

OVERVIEW: UoA 22 PURE MATHEMATICS

§1. Conduct of the assessment.

The submissions contained the work of 661 staff, 32 of whom were women, from 47 institutions. Two HEI's submitted outputs from single researchers. There were 2,101 items of output and these were allocated to the Panel members and to 20 advisers from 14 UK institutions according to their specialisations. A significant proportion was considered by more than one person. All assessors were asked to judge the output, and study in detail at least 50% of it, according to its originality, depth, rigour and influence. The submitted output of each individual was graded according to whether it conformed to attainable standards of international or national excellence or whether it fell below the latter. Virtually all outputs were in fact at least of national excellence. The panel formed a final judgment by factoring in the secondary indicators such as the number of completed PhD's and research grant income per research-active staff submitted, items of esteem, and the perceived quality of the research environment. An independent calibration of the higher provisional grades was provided by four non-UK experts in three different continents.

§2. The submissions

The final grades showed 62% of the submissions gaining a grade of 5 or 5* although, as the published RAE criteria allowed, there was a wide variation in the performance of institutions within these categories. This figure constituted a considerable increase over the 38% recorded in the 1996 RAE assessment. Although the actual institutions submitted are slightly different, more were putting forward a higher proportion of staff than in 1996. There was no evidence on average, even for those that increased their score, of their having done so by decreasing the proportion of staff submitted. Nevertheless, particular institutions clearly made successful efforts to improve disappointing grades in 1996 by taking strategic decisions on appointments and selectively entering research active staff.

§3. New appointments

Of the research-active individuals declared, there were 165 new appointments, of which about 135 have permanent posts, representing 20% of the total staff submitted. About 30 individuals were on short-term contracts of 2 years or less, some as short as six months. Their performance on average was consistent with that of the whole sector.

Approximately 40% of the new appointees were from the UK. About half of the remaining 60% came from Eastern Europe, and of the rest a significant proportion from Germany. Although some institutions made key appointments where a particular expertise was being acquired, the evidence of the Panel's reading of output is that those coming from overseas performed on average at the same level as that of the established community. The figures suggest that in general the UK has benefited from difficult situations for mathematicians in some countries which have released highly qualified overseas academics onto the recent labour market.

§4. Demographic issues

The age distribution of the individuals submitted was as follows:

20-30: **8%** 30-40: **25%** 40-50: **28%** 50-60: **30%** 60-70: **7%** 70+: **2%**

Over 70% of the new appointees were under the age of 40. Over half of the Category C researchers were over 60.

The quality of the submitted material was highest for the 30-40 age group, where work of international excellence (as determined by the Panel) accounted for approximately half of the output. The other groups performed at broadly the same level with an overall percentage of 39% of the output being of international excellence.

§5. Mathematical trends

Using a rough classification of Pure Mathematics into Logic, Combinatorics, Number Theory, Algebra, Geometry and Analysis (including Stochastic Analysis), the approximate percentages of output overall were:

Logic 4% Combinatorics 6% Number Theory 10%

Algebra 27% Geometry 26% Analysis 27%

These were calculated by taking the MathSciNet AMS Primary Classification for each item of output.

A more refined inspection showed a gradual change of emphasis from one generation to another. As an example, for mathematicians in the two age-groups 50-60 and 30-40, the top five subjects in terms of numbers of items of output were:

| Age 50-60 | | Age 30-40 | |
|---------------------|-----|---------------------|----|
| Group Theory | 111 | Number Theory | 77 |
| Functional Analysis | 58 | Group Theory | 65 |
| Combinatorics | 48 | Algebraic Geometry | 48 |
| Number Theory | 41 | Global Analysis | 35 |
| Associative Rings | 32 | Functional Analysis | 28 |

Within analysis, the top three subjects were Functional Analysis, Operator Theory and the growing area of Stochastic Analysis. However, it should be noted in interpreting these tables, that links between disciplines in Pure Mathematics are becoming more apparent, so that arithmetic geometry and representation theory papers, for example, can be classified under different headings.