant (doubling?) of the time between reviews, as can be seen from the changes from one RAE to the next.

**b) What measures should be used to establish each institution's baseline ratings?**

A profile-based system would be more stable than the present arrangements mapping onto the seven ratings.

**c) What mechanism might be used to identify failing institutions or institutions outperforming expectations? Could it involve a 'value for money' element?**

For improved performance, one could rely on self-proposals, but universities are unlikely to volunteer to receive lower funding. It might be possible to have certain trigger metrics, but this would result in researchers continually monitoring their metrics and playing the system, which could be very wasteful of both time and intellectual energy.

**d) What would be the likely effects upon behaviour?**

As indicated in the previous section, there is likely to be considerable scope for seeking to at least maintaining metrics.

**e) What are the major strengths and weaknesses of this approach?**

A general point about this system is that the efficacy of it will depend on how much of the 'research profile' system is adopted – see paragraph s 12 – 14 of introduction.

## 5. *Cross-cutting themes*

Regardless of the approach to the assessment, the following generic issues need to be addressed:

### a) **What should/could an assessment of the research base be used for?**

Assessment should be primarily used as a basis for funding decisions. There are problems in citing them more widely, such as in league tables, and this should be discouraged.

On the other hand it would be helpful if the assessment could be used as a basis for management information more generally, although its limitations in comparing individual departments within a university needs to be recognised.

### b) **How often should research be assessed? Should it be on a rolling basis?**

An assessment every five years is sufficient and might be extendable to six. While a rolling assessment would smooth out the burden on institution and Funding Council central administrations, it would not reduce the load on researchers.

### c) **What is excellence in research?**

Excellence in research has to be defined by the community of researchers in each discipline; it is impossible to come up with any other robust definition.

### d) **Should research assessment determine the proportion of the available funding directed towards each subject?**

Research assessment should have a major role in determining the amount of funding directed at a subject, adjusted with weightings to take account of relevant costs (ie for Funding Council support) of research in different subjects. However, the review should explore the implications of subject expert groups consciously or sub-consciously inflating the overall sums available to their area. Some additional information can be obtained from relative citation impact information (the average number of citations per paper in the discipline compared with the world average in the discipline), but it would be unwise to use this purely arithmetically.

### e) **Should each institution be assessed in the same way?**

Yes, quality needs to be assessed in a standard way, but funding decisions on institution block grants based on the quality measure could conceivably take other factors into consideration.

### f) **Should each subject or group of cognate subjects be assessed in the same way.**

In general terms there should be consistency across all subjects, but the detailed assessment arrangements could be refined at a subject or group of cognate subject level.

**g) How much discretion should institutions have in putting together their submissions?**

The discursive part of the RAE assessment should be made more pro forma, perhaps by putting it into tabular form, so that comparisons can be made more easily. This might reduce the effort that universities feel they should put into this part of the submission, and of the Funding Councils in using the information.

**h) How can a research assessment process be designed to support equality of treatment for all groups of staff in Higher Education?**

This is addressed in proposal for research profiling – paragraphs 12 – 14 and annex B.

**i) Priorities: what are the most important features of an assessment process?**

The assessment process should be:

- directed entirely at research quality;
- aim to minimise the burden on universities without sacrificing rigour;
- transparent.

## **CONTINUING TO DEVELOP THE EXCELLENCE OF UK UNIVERSITY RESEARCH**

### **The Royal Society's Submission to the House of Commons Science and Technology Committee: January 2002**

1. A healthy research base in our universities is crucial to the future of the UK, most obviously in providing new ideas for exploitation by our companies and by the health and other public services. However, it is in the maintenance of a dynamic knowledge system across all major areas that is arguably more important as it is impossible to know what areas of expertise will be required in future. Most recently the importance of university expertise was exemplified by the need to call on experts in depleted uranium, bioterrorism and on Afghanistan, Middle East and Islamic studies. The Royal Society believes that the overall international standing of UK research is higher than it has been for many years, but that this position can easily and all too quickly be lost if steps are not taken to put the present funding arrangements on a sustainable basis. Once lost, it would be difficult and expensive to regain the present position.
2. In considering the health of university research it is important to recognise and take account of its unique structure involving the symbiosis of researchers and their home university, with each side having their own aspirations and long and short term objectives:
  - the researcher's main aim is to take forward the frontiers of knowledge and to be recognised by their peers. In pursuit of this, the researchers often receive only modest financial rewards, especially considering the amount of time that they devote to their research, but the best of them will look for an institution that can provide them with appropriate facilities in terms of physical and human infrastructure and an intellectually challenging environment. Researchers will seek access to a pool of bright postgraduate students and increasingly they have also been seeking opportunities for exploiting their research, which can also require suitable infrastructure within the institution.
  - The universities wish to retain the services of researchers in appropriate disciplines, if possible ones with an international reputation, in order to maintain the institution's standing as a centre of learning, to teach undergraduates and post-graduate students, and of increasing importance, to provide appropriate expertise for delivering in-house and distance-learning based continuing professional development.
3. This relationship between researcher and institution can be traced back to the formation of medieval universities and it can be questioned whether it is still appropriate at the start of the twenty first century, especially when in many areas where there is a requirement for very expensive technology and the involvement of larger research teams than hitherto. Furthermore, the massive increase in participation in higher education, coupled with the necessary decrease in the cost per student that has occurred over the past 20 years, has also impacted on the structure of universities and on the balance of time that academic staff can spend on various activities including research. Nevertheless, the Royal Society believes that none of these changes has diminished need for the structure of universities to take account of the special position of university researchers.

### **THE DUAL SUPPORT SYSTEM**

4. A balanced pluralistic funding system is necessary both to provide stability for long-term developments and to recognise needs of the various components of the system. The dual support system for public funding of university research in the UK – many features of which are unique to the UK - seeks to recognise the requirements and needs both of universities as institutions and of researchers as individuals.

5. As far as the university is concerned, the funding arrangements need to provide flexibility to local management to develop their institution's strengths, with a clear understanding of how success or failure will impact on the institution's future funding. The block funding from the Funding Councils allows an institution to develop its research capabilities within the context of its overall mission by providing the resources for it to develop the key basic facilities and the "pump priming" funding packages required to attract and retain world class researchers. It is a great strength of the system that the funds provided are both unhypothecated and transparent in the way that they have been calculated by the Funding Councils.
6. In the UK funding arrangements, it is important for the support through the two arms of the dual support system to be balanced. During the 1980s and early 1990s the proportion of funds distributed through the Funding Councils decreased and this led amongst other things to the run-down of research facilities. The additional capital funding provided through the last spending review, including a significant contribution from the Wellcome Trust, has redressed the situation to some extent, but there remains some way to go.
7. Research Councils provide researchers with the necessary grants and access to national and international facilities to enable them to develop their research and in appropriate cases build up teams of postdoctoral researchers and postgraduate research students.

#### **FUNDING COUNCIL FUNDING AND THE RESEARCH ASSESSMENT EXERCISE**

8. It is important that both Research Council and Funding Council grants be distributed competitively to support the best quality research and to provide both institutional and personal incentives to strive for the best. This inevitably means that there will be a high degree of selectivity in the system, but this should result from the system of funding, not imposed top-down. A rigid institutionalised system of selectivity runs a severe danger of fossilising the system at a particular point in time, whereas it is essential for our university system to be dynamic and to enable new centres of expertise to develop, possibly at the expense of more established ones that have lost their edge.
9. It is also important not to take too simplistic a view of selectivity when for example comparing the UK universities with those in other countries, where differences in the type of institution and their size can result in a distorted picture. There have in the past been wild claims of the US being much more selective than the UK, whereas a more sophisticated analysis indicates that the two systems were much more comparable with respect to selectivity.
10. The Research Assessment Exercise (RAE) has been a successful way of determining by peer review the quality of university research departments, and there can be little doubt that this, coupled with the related funding formula, has been a major factor in the increased standing of UK university research.

#### **THE RESEARCH ASSESSMENT EXERCISE**

11. The RAE assesses university research on the basis of 69 units of assessment (UoA), and university departments or major research units have to map themselves onto one or more of these UoA. In 2001 the Funding Councils took note of previous criticisms levelled at the assessment exercise and in particular paid particular attention to the following:
  - wider representation on the assessment panels including people from outside the university research;
  - the use of international referees to confirm or otherwise the 5 and 5\* ratings decisions;

- particular attention to possible problems with inter-disciplinary and multidisciplinary research;
  - a wider definition of research output to include many other outputs beyond peer reviewed articles;
  - taking into account movement of staff between universities.
12. Under the RAE, a university specifies those academic staff that it wishes to be considered as part of the assessment exercise. This has led to criticisms that certain universities have been game-playing, and manipulating their returns to gain higher ratings by excluding some staff from the exercise. However, it is right to recognise that some academic staff within departments may no longer wish or be able to continue at the cutting edge of research, but yet more than earn their salary through concentrating on teaching, including the preparation of course material, undergraduate text books or distance learning material, and/or take on a significant administration load including the annual recruitment of students. The cost of such staff should not be borne from research funds, and should be excluded both from the RAE and from any volume measure used for determining the research block grant. Nevertheless, there are some worrying trends in the submissions from some universities to the 2001 RAE, where some research-intensive universities offered less than 80% of their academic staff for assessment. This needs further study and consideration as to whether there should be a minimum percentage of staff who should be included to achieve a 5 or 5\* rating.
13. On a related issue, the Society believes that it is important for the RAE to remain strictly an assessment of research quality across the spectrum from applied to blue sky research. It should not try and include recognition of other desirable, but non-research activities. The Society supports the Funding Councils' and OST's policy of supporting other activities through different streams of funding, such as those made available to support exploitation and contact with the user communities. However, it has to be recognised that with severe pressure on resources some other activities that are not so easy to accommodate may be squeezed. For example, there have been claims that pressures on academic staff time have resulted in a reluctance to become engaged in peer review activities such as serving on grant and other committees, and acting as referees for grant proposals or for publications.
14. Perhaps the major practical problem with the RAE is its cost, not only to the Higher Education Funding Councils and the peer review panels, but also the work required of each individual member of staff, heads of department and the administrative staff of the institution. Set against this the exercise is only undertaken once every five years and thus probably represents a significantly smaller overhead than that for the research councils' peer review system. Nevertheless, the combination of administrative work associated with the RAE, preparation of grant proposals, coupled with demands of the QAA, are a significant and growing burden on academic staff. The Society therefore believes that the Funding and Research Councils should consider over the next 12 months how they could reduce these burdens while retaining robust systems for determining quality.
15. The results of the 2001 RAE has shown a greater increase in the rated quality of departments compared to the outcome from 1996 than between any previous adjacent pairs of assessments. The number of departments with at least a 4 rating (research of national or international standing) increased from 43% to 65% and, because of the generally larger size of the higher rated departments, the number of researchers in these departments has gone up from 59% to 80%. It is important to check that this is a real increase in quality of the UK's overall research standing and not due to "grade drift". Evidence for a real increase in quality comes from the international referees, by a study of some of the departments that have increased their rating where significant efforts have been made to recharge their research complement, or where the rating can be compared with other departments in the same UoA that have not increased their standing, and by a study of the relative citations received by the UK. An initial analysis is set out in the next section.

## THE STANDING OF UNIVERSITY RESEARCH

16. Over the history of the RAE there has been a general improvement in the research ratings as universities have strived to improve the standing of their key departments, and it is important to recognise that there has been some major restructuring within the system.
17. As funding contributions for departments rated 1, and then 2, were withdrawn, universities were faced with the choice of investing to improve the standing of the department or taking more radical action, such as closing the department, merging with one or more other departments within the university or rationalisation with a neighbouring university. This has resulted in the reduction in the number of lower rated departments and some spectacular rises in rating, some from very modest beginnings.
18. There have also been cases over the past decade where some previously high standing departments at major research universities have lost the cutting edge, and this has been reflected in reduced RAE ratings. In most cases, the universities concerned have taken action to replace poor research performing staff with new blood, often starting at the top, and the departments have recovered their previously high RAE rating.
19. Evidence for the overall improvements in the peer reviewed assessments of university research departments comes from an examination of the citations received by UK researchers relative to the average citations received by researchers throughout the world. An analysis undertaken by Evidence Ltd of the detailed Institute for Scientific Information (ISI) data has shown that not only have the relative citations of papers in science and social sciences produced by departments rated 5 and 5\* in the 1996 RAE increased significantly between 1991 and 2000, this is also true of the citations of papers produced by departments rated 3b, 3a and 4<sup>1</sup>. Furthermore, an added indication of the genuine improvement in quality at these levels, is that the papers from 1996 3b to 4 rated departments took an increased share of the UK total.
20. Finally, it is important to recognise that research excellence stretches well beyond the powerhouses of Cambridge, Oxford, University College London, Imperial College and Edinburgh. There are 76 universities (ie excluding specialist institutes and free standing medical schools) with one or more 5 rated departments and 53 with one or more 5\* departments. Further evidence can be found from a consideration of the top 10 institutions for citations in the various disciplines. An initial study, of 8 groups of science and social science UoAs (Clinical Research, Biological Sciences, Environment, Mathematics, Physical Sciences, Engineering, Social Sciences, and Business and Economics) includes 37 universities. This confirmed an earlier study of 21 subject areas where only considering the top three UK universities within each area resulted in a total of 26 universities being included in the list (ISI Science Watch 1997 January/February 1-2). A similarly wide range of institutions is obtained from a consideration of the top ten institutions in terms of total grant income from each of the six Research Councils. Of course this demonstrates the heterogeneity of quality within universities; but this is healthy. All this argues for continuing to treat the university system as a continuum, allowing for the growth of research excellence where it is best established within the system, with possible contraction elsewhere, rather than trying to determine the structure top down. It is essential to allow for the development of both significant research universities, like Warwick, and for individual high quality centres of expertise throughout the system wherever they develop.

---

<sup>1</sup> As an illustration of the increase in impact as indicated by relative citation analysis, the citation impact relative to the world average for papers in the science and social sciences from departments rated 3b, 3a, 4 and 5/5\* in the 1996 RAE over the period 1991-92 to 2000 is shown at annex A. This information was commissioned by the HEFCE from Evidence Ltd, and further information can be provided.



## **FUNDING COUNCIL BLOCK GRANTS**

21. The increased number of higher rated departments in RAE 2002 clearly causes funding problems. In its submissions to the three funding Councils on their 2000/2001 consultations over university funding policy, the Society expressed the view that it was important to continue to provide some recognition for 3b and 3a rated departments, as this allowed entry routes for up and coming departments and also research capability in some subjects across the country. While the latter will be of lesser importance with the smaller number of 3-rated departments, the Society believes that flexibility is still a compelling reason for continuing to recognise these departments, albeit possibly at a lower level of funding.
22. Without increased total funding, but taking into account the new ratings, distribution of the funds in 2002 on the same basis as those for 2001, would result in significant reductions in the block funding for research at the top four English institutions Cambridge, Oxford, University College and Imperial College, possibly amounting to £40 million.
23. The Society would urge the DfEE and the Scottish, Welsh and Northern Ireland authorities to establish increased support for university research in the current spending review. It cautions against the optimistic view, which has been expressed by some, that the universities have been able to raise their performance within the existing resources and so should be able to maintain them within current resources. Satisfactory performance under the current funding level is not sustainable and it is essential to put university research and other activities on a realistic long-term basis. International comparisons confirm that UK funding of university research is still lower than our major competitors, despite the high private sector component.
24. The efforts of the OST, the Funding Councils and the universities to take forward a major improvement in university accounting procedures should ensure that universities are better able to organise their investments in capital facilities and human resources.
25. The Society notes that over the last two spending reviews significant resources have been made available to renew university facilities. As the Cabinet Minister for Science and Lord Sainsbury both said in their oral evidence to the Committee on 19 December, there is some distance to go to make up the shortfall of the previous decade or so of under-funding of university research. The Society hopes that the total increased expenditure on university research, including this capital element can be consolidated and indeed increased in the forthcoming Spending Review, in order to ensure that we can maintain and indeed continue to enhance the standing of our research base.
26. There remains a problem for the forthcoming year, but provided that some additional funds can be made available, a combination of this and some transitional arrangements should provide a way forward so long as the longer term funding is secured.

## **THE FUTURE DEVELOPMENT OF UNIVERSITY RESEARCH**

27. Building on the basic underpinning support provided by the HE Funding Councils, the Research Councils, including the Arts and Humanities Research Board, have an important role in signalling the way that research should develop into the future. However, it is important for them not to lose sight of the importance of some unfashionable but underpinning fields, exemplified by systematic and whole animal biology. Furthermore, a danger of project based funding systems is that under financial pressure they can become risk averse. One other issue is whether the 3-year basis of many grants is such that it results in projects being artificially constrained by unnatural timetables and also to hinder the planning of longer-term projects.
28. Our major charities, largely in the biomedical field, have a significant role to play in the development of research capability. This is also true of our innovative firms and public service

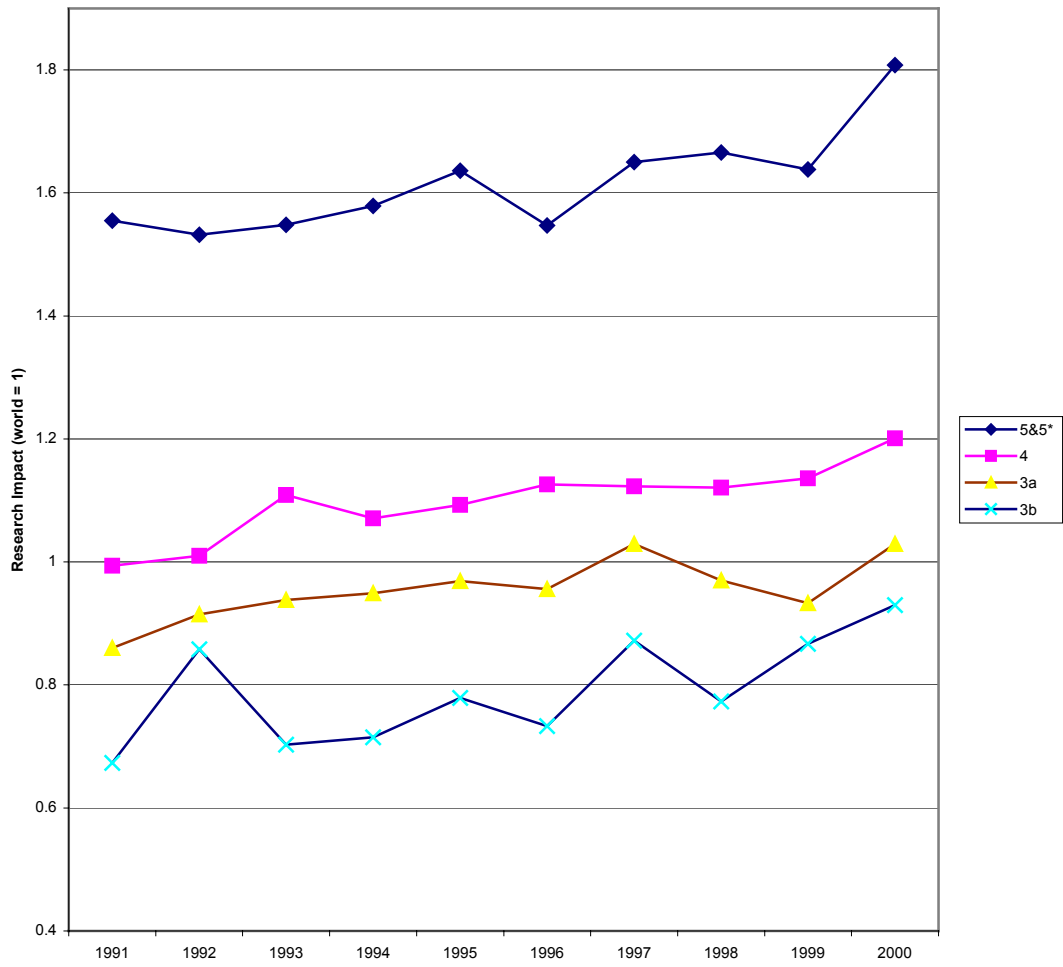
authorities, which should seek out the most appropriate university research partners, both for the support of longer term underpinning projects of mutual interest and also, where appropriate, more directed research contracts.

29. The Society also believes that there is an important continuing role for the National Academies in selecting and supporting high quality researchers, irrespective of their area of work. The Royal Society, for example, makes use of its grant-in-aid from the Science Budget, supplemented with £6.1 million from its own funds and a range of other sources, to support the highest quality researchers across the career range. It also uses these schemes to encourage and develop excellent women researchers with outstanding potential, and it takes particular care to ensure that its schemes include flexible family-friendly best practice.
30. The main schemes are:
- 17 Royal Society Professorships, of which 2 are held by women (33% of the last round or awards): allowing distinguished researchers to concentrate on their research.
  - 20 Research Merit Awards, jointly funded with the Wolfson Foundation: to date to enable UK universities to attract and retain the best scientists through paying enhanced salaries and research expenses; So far, these awards have enabled UK universities to attract five top scientists from overseas universities.
  - 320 University Research Fellowships, of which 77 (24%) are held by women: these fellowships allow promising senior postdoctoral fellows to concentrate on their research for up to 10 years rather than having to undertake extensive teaching loads, although many do contribute to the teaching of their home institution.
  - 55 Dorothy Hodgkin Fellowships, of which 52 (95%) are held by women, specifically directed at promising young scientists, particularly women, at the early stages of their research careers. These research fellows receive high levels of support including a mentor to offer individual career and research advice.
  - 19 Industry Fellowships promoting innovation, collaboration and knowledge transfer between academic scientists and industrialists.
  - Up to 20 Laboratory Refurbishment grants per year of up to £250,000, funded through support from the Wolfson Foundation, to enable departments to renew their research facilities in key areas such as informatics and nanotechnology.
  - A research grants scheme supporting the research programmes of around 300 UK based scientists each year through awards of up to £10,000 for equipment, consumables and field work costs.
  - 3 Mercer Innovation Awards each year to enable scientists to develop their inventions through the commercialisation stage.
  - A conference grant scheme enabling up to 1250 UK based scientists each year to present their work at international events.
  - A range of post-doctoral exchange schemes.
31. The Society believes that, in particular, the research chairs, research merit awards and fellowships have made a significant contribution towards attracting outstanding researchers from abroad and retaining our best researchers in the UK.

## APPENDIX: SOME WIDER THOUGHTS

1. The Committee will no doubt receive evidence suggesting possible long-term changes to the RAE and Funding Council support for research that could be examined further including:
  - Whether the time between assessments could be increased and whether all subjects need to be examined at the same time.
  - Whether the significant discontinuities in funding if a department goes up or down one rating point resulting from the fact that there are five funded rating categories but two-digit accuracy in the volume measure, could be improved. A possible way forward may be to have three "5" quality ratings with the highest one having a higher threshold for the proportion of internationally excellent work.
  - Whether, in view of the larger number of 5 and 5\* departments, the current system of criteria referencing should be replaced by norm referencing, by grading to a curve, as used to guard against grade inflation in many US universities.
  - Whether, the Funding Councils should see what could be done to make standards more uniform across UoAs. While there is no operational need to have strict comparability between UoAs, since the RAE is designed to allocate funding within a UoA, there is some evidence suggesting differences in the way that standards have been applied (which can cause problems if they are used for purposes for which they were not intended).
  - Whether the overall burdens of the RAE could be reduced by making use of the success of staff in gaining research grants – for example by providing the "dual support" element of the funding by means of fixed percentage addition to individual grant applications, with the money going to the university as a whole to use as it thinks fit, as is the case with the existing Funding Council block grant (and with such funding arrangements in the US).
2. These changes could have significant implications for the future development of the UK university research system, and many of them were extensively explored in the reviews conducted by the Funding Councils a year or so ago. Nevertheless, some of them could usefully be revisited in the light of the outcome of the 2001 RAE. The Society is intending independently to examine the RAE outcome in relevant disciplines, but the results of this study will not be available until after the Committee concludes its own review.

Annex A: Research Impact of papers from different RAE rated departments



## The RAE: Some Personal thoughts by John Enderby

*Science in Parliament* 59(4) 24-25 (2002)

Although as a Vice-President of the Royal Society I contributed to our collective view about the RAE, I wish to make it clear that the views expressed here are my own. I have, over the years, been involved with the RAE at three levels: as a Head of Department preparing the submission (1992); as an ordinary member of the Physics panel (1996) and as Chair of the panel in 2001. I therefore feel reasonably well qualified to have a view on several of the issues raised in, if I may say so, the high level and thoughtful Parliamentary debate of 27<sup>th</sup> June, 2002.

Over the years HEFCE has lightened the load on Departments (as defined by HEFCE) in preparing submissions. For example, in 1992 Departments were asked to provide quantitative data on all publications classified according to (if my memory serves me right) some 15 categories. This was dropped in 1996 and Departments are now asked to list up to four papers for the research staff submitted. HEFCE also collected numerical data on research income; research students and other measures of activity and these were made available to Departmental Heads, and of course to the panels. Although the RAE does indeed place an extra administrative burden on Departments, its impact is, by orders of magnitude, much less than the Teaching Quality Assessment that many of us coped with in the late 1990s and which, in the end, turned out to be little more than a complex audit trail.

I have no idea how I came to be on the 1996 panel, but I do know more about the 2001 panel. All members of the 1996 panels were contacted and asked to nominate potential chairs for the next exercise. Self-nominations were excluded...a rule which seemed to be hardly necessary. Apparently the panel thought I would be an appropriate person to act. The relevant professional bodies suggested potential members and the panel that emerged was (with one important exception) reasonably well balanced in terms of subject coverage and geographical and institutional distribution. Unfortunately there are rather few women in Physics at the senior level and those were asked to serve declined, in every case for perfectly understandable reasons. Gender balance is of crucial importance and HEFCE must be prepared to offer practical assistance to alleviate the special pressures experienced by women because of the many professional tasks that come their way and the fact that they are often the carers for both children and the elderly.

The work of the panel was greatly helped by the specialist advisors and international assessors so that in our case, some thirty or so physicists were involved in the assessment. The use of cross-referral between panels was encouraged and was mandatory if submitting institutions asked for it. In so far as peer review works I felt that at the end of the exercise a fair summary in terms of the fraction of the submitted activity at an International (I), National (N) or Sub-national (S) level had been made. Perhaps Physics, as a discipline is well suited to the methodology of the RAE. Many UK physicists do indeed work with international organisations and measures like success at obtaining time on facilities such as neutron sources, telescopes and satellites etc help to establish a scale of international excellence. But it is important to note that it is after all historians who assess history departments, chemists who assess chemistry departments and so on. I suspect that most panels are reasonably confident that their the I, N, S fractions are about right. It is, in my opinion at this point where the reform should take place and if the following idea were to be implemented, many of the difficulties referred to in the debate would go away.

As an example consider three departments A, B, and C each with 40 research active staff. The I, N, S fractions as judged by their peers are shown in the table:

Department	Fraction at I level	Fraction at N level	Fraction at S level
A	0.51	0.49	0
B	0.75	0.05	0.2
C	0.48	0.49	0.03

At this stage panels are required to map these results into grades with the rubric provided. Thus "A" would meet the criteria for 5\* and receive substantial funding. "B" on the other hand would fail to meet even the criteria for grade 4 and should strictly receive 3a...and little funding. "C" would make 5 but if two of the "weaker" staff had been dropped would have been awarded 5\*.

Institutions, of course, know the rules and there is terrific pressure for them to remove those staff that they perceive as "weak" from the submission. This is a highly negative, possibly unforeseen consequence of the rubric and leads to numerous problems in that it:

- generates a lack of motivation and unity in Departments;
- encourages the distinction between researchers and teachers and may even devalue the latter;
- might well discriminate against women and new entrants who for various reasons have not yet made their mark in research.
- could be used by senior staff to put pressure on staff whom they perceive as "difficult"

It is the perception *at the institutional level* that risks cannot be taken to include all staff, because of the consequences for funding exemplified by the illustrative table. Essentially, this is the origin of the problems identified by Members in the debate

Yet there is a simple solution, so obvious that it must have been thought of and I may have missed it. Instead of shoehorning the finely structured I, N, S scheme into 7 broad grades, why not simply produce a *research quality profile* and fund accordingly?

Thus again as an illustration let us suppose that I activity attracts £5k per staff member, N activity £2k and S activity zero. The results are shown in the table:

Department	I-income	N-income	S-income	Total
A	£102k	£39.2k	0	£141.2k
B	£150k	£4k	0	£154k
C	£96k	£39.2k	0	£135.2k

It is my view that the financial outcome fairly reflects the international excellence of the three departments. Instead of penalising departments for making a "mistake" in their choice of research active staff, this system rewards excellence. Thus there is no penalty for submitting staff that the panel deems as performing at a sub-national level. Indeed it is perfectly possible that the panel might regard the work of a staff member as "N" but who otherwise due to internal misjudgement or even malice might not have been submitted at all.

Of course, the simple formula for funding would need refinement to include pos-doctoral fellows and students but this is easily fitted into the overall scheme. The methods would avoid game playing by Institutions in terms of allocation of staff to notional departments and combined with proper cross-referral would do much to ease the problem of interdisciplinary activities.

And finally, it may help in getting away from our current obsession with league tables, but perhaps this is too much to hope for!