

ROUTLEDGE LIBRARY EDITIONS:
HIGHER EDUCATION

Volume 22

THE HIGHEST EDUCATION



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

THE HIGHEST EDUCATION
A Study of Graduate Education in Britain

ERNEST RUDD

First published in 1975 by Routledge & Kegan Paul Ltd

This edition first published in 2019

by Routledge

2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge

52 Vanderbilt Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

© 1975 Ernest Rudd

All rights reserved. No part of this book may be reprinted or reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publishers.

Trademark notice: Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

ISBN: 978-1-138-32388-9 (Set)

ISBN: 978-0-429-43625-3 (Set) (ebk)

ISBN: 978-1-138-33303-1 (Volume 22) (hbk)

ISBN: 978-0-429-44585-9 (Volume 22) (ebk)

Publisher's Note

The publisher has gone to great lengths to ensure the quality of this reprint but points out that some imperfections in the original copies may be apparent.

Disclaimer

The publisher has made every effort to trace copyright holders and would welcome correspondence from those they have been unable to trace.

CONTENTS

PREFACE	ix
1 INTRODUCTION	1
2 THE HISTORY OF GRADUATE STUDY IN BRITAIN	6
3 TODAY'S STUDENTS	22
4 THE PURPOSE OF POSTGRADUATE STUDY	43
5 RESEARCH STUDENTS AT WORK: SUPERVISION AND INSTRUCTION	60
6 RESEARCH STUDENTS AT WORK: FACILITIES FOR STUDY AND RESEARCH	90
7 RESEARCH STUDENTS IN THE ACADEMIC COMMUNITY AND THE WORLD OUTSIDE	100
8 ADVANCED COURSES	115
9 PART-TIME STUDENTS	129
10 STUDENTS' FINANCES	145
11 POLICY ISSUES	163
NOTES	187
BIBLIOGRAPHY	191
INDEX	195



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

PREFACE

This book has two origins. It springs both from six years I spent as one of the administrators of the postgraduate studentships given by DSIR, and from research on the problems of graduate education after I had moved to the University of Essex. Generally the one-time civil servant risks falling foul of the Official Secrets Act if he tries to write about any field in which his official duties involved him. However this is no problem in my case as DSIR and its successor research councils have run their studentships very openly, explaining in various published reports and in circular letters the reasons for changes in policy, and showing considerable willingness to take part in public debate on their activities.

My main assistant in this work has been Mrs Renate Simpson. She took an active part in most phases of the research and in particular carried out the research on the history of graduate study up to 1918 (chapter 2, part I) and on part-time graduate study (chapter 9) and wrote the earlier drafts of these parts of the book. She has contributed in so many ways to this book that I cannot adequately thank her here. I am also greatly indebted to Stephen Hatch who bore the main brunt of the study of the careers of part graduate students the results of which have been published separately but are also used to a certain extent here. He also produced the method of collecting data on how students spend their leisure time. I am grateful to Mrs Susan Roberts and Mrs Pamela Ratee, who helped with the interviewing, as did my colleagues Marie Oxtoby, Roy Cox and Stephen Hatch. Mrs Aileen Petter and Mrs Pamela King worked their way through our piles of questionnaires and interview schedules coding, punching and verifying, and I am glad to be able to thank them here for their efforts.

I owe an especial debt of gratitude to the registrars and their staff at the universities at which we interviewed. They took a great deal of trouble to smooth our path for us. There were too many people, whose names in many cases I never learnt, to thank them all individually. Clare College and Queens' College, Cambridge kindly rented us rooms in which we could interview, but sent us no bill; we are literally indebted to them.

I wish to thank Christopher Jolliffe and Gareth Williams for their very helpful comments on the penultimate draft.

The funds for almost all the research described in this book came from a grant which the Calouste Gulbenkian Foundation provided to set up the short-lived Unit for Research into Higher Education at the University of Essex. I am grateful to the Foundation for its support and to Mrs Jean Floud and Dr A.E. Sloman for their part in setting up the Unit.

I especially wish to thank again the students who came to see us. We enjoyed meeting and interviewing them, and I hope they too got something out of the interviews. I am also grateful to those students and graduates who completed our questionnaires, and to the many university staff who have discussed graduate education with me.

INTRODUCTION

In 1938, when there were 50,000 full-time students in British universities, 3,000 of them were graduates (apart from those being trained for school teaching). By 1972 there were five times as many students but thirteen times as many graduate students - substantial growth by any standard. This must make graduate education one of Britain's foremost growth industries; and there can be few industries that have exported so high a proportion of their products - though it gets little praise on that account. This rate of growth alone, implying rapidly rising public and private expenditure, prompts many questions on what has taken place. Is the increase the result of changes either in the educational system or in the structure of knowledge? Is it a response to changes in the needs of employers? Or does it reflect a jockeying for position when there are more graduates than jobs that graduates want? Or again, does it represent a kind of luxury expenditure that can be afforded in increasing measure by our increasingly wealthy society? Do the students have any precise objectives in entering graduate education, or just a general feeling that, as education is a 'good thing', they will benefit from some more of it? How has this change affected the universities? Have some of them changed from being predominantly undergraduate into graduate teaching institutions? Has the increase in numbers brought a change in the character of graduate study? These are only a few of the very many questions that arise. But although in recent years a great deal of attention has been given to the system of higher education, with a substantial amount of research reported, and far more written that has been based on opinion and intuitive judgment, in Britain, at least, hardly any attention has been paid to the problems of graduate education. This book therefore deals with an area that is largely unexplored.

At first sight the problems of graduate education may seem esoteric, of concern only to a few thousand people in universities. But this is not so. Because the graduate students are the academic elite of the rising generation, these problems should be a matter of concern to everyone with an interest in what kind of country, indeed what kind of world, we shall have in the future. Earlier stages of the educational system have tried to put the most able students onto

the route that will give them the longest education. This is the end of that road where we are left with the elect from the elect of the elect. They are the group amongst whom we should expect to find those who, in many kinds of activity, will make some of the most substantial contributions. (1) From their ranks will come many of the leading politicians, industrialists, scientists and administrators of tomorrow.

THE DIVERSITY OF HIGHER DEGREES AND NOMENCLATURE

This book, then, is about an elite who find themselves in their early twenties awarded good degrees and offered the chance to enter graduate education and to work for higher degrees and other postgraduate qualifications. Many of them immediately begin work for a doctorate - almost always the somewhat oddly named degree of doctor of philosophy. Others work for master's degrees, but here, for reasons that will appear in chapter 2, the nomenclature is somewhat confusing.

Although universities tend to classify their students in terms of the degrees for which they are registered, a more significant distinction relates to the form of the student's studies. Here, rather than a sharp division between one kind of study and another, there is a continuous spectrum of types of graduate study. At one extreme are those that are far from postgraduate in level and are not in any sense built on top of first degree work, being postgraduate only in the sense that they chronologically follow the first degree, such as training in school teaching, which is not covered in this book at all. Further across the spectrum are courses that are wholly postgraduate in level. These will be discussed mainly in chapter 8.

Many of these courses include a research project, or projects. There is nothing distinctively postgraduate about the inclusion of this; teaching by projects now starts in the infants' school. But when the project becomes the major part of the course of study a change of some importance has taken place - the transition from a course of instruction to research - and this distinction is more useful than that between the different kinds of qualification to which graduate study leads.

Research is extremely difficult to define. At first sight there is little in common between a student who is going through a series of routine and well-tried analytical procedures, applying them to a different substance and so increasing the stock of information but contributing no new ideas, and one who is studying an author, producing a new critical evaluation of his work stuffed full of new ideas and insights but adding nothing to the stock of information about him. In a sense both are augmenting knowledge, and both come within the broad fold of scholarship and research which I shall simply call 'research' here. In this book we shall mainly be concerned with research students, partly because they are the larger group and partly because their problems are to a larger extent distinct whereas advanced course students' problems resemble to a certain extent those of undergraduates.

There is one point of nomenclature to mention. It seems reasonable to call a student who has not yet graduated an 'under-

3 Chapter 1

graduate', but it is difficult to find any comparable reason for calling someone who has graduated a 'postgraduate'. Once he has graduated he is a graduate, and so I avoid the term 'postgraduate' except in a few cases where the use of 'graduate' could be ambiguous.

THE DATA

The data used in the study were collected in a number of ways, but principally by means of (i) structured interviews with some 800 full-time students, centred on their reasons for their choice of graduate education, the form of their studies and their financial, social and other problems; (ii) postal questionnaires from some 230 part-time students covering similar topics; (iii) open-ended interviews with university staff ranging across their views of graduate education and their ideas for reforming it, to their own careers; (iv) postal questionnaires from some 2,300 past graduate students, which covered their careers and their retrospective view of their graduate studies. The following paragraphs briefly describe how the research was done.

(i) Interviews with full-time students

These lasted about an hour. (3) They started with the interviewing of students at Queen Mary College, London, in 1964. Successive drafts of two versions of a questionnaire - one for research students and one for advanced course students - were tried out on QMC students until they were satisfactory. Including the last few students interviewed at QMC, when we were using what was virtually the final questionnaire, 844 students were interviewed - 696 research and 148 advanced course. The universities covered were: two colleges of London University (Queen Mary College and the Imperial College of Science and Technology), one of the Scottish universities (Edinburgh), one of the two ancient English universities (Cambridge), three of the 'red-brick' provincial universities founded in the nineteenth century - Bristol, Leeds and Manchester (including the Institute of Science and Technology) - one of the group of smaller provincial universities that received their charters after 1945, having until then taught for external London degrees (Leicester), and a college of advanced technology (Northampton Polytechnic, then about to become the City University, the name by which it is referred to below). When we had to choose our sample of universities a lack of comprehensive statistics meant that we could base our selection on little more than our own knowledge of the universities. Nevertheless, when the University Grants Committee later published better statistics we found that, if we had drawn a sample based on the percentages of students who were graduates, as we would have done had this been possible at the time, our sample would have been little different.

Within a given university, many of the problems in interviewing a sample of graduate students arise from the diversity of graduate study, and especially of research. Every research student's work is, or at least ought to be, different from any previous work. Many of them need to be away from the university from time to time for shorter or longer periods. Some will be working in other

libraries; geologists may be in the field collecting rocks and mapping; botanists may be collecting plants and meteorologists reading rain gauges; nuclear physicists may be using the big machines at Harwell or Geneva. Some students need to visit their university only rarely, and so live where it is cheapest. Further, many continue working on their theses for a period, sometimes for many years, after their grants have come to an end. But in other ways too, the end of the grant does not mark a sharp transition from student to employee. As their grants come to an end some students take part-time work in order to prolong their research, and so, by gradual stages, pass to a full-time job, working on the thesis at weekends and evenings. Others may succeed in finding a job a little before the end of their last year of full-time study.

The more flexible a university's regulations for graduate study and the more it allows students to fit their manner and place of work to their individual needs, the more difficulty it has in producing an accurate current list of its research students. Some of the lists we were given were, therefore, unavoidably inaccurate. We did not try to trace every student who neither came to be interviewed nor replied to our letter, because when we did we generally found it difficult to get any firm information; frequently we could find no-one who knew whether the student had left the university and taken a job, or was just living somewhere else. Only a small minority, about a quarter to a third, of the sample that was drawn did not come for interview, but in the circumstances it was impossible to try to calculate the percentage of non-response.

Another problem in the drawing of a sample arose from organizational differences between universities. It proved impossible both at Cambridge and at Imperial College to draw an overall sample of all the research students and so it was necessary to take a two-stage sample, first sampling from among the departments and then taking a sample of students.

The differences between universities, both in the form in which the lists of students were kept and in the way in which the sample had been drawn, might have made it necessary to adopt a complicated system of weighting in order to be sure that the overall percentages of students answering a given question in a particular way are correct for each university. In practice it did not prove necessary to present our results in such a complicated way, partly because the measurable differences between the experiences of graduate students at the various universities at which we interviewed were generally too small for such a calculation to be justified, and partly because, in most respects, the problems and difficulties of a chemist doing research at Leeds are more like those of a chemist at Cambridge, Imperial or Edinburgh than those of a civil engineer at Leeds, so that analysis according to the fields in which the students were working seems in general to give the most interesting results.

In those cases where we found differences between the universities, for example in the extent of students' satisfaction with their libraries, no amount of re-weighting of the answers seemed to make much difference to the picture that emerged, and so here too the results are presented in a straight undoctored form.

(ii) Postal survey of current part-time students

During the pilot stage of the survey of current students, we interviewed some part-time students. The difficulties of contacting them and the extent of their special problems made it clear, however, that they would have to be covered separately by a postal survey. This asked, as far as possible, the same questions, but also covered the specific problems of part-time study, students' reasons for choosing to study part-time and related topics.

(iii) Interviews with staff

These were tried out first on friends attending the 1964 meeting of the British Association, then at QMC. I quickly discovered that any attempt to follow an interview schedule introduced an element of rigidity into the interview and tended to make the informant dry up, whereas a more open discussion produced a large number of valuable and unexpected points. I therefore worked merely from a list of topics to be covered, tape-recording the discussion. I also found that drawing a sample of staff brought in many who had no research students, and many junior staff who were virtually research students themselves. As, furthermore, I could not hope to interview enough staff to be able to quantify their answers, I changed to interviewing staff with whom I was already acquainted or whose names had been given to me by friends in the universities in which we were working, selecting those who had a considerable experience of graduate education, or whose experience was in some other way of special interest, or who were known to have interesting ideas on the subject. These interviews provided an opportunity to discuss the various problems that were emerging in the course of the interviews with the students. I also asked respondents if they had themselves been graduate students and how they had entered the academic world. Altogether these interviews were especially valuable as a source of ideas and of insight.

In addition to these more formal interviews with staff, I have had countless opportunities of discussing the subject with university teachers, over the many years that, first as a civil servant then as a researcher, I have been interested in graduate education, and these discussions, too, have been drawn on in this book.

(iv) Survey of past graduate students

In 1966 we sent questionnaires to all the British students who had begun graduate study as internal students of a British university in 1957-8. Our response rate was about 70 per cent overall, but about 80 per cent of those who had succeeded in gaining the qualifications at which they were aiming. This survey has been reported fully in Rudd and Hatch (1968), but some of the results are used here.

NOTES

CHAPTER 1 INTRODUCTION

- 1 The study of 1,500 gifted Californian children (with an IQ of over 135 and a mean IQ of 151) which began in 1921 found that 70 per cent graduated from college compared with 8 per cent of their generation in America. 13.8 per cent of men graduates and 4.0 per cent of women graduates held a PhD and 42.0 per cent of men graduates and 29.4 per cent of women graduates held other postgraduate degrees or diplomas - at this period only 2 per cent of American graduates took a PhD or comparable doctorate. By their mid-40s a relatively high proportion had achieved eminence, as shown, for example, by being listed in 'Who's Who' (see Terman and Oden, 1959).
- 2 In most universities a master's degree is a higher degree, though the standard this represents varies considerably between universities, and sometimes between faculties in the same university, and a master's degree can need anything from one to three years' full-time study after graduation. At Oxford and Cambridge, however, and in the arts faculties of Scottish universities, the degree of Master of Arts is in effect a first degree requiring no study beyond undergraduate level. On the other hand, Oxford has had higher degrees called BSc and BPhil gained by postgraduate study and roughly equivalent to the masters degrees of many other universities.
- 3 Copies of the interview schedule and other questionnaires used are obtainable from the author or from the SSRC Survey Archive, where the data collected have been deposited.

CHAPTER 2 THE HISTORY OF GRADUATE STUDY IN BRITAIN

- 1 This was founded in 1880 and joined by Liverpool in 1884 and Leeds in 1887.
- 2 A full account of the history of the MA is to be found in a BED thesis 'The English MA' presented to the University of Edinburgh by R.E. Bell. I am grateful to Mr Bell for allowing me access to this.

- 3 As appendices to both the 'Annual Survey' for 1966-67 and 'University Development 1962-1967'.
- 4 The Working Group on Manpower Parameters for Scientific Growth of the Committee on Manpower Resources for Science and Technology.

CHAPTER 3 TODAY'S STUDENTS

- 1 Figures in this chapter that have no other attribution are taken from the UGC's annual statistics. Where possible, students following courses of professional training in school teaching are counted as undergraduates. Sometimes this has entailed the removal of all education students from the figures of graduates. Where possible, also, the figures exclude Northern Ireland, which was outside the scope of our study.
- 2 The categories in this table are those used in the appendices to the Robbins Report, except that Nottingham moves from the 'larger' to the 'smaller' group, having been overtaken in size by some of the latter, and there are two new groups (a) the new universities founded in the 1960s, and (b) those technological institutions that came under the aegis of the UGC on gaining university status during the 1960s (except for Chelsea College which differs from other ex-CATs in having few technology students).
- 3 As we used slightly different groupings of universities in analysing these data, precise comparisons are not possible.
- 4 I clearly cannot judge the status of the university of which I am a member, so Essex must be excepted here.
- 5 The main explanation of this phenomenon is that it is possible in most science subjects to produce answers that are almost wholly right or wrong, thus scoring very high or low marks, whereas such marks are more rarely awarded in arts and social studies.
- 6 See, for example, Mead (1949) chapter 15, and for a general discussion of these issues, Heim (1970), chapter 14.
- 7 There are substantial problems in using the Registrar General's classifications in order to allocate students from all over the world to a social class.
- 8 I am grateful to Keith Kelsall, Anne Poole and Annette Kuhn for providing me with the figures from their survey of 1960 graduates which I have used in this calculation.

CHAPTER 4 THE PURPOSE OF POSTGRADUATE STUDY

- 1 A decision to study engineering, agriculture or medicine generally implies a decision on a career. The survey carried out for the Robbins Committee found that 75 per cent of undergraduates in applied science had an occupation in mind on going to university, compared with from 46 per cent to 51 per cent in other faculties (app. 2B, p. 168).
- 2 At the pilot stage of the survey of past graduates this was claimed by the proud holder of an Oxford fourth class degree.

- 3 The position was well summed up by the Chemistry Sub-committee of the Royal Society's Committee to Examine Postgraduate Training in Science and Technology, as follows: 'From the supervisor's side, one of the factors for academic promotion is a healthy research achievement and one of the methods to optimise this involves the acquisition of research students. This needs not necessarily mean a stampede to collect "pairs of hands" with little regard for initial quality (although let us admit that this does exist)' (p. 11).
- 4 This impression is supported by (inter alia) the report of a Working Party under the Chairmanship of Professor Sir Nevill Mott: 'Research students are essential to university research schools; it is they who, under direction, do much of the research. The research schools would be greatly impoverished if a high proportion went elsewhere for their first experience of research. Moreover undergraduate teaching would be hindered by absence of research students who help with the practical classes and in other ways' (Ministry of Aviation, Electronics Research Council, 1966, p. 8); and the main report of the Swann Working Group: 'the extent and vigour of university research and teaching depends in quite large measure on the participation of Ph.D. students: and the research contribution of the universities has considerable national importance in the absence of sizeable fundamental programmes in industry' (para. 115).

CHAPTER 5 RESEARCH STUDENTS AT WORK: SUPERVISION AND INSTRUCTION

- 1 Persuasion and pressure are widely defined here. If a student was offered a place for graduate studies and he mentioned that this influenced his decision it is counted; if the offer of a place did not influence his decision, it is not counted here.
- 2 My favourite genuine PhD topic is 'Chastity in the thoughts of the medieval fathers, except St Jerome'.
- 3 The median age of our home respondents on starting research was 22. The median time spent gaining a PhD by the 1957 entrants was about 3½ years (Rudd and Hatch, 1968, Table 2.13).

CHAPTER 6 RESEARCH STUDENTS AT WORK: FACILITIES FOR STUDY AND RESEARCH

- 1 In 1964 79 per cent of full-time graduate students at LSE said the library was not adequate, the main problem being lack of space (Glennerster, 1966) and in 1967 47 per cent of PhD students at LSE found the main library very unsatisfactory (Blackstone et al., 1970).
- 2 This is the year that was most relevant to our interviews, covering expenditure for a period before they took place. A few years earlier the comparison would have been even less flattering to Bristol.
- 3 Students from under-developed countries may not, however, benefit from being taught to use instruments so expensive that

they have no hope of using them in their own countries rather than learning to use cheaper if more laborious methods.

CHAPTER 7 RESEARCH STUDENTS IN THE ACADEMIC COMMUNITY AND THE WORLD OUTSIDE

- 1 I especially recommend the account in 'The British Museum is Falling Down' by David Lodge:
The postgraduate sherry party was a regular feature of the first term of the academic year, designed to introduce students to staff and to each other. For many it was hail and farewell since the Department did not have the resources to mount a proper graduate programme, and in any case espoused the traditional belief that research was a lonely and eremitic occupation, a test of character rather than learning, which might be vitiated by excessive human contact...

Three of the young men present were writing academic novels of manners. From time to time they detached themselves from the main group of guests and retired to a corner to jot down observations and witty remarks in little notebooks.

CHAPTER 10 STUDENTS' FINANCES

- 1 The relationship between the quality of the first degree and success in graduate study is discussed in Rudd and Hatch (1968), pp. 36-9.
- 2 Even though graduate students are not generally dependent on their parents, the tax laws permit their parents, in most cases, to claim income tax relief for them while they are receiving full-time education, and, at the standard rate of tax, this is worth over £100 in 1975-6.

CHAPTER 11 POLICY ISSUES

- 1 The discussion of loan schemes for undergraduates has now spread through a very large number of articles. For balanced discussion and a listing of references see the two works by Woodhall.
- 2 University of Leeds Careers and Appointments Service. I am grateful to Gareth Williams for pointing this out to me.

BIBLIOGRAPHY

- Barlow Committee, see Committee on Scientific Manpower.
- BERELSON, Bernard (1960), 'Graduate Education in the United States', New York, Toronto and London, McGraw-Hill.
- BLACKSTONE, Tessa, GALES, Kathleen, HADLEY, Roger and LEWIS, Wyn (1970), 'Students in Conflict: LSE in 1967', London, Weidenfeld & Nicolson.
- BLAUG, M., PESTON, M.H. and ZIDERMAN, A. (1967), 'The Utilization of Educated Manpower in Industry', Edinburgh and London, Oliver & Boyd.
- CARTTER, Allan M. (1966), 'An Assessment of Quality in Graduate Education', Washington, DC, American Council on Education.
- COHEN, A.V. and IVINS, L.N. (1967), 'The sophistication factor in science expenditure', Department of Education and Science, Science Policy Studies No. 1', London, HMSO.
- Committee on Higher Education (Robbins Committee), 'Report', Cmnd 2154; Appendix Two (B), Students and their education, Cmnd 2154-II-I; Appendix Three, Teachers in higher education, Cmnd 2154-III, London, HMSO.
- Committee on Manpower Resources for Science and Technology, Working Group on Engineering Training and the Requirements of Industry (1966), 'Education and Training Requirements for the Electrical and Mechanical Manufacturing Industries, London, HMSO.
- Committee on Manpower Resources for Science and Technology (1966), 'Interim Report of the Working Group on Manpower Parameters for Scientific Growth', Cmnd 3102, London, HMSO.
- Committee on Manpower Resources for Science and Technology, Working Group on Manpower for Scientific Growth (1968), 'The Flow into Employment of Scientists, Engineers and Technologists', Cmnd 3760, London, HMSO.
- Committee on the National Science Foundation Report on the Economics Profession (1965), 'The structure of economists' employment and salaries 1964, 'American Economic Review', 55 (4) Supplement.
- Committee on Scientific Manpower (Barlow Committee) (1946), 'Scientific Manpower', Cmd 6824, London, HMSO.
- CORNFORD, F.M. (1908), 'Microcosmographia Academica', 5th edn, Cambridge, Bowes & Bowes, 1954.

- Department of Scientific and Industrial Research (DSIR) (1962), 'DSIR, Universities and Colleges 1956-60', London, HMSO.
- Dominion Bureau of Statistics, Education Division (1964), 'University Student Expenditure and Income in Canada 1961-62, Part III Canadian Graduate Students', Ottawa, Queen's Printer and Controller of Stationery.
- Dominion Bureau of Statistics, see W.H. Lucow.
- FELDMAN, Kenneth A., and NEWCOMB, Theodore M. (1969), 'The Impact of College on Students', San Francisco, Jossey-Bass.
- GLENNERSTER, Howard (1966), 'Graduate School', London and Edinburgh, Oliver & Boyd.
- HALSEY, A.H. and TROW, Martin (1971), 'The British Academics', London, Faber & Faber.
- HEIM, Alice (1970), 'Intelligence and Personality', Harmondsworth, Penguin Books.
- HEISS, Anne M. (1964), 'Berkeley Doctoral Students Appraise Their Academic Programs', Berkeley, California, Center for the Study of Higher Education (mimeo).
- HEISS, Anne M. (1970), 'Challenges to Graduate Schools', San Francisco, Jossey-Bass.
- House of Commons Expenditure Committee (1974), 'Third Report from the Expenditure Committee, Session 1973-74, Postgraduate Education Vol. 1 Report', H.C. 96 73-74, London, HMSO.
- HUNTER, J. Scott (1967), 'The Academic and Financial Status of Graduate Students, Spring 1965', Washington, DC, US Government Printing Office.
- Institute of Physics and the Physical Society, see Kemmer Committee.
- JAMES, William (1903), The Ph.D. octopus, 'Harvard Monthly', 36, pp. 1-9.
- KELSALL, R. Keith (1957), 'Applications for Admission to Universities', London, Association of Universities of the British Commonwealth.
- KELSALL, R. Keith, POOLE, Anne and KUHN, Annette (1970), 'Six Years After', Sheffield University Department of Sociological Studies.
- Kemmer Committee (1960), 'The Postgraduate Training of Physicists in British Universities: the Report of a Joint Committee appointed by the Institute of Physics and the Physical Society', London, Institute of Physics.
- KING, John and LAYARD, Richard (1970), The LSE as a graduate school, 'Universities Quarterly', 24 (4) 1970, pp. 360-74.
- KREBS, Sir Hans (1967), The making of a scientist, 'Nature', 215, pp. 1441-5.
- LONSDALE, Kathleen (1968), Science and the good life, 'Advancement of Science', 25 (123), pp. 1-11.
- LUCOW, W.H. (1970), 'The Post-secondary Student Population in 1968-69', Ottawa, Dominion Bureau of Statistics.
- MACLEAN, G.E. (1917), Studies in higher education in England and Scotland with suggestions for universities and colleges in the United States, 'U.S.A. Bureau of Education Bulletin', 15.
- MARRIS, Peter (1964), 'The Experience of Higher Education', London, Routledge & Kegan Paul.
- MEAD, Margaret (1949), 'Male and Female', London, Gollancz.
- Ministry of Aviation, Electronics Research Council (1966), 'The

- Educational Role of Ministry of Aviation Establishments', London, HMSO.
- MURRAY, Keith (Lord Murray of Newhaven) (1958), The development of the universities of Great Britain, 'Journal of the Royal Statistical Society' Series A, 121 (4), pp. 392-409.
- National Academy of Sciences (1967), 'Doctorate Recipients from United States Universities 1958-1966, Washington, DC, NAS.
- PERKIN, H. (1969), 'Key Profession', London, Routledge & Kegan Paul.
- POPPLETON, Pamela K. and PILKINGTON, G.W. (1963), The measurement of religious attitudes in a university population, 'Brit. J. Soc. Clin. Psychol.', 2, pp. 20-36.
- RASHDALL, H. (edited by Powicke and Emden) (1936), 'Medieval Universities', Oxford University Press.
- Robbins Committee, see Committee on Higher Education.
- ROOSE, Kenneth D. and ANDERSON, Charles J. (1971), 'A Rating of Graduate Programs', Washington, DC, American Council on Education.
- Royal Commission on Medical Education (1968), 'Report', Cmnd 3569, London, HMSO.
- Royal Society Committee to Examine Postgraduate Training in Science and Technology (1967-71), 'Postgraduate Training in the United Kingdom': 1 Chemistry, 2 Physics, 3 Biology, 4 Applied mathematics, 5 Solid earth sciences, 6 Engineering and technology, London, Royal Society.
- RUDD, Ernest (1962), What students spend, 'Universities Quarterly', 16 (4), pp. 379-92.
- RUDD, Ernest (1968), The rate of economic growth, technology and the Ph.D., 'Minerva', 6 (3), pp. 366-87.
- RUDD, Ernest (1973), The research orientation of British universities, 'Higher Education', 2, pp. 301-24.
- RUDD, Ernest and HATCH, Stephen (1968), 'Graduate Study and After', London, Weidenfeld & Nicolson.
- Science Research Council/Social Science Research Council Joint Committee (1972), 'Report on Broader Education for Graduates', London, SRC and SSRC.
- Swann Committee, see Committee on Manpower Resources for Science and Technology, Working Group on Manpower for Scientific Growth.
- TERMAN, L.M. and ODEN, M.H. (1959), 'The Gifted Group at Mid Life', Oxford University Press.
- TOUT, T.F. (1929), 'History and Historians in America' (Presidential Address to the Royal Historical Society, 14 February, London.
- University Grants Committee (1964), 'University Development 1957-62', Cmnd 2267, London, HMSO.
- University Grants Committee (1966), 'Returns from Universities and University Colleges in Receipt of Exchequer Grant, Academic Year 1964-65', Cmnd 3106, London, HMSO.
- University Grants Committee (1967), 'Returns from Universities and University Colleges, Academic Year 1965-66', Cmnd 3586, London, HMSO.
- University Grants Committee (1968), 'University Development 1962-67', Cmnd 3820, London, HMSO.
- University Grants Committee (1970), 'First Employment of University Graduates 1968-9', London, HMSO.
- University Grants Committee, 'Annual survey' (1966-7), Cmnd 3510;

- (1967-8), Cmnd 3914; (1970-1), Cmnd 4893, London, HMSO.
- University Grants Committee, 'Statistics of Education, Vol. 6, Universities', London, HMSO, annually.
- University of Leeds Careers and Appointments Service (previously University of Leeds Appointments Board), 'Annual Reports'.
- VERNON, P.E. (1963), 'The Measurement of Abilities', University of London Press.
- Willink Committee (1957), 'Report of the Committee to consider the Future Numbers of Medical Practitioners and the Appropriate Intake of Medical Students', London, HMSO.
- WINSTANLEY, D.A. (1935), 'Unreformed Cambridge', Cambridge University Press.
- WOODHALL, Maureen (1970), 'Student Loans; a Review of Experience in Scandinavia and Elsewhere', London, George Harrap.
- WOODHALL, Maureen (1972), Methods of financing higher education in H.J. Butcher and E. Rudd (eds), 'Contemporary Problems in Higher Education', London, McGraw-Hill.
- Working Group on Engineering Training and the Requirements of Industry (1966), 'Education and Training Requirements for the Electrical and Mechanical Manufacturing Industries', London, HMSO.
- ZUCKERMAN, Harriet (1966), Nobel laureates in science: patterns of productivity, collaboration and authorship, Paper read to the American Sociological Association, August 1966; revised version in 'American Sociological Review', 31, pp. 391-403.