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UNIVERSITY OF CAMBRIDGE

# DEPARTMENT OF APPLIED ECONOMICS

SIXTH REPORT  
ACTIVITIES IN THE PERIOD  
JANUARY 1965 TO SEPTEMBER 1966



*March 1967*





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## SIXTH REPORT

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# UNIVERSITY OF CAMBRIDGE DEPARTMENT OF APPLIED ECONOMICS.

*Director*

W.B. REDDAWAY

*Committee of Management, September 1966*

Professor E. A. G. ROBINSON (*Chairman*)

Miss P. M. DEANE

J. R. S. REVELL

C. H. FEINSTEIN

A. SILBERSTON

J. H. GOLDTHORPE

Professor RICHARD STONE

W. B. REDDAWAY

Professor H. A. TURNER

Mrs D. E. WEDDERBURN

*Secretary*

H. LOSHAK

Mr K. E. BERRILL and Professor J. A. C. BROWN were also members, and Mr ROBERT DAVIES was also secretary, of the Committee of Management during part of the period covered in this Report.

# SIXTH REPORT OF THE DEPARTMENT OF APPLIED ECONOMICS

(covering the period January 1965 to September 1966)

## I. GENERAL

1. The Fifth Report of the Department of Applied Economics covered the period January 1958 to December 1964. In order to bring the Department into line with usual University practice the present Report deals with the period January 1965 to September 1966, and its future Reports will cover periods of academic, not calendar, years.

2. Mr W. B. Reddaway, whose appointment as Director of the Department dates from October 1955, resigned the Directorship from 1 October 1965. He was re-appointed for a further five years, which will bring his tenure of the post to fifteen years, the maximum permissible under the regulations for the Director of the Department of Applied Economics as revised in 1965 (*Reporter*, 1964-65, p. 1686).

3. In the period under review the Department's research activities have continued to increase both in number and in scope. This increase has been reflected in the maximum permitted staff, which now consists of the Director, the Assistant Director, thirty-two other holders of University posts, up to six graduate research workers not holding University posts, and thirty-three assistants; a total of seventy-three, as against seventy when the Fifth Report was published in 1965. This number does not include research associates and visiting members not employed by the Department, nor research consultants appointed on a fee basis.

4. The actual staff and associated members of the Department at the time this Report was prepared (December 1966) was as follows: the Director (on sabbatical leave), the Acting Director, one Special Appointment, five Senior Research Officers, sixteen Research Officers, six Junior Research Officers, four research consultants, four visiting members, fourteen research associates (teaching officers of the Faculty of Economics and Politics actively associated with research projects within the Department), and twenty-five full-time assistants.

## II. FINANCE

5. As a result both of higher prices and pay-scales and of increased research activities the Department's annual expenditure rose from £66,869 in 1963-64 to £89,303 in 1965-66. Nearly 85 per cent. of this expenditure is on stipends, wages, and related payments.

6. The annual grant which the Department receives from the University is not increased to take account of increased activities, a larger establishment, or higher costs. It is increased to allow for higher scales of stipends and wages, but only in respect of eleven-eightieths of the establishment fixed in 1956. In consequence, the University grant rose from £33,800 in 1963-64 to £41,400 in 1965-66, an increase of £7,600, while expenditure in the same period rose by £22,434.

7. The University grant now covers only about 47 per cent. of the annual expenditure of the Department, which is therefore more than ever dependent upon the support of outside bodies in order to maintain its research activities.

8. During the period covered by this Report the following are the principal new payments by outside bodies which have been accepted, for payment over various periods, either as grants in support of specific research projects or as donations to the Department's Research Account (which can be used for a wide range of purposes, not necessarily connected with any specified project):

	£
Ford Foundation	50,000
Social Science Research Council	20,388
Confederation of British Industries	25,000*
National Ports Council	(up to) 7,000

\* This grant is to reimburse the Department for the entire cost of the research into The Effects of the United Kingdom Direct Investment Overseas (see paragraph 25). The figure of £25,000 is given as an indication of the order of magnitude of the grants, the exact amount of which will not be known until the research is concluded.



	£
Science Research Council	6,627
United Nations Conference on Trade and Development	6,000
National Economic Development Office	1,000

### III. RESEARCH ACTIVITIES

#### (a) Economics and Economic History

##### *Empirical Models of Economic Growth*

9. The nature and progress of this project, which is under the direction of Professor Stone, was described in our Fifth Report up to the appearance of *Exploring 1970: Some Numerical Results* (July 1965). This publication is no. 6 in the series entitled *A Programme for Growth* (London: Chapman and Hall).

10. In addition to Professor Stone, the following have been engaged on the project during the period of this Report: Professor J.A.C. Brown, Dr M.O.L. Bacharach, and Mr C.J. Bliss (to October 1965); Mr A.G. Armstrong, Mr O.T. Hooker, Mr R. Lecomber (who was seconded from the National Economic Development Office), Mr C.S. Leicester, Dr L.J. Slater, and Mr K.J. Wigley; Mr T.S. Barker and Mr M.J. Green (from October 1965). During parts of this period a number of visitors to the Department, Dr B. Isaev, Dr J.W. Lee, Dr S.J. Loccufier, Dr S. Rossi, and Mr H. Bhattacharya, were associated with the project.

11. Since the publication of *Exploring 1970*, a number of steps have been taken to improve and extend the model with a view to making a new series of calculations relating to 1972 at the end of the calendar year 1966. The accounting framework for 1960 has been thoroughly revised and similar frameworks have been established for 1954 and 1963. In carrying out this work considerable use has been made of information obtained from industry in addition to official statistics. A detailed study has been made of the demands in different parts of the economy for the products of the fuel and power industries and work has continued on estimating the changing pattern of demand for goods and services by the personal sector. The treatment of foreign trade has been changed by the introduction of a set of import functions for the various commodity groups distinguished in the model. As a consequence a particular balance of trade is no longer imposed *ab initio*, but any undesirable imbalance is corrected by relative changes in domestic and foreign prices. Some work has been done on an improved treatment of exports, starting from a series of matrices showing British exports classified by commodity and country of destination. Progress has been made in projecting the changing pattern of the industrial use of labour, starting from matrices showing the composition of the industrial use of manpower in 1951 and 1961. The methods previously used to estimate the supply of private earning have been further tested and improved.

12. With two exceptions, the papers referred to as unpublished in the Fifth Report have now been published. In addition, the following further papers have appeared.

- 'The Cambridge Growth Project', by Richard Stone (*Cambridge Research*, October 1965; Reprint no. 250).
- 'Modelling Economic Systems' (in Russian), by Richard Stone (*Economic and Mathematical Methods*, vol. I, nos. 3 and 4, 1965).
- 'Mathematical Models of the Economy', by Richard Stone (*Bulletin of the Institute of Mathematics and its Applications*, vol. II, no. 3, 1966).
- 'Computing the State of the Economy', by Lucy Slater (*The Computer Journal*, vol. IX, no. 1, 1966; Reprint no. 253).
- 'The Cambridge Growth Project and the Fuel and Power Industries', by Kenneth Wigley (*The Advancement of Science*, vol. XXIII, no. 108, 1966).
- 'The Development of the National Plan', by Kenneth Wigley (*Journal of the Royal Statistical Society* (Series A), vol. CXXIX, part 1, 1966; Reprint no. 259).
- 'Spending and Saving in Relation to Income and Wealth', by Richard Stone and 'A Unitary Interpretation of Professor Stone's Equations for Savings and Expenditure', by H.R. Fisher (to be published in *L'industria*).
- 'An Exercise in Projecting Industrial Use of Manpower', by Richard Stone and Colin Leicester (submitted to the Study Group on Highly Qualified Manpower and now being reworked and tested).

The only issue in *A Programme for Growth* to be completed in the period of this Report, no. 7, relates to a financial topic and is referred to in the following section.

##### *Financial Aspects of British Economic Growth*

13. The major part of the work on this project during the period has been concerned with constructing the social accounting framework. The study of the national balance sheet of the United Kingdom for the years 1957-61 has now been completed, and a monograph by Jack Revell entitled *The Wealth of the Nation: The National Balance Sheet of the United Kingdom, 1957-1961* is with the press and will probably be published towards the end of 1967. The work on national balance sheets for later years is now being continued as part of a set of completely integrated social accounts on the model proposed to the United Nations by Professor Stone for the revision of the System of National Accounts. The accounts for 1963 are nearly complete.

14. The other studies which have been made or are in train are largely concerned with the finances of the personal sector. Some work has been done on the growth of life and pension funds and a study has been started on building societies with the aim of setting out a mathematical model of their working and of examining the determinants of personal saving through building societies. The study of the owners of ordinary shares quoted on the London Stock Exchange referred to in the Fifth Report has been published.

15. The research staff working under Professor Stone on the project have been Mr J.R.S. Revell, Mr D.R. Gray, Mr M.St J. Wright (seconded for two years from the Bank of England), Mr J.P. Moyle, and Mr F.E. Townson.

16. The following papers and articles have been produced:

- 'The Social Accounts from a Consumer's Point of View: an Outline and Discussion of the Revised United Nations System of National Accounts', by Richard Stone (read to the International Association for Research in Income and Wealth, Lom, Norway, September 1965 and published in *The Review of Income and Wealth*, no. 1, 1966).
- 'The National Balance Sheet of the United Kingdom', by Jack Revell (read to the International Association for Research in Income and Wealth, Lom, Norway, September 1965 and to appear in *The Review of Income and Wealth*).
- 'Changes in the Social Distribution of Property in Britain in the Twentieth Century', by Jack Revell (read to the International Economic History Association, Munich, August 1965).
- 'The Growth of Life and Pension Funds', by Jack Revell (read to the Insurance Institute of London, March 1965).
- 'The Wealth of the Nation', by Jack Revell (in *Moorgate and Wall Street*, Spring 1966; Reprint no. 249).
- The Owners of Quoted Ordinary Shares: A Survey for 1963*, by Jack Revell and John Moyle (Number 7 of *A Programme for Growth*).

##### *The Growth of Public Companies and its Finance*

17. The inception and aims of this project, and its progress until 1964, were described in the Fifth Report. Mr G. Whittington, in close association with Mr A. Singh, has been engaged on the project throughout the period. Dr J.K.S. Gandhi worked on the project until September 1965. Mr H.T. Burley has carried out the computer programming since March 1965. The Imperial College of Science and Technology, University of London, has made its I.B.M. 7090 computer available for the purposes of this project.

18. Computing difficulties encountered in the early stages have now been resolved; by September 1966 over 40 per cent. of the available data had been transferred to magnetic tape, standardized, and tested.

19. Mr Singh and Mr Whittington have undertaken a preliminary analysis of four industries, with programming assistance from Mr Burley. This analysis concentrates on the size, profitability, and growth of quoted companies, with growth as the principal dependent variable. Mr Singh is using results from this project for a study of the determinants of the valuation ratio and take-over bids. Mr Whittington is undertaking a study of trade credit and company liquidity. It is also hoped to provide data for other research projects, such as that on Productivity in Distribution.



20. 'The Profitability, Growth and Valuation of Quoted Companies: A Preliminary Report', by A. Singh, G. Whittington, and H. T. Burley, is to be published early in 1967 as no. 7 of the Occasional Papers series. Some results from this Occasional Paper were given in a paper presented by Mr Singh to the University of Ancona Congress in September 1966. This paper, 'The Profitability, Valuation and Growth of Firms: A Preliminary Report on the Post-war British Experience', by A. Singh and G. Whittington, is to be published in the *Proceedings of the Ancona Congress*.

#### *The Economics of Developing Countries*

21. In 1964 the Ministry of Overseas Development (then the Department of Technical Co-operation) agreed to provide up to £9,000 a year for five years to enable the Department to appoint three research workers to study the economic problems of developing countries. In return, the Department agreed to make three research workers available when required to meet requests received by the Ministry for economists to work in overseas countries.

22. Under this arrangement Mr A. R. Jolly was seconded for almost two years to Zambia as Adviser on Manpower Planning in the Office of National Development and Planning, where he directed Zambia's national survey of skilled and educated manpower. His report, containing detailed tabulations of actual and normally required levels of education and training of all wage-earning employees in the country, together with projections of employment and skilled manpower requirements in 1970 and 1980, was published as *Zambianization: A Report on Manpower, Education and Training in Zambia 1965-66* (Government Printer, Lusaka 1966). It formed the basis of the manpower and education sections of Zambia's first National Development Plan 1966-70. The following articles also have been, or are to be, published in connexion with Mr Jolly's work in Zambia:

'The Demand for Manpower', by E. R. Rado and A. R. Jolly (*Journal of Development Studies*, vol. 1, no. 3, April 1965).

'The Treatment of Education in National Accounting', by Dudley Seers and A. R. Jolly (a paper presented at the conference of the International Association for Research in Income and Wealth, Lom, Norway, September 1965, to be published in *Journal of Income and Wealth*).

'Educational Planning in Zambia', by A. R. Jolly (*1967 World Yearbook of Education*).

23. Mr E. Bennathan has been engaged on a major study of the cost of ocean transport and the trade of developing Asia, with the object of compiling comparable information on relative shipping costs between different developing countries in Asia and between these countries and North America and Western Europe, in order to assess the impact of these shipping costs on the growth and structure of trade. Most of the Asian developing countries suffer from severe shortages of foreign exchange. The possibility of increasing trade between them provides an opportunity to promote regional import substitution and a more rational distribution of large-scale industries. Professor A. A. Walters, of the University of Birmingham, is closely associated with this study, which is being carried out in collaboration with research departments in the Universities of Bombay, Hong Kong, Singapore, and Thammasat, in the Bank of Thailand, and in the Institute of Development Economics in Karachi. In connexion with this research Mr Bennathan has been in Thailand since May 1966. Pilot studies have been completed. It is hoped to have an interim report ready by April 1967 and a final version of the study later in the year.

24. Mr M. P. Ward has been seconded to the Bureau of Statistics in Maseru, Lesotho (formerly Basutoland), where he has been engaged since August 1966 on setting up a national accounts system and an import/export matrix.

#### *The Effects of United Kingdom Direct Investment Overseas*

25. Originally conceived in 1965 as the Department's own study, this project was greatly increased in scope as the result of an approach by the Confederation of British Industry, following the 1965 Finance Bill. The C.B.I. is providing finance for the project, which is expected to occupy two research workers full-time for about two years, and has required, especially in the first year, considerable part-time assistance from other members of the research staff. Work began on the project in September 1965.

26. Mr Reddaway, who is in charge of the project, is largely responsible for the general strategy of the study and for the methodological approaches used. Mr S. J. Potter and Mr C. T. Taylor are carrying out the research under his direction. Assistance in interviewing companies is being given by Mr B. M. Deakin, Mr K. D. George, and Mr C. F. Pratten of the Department; by Professor J. H.

Dunning of the University of Reading; and by Professor S. J. Wells of the University of Salford. In addition, Dr J. O. N. Perkins of the University of Melbourne, who visited the Department during 1966, has worked full time on the project.

27. The objective of the research is to identify, and if possible quantify, the main effects of direct overseas investment by British companies on the British balance of payments and on the economy generally. The method of approach was firstly to discover in depth what has actually happened over a recent ten-year period in terms of flows of net investment, rates of return, local production by overseas companies controlled in this country, and U.K. trade in goods affected by such overseas production; and secondly to suggest, through a hypothetical 'alternative position', what might have happened if less investment had been undertaken. Detailed information has been collected, by means of a questionnaire and interview procedure, from some sixty major manufacturing and mining companies, together accounting for about 70-75 per cent. of U.K. direct overseas investment in those industries. Information of a somewhat less detailed nature has been obtained from the leading British oil companies, with the result that the coverage of total U.K. overseas investment will be about 80 per cent.

28. Preliminary findings of an analysis of the company returns are to appear in an interim report to the C.B.I. early in 1967, together with some discussion and figures relating to the 'alternative position'. It is proposed to produce a final report in 1967-68. This will be an expanded version of the interim report and will cover certain industries with large overseas interests which, for reasons of time, will not be included in the interim report. It will also deal more fully with aspects of the subject which receive less than adequate treatment in the interim report.

#### *Current Economic Assessments*

29. Assessments of the current economic position continued to be published quarterly during 1965-66 in the *London and Cambridge Economic Bulletin*, but December 1965 saw the last issue of the Bulletin in its traditional format. Since then it has appeared as a page in *The Times*, offprints suitable for filing being published by that newspaper's Special Publications Department. The statistical and secretarial services required for the production of the quarterly articles continue to be provided by the Department. Dr C. H. Feinstein became secretary of the L.C.E.S. at the beginning of 1966; Miss T. Seward was statistician until March 1966, when she was succeeded by Mr S. J. Potter.

#### *Capital Formation and the Stock of Assets in Britain, 1830-1960*

30. The object of this inquiry is to explore some aspects of the relationship between capital formation and economic growth in Britain since the beginning of the railway age. Over the period January-September 1966 Dr B. R. Mitchell and Miss P. M. Deane continued with the task of filling in the gaps in the capital formation and national expenditure statistics for the period 1830-1914 where the existing data are most deficient, while Miss B. A. Mercer and Mr M. P. Ward used the material of the nineteenth-century occupation censuses to construct a new classification of the labour force. Miss Mercer left the Department in the spring of 1966 to take up a post in the Research Division of the United Nations Conference on Trade and Development, but is completing her work on the labour force statistics. It is hoped to publish the results of this project during 1967 and 1968.

#### *The Growth of the U.K. Economy since the War*

31. The objects and methods of this enquiry were described in the Fifth Report. Mr R. C. O. Matthews, Dr C. H. Feinstein, and Mr J. C. Odling-Smee worked on the project in the Department between January and September 1965. On the appointment of Mr Matthews as Drummond Professor of Political Economy at the University of Oxford in October 1965 the project was transferred to the Oxford Institute of Economic and Statistics. Dr Feinstein has continued to undertake research in the Department for the purposes of this project.

#### *National Income, Expenditure, and Output of the United Kingdom 1860-1960*

32. This project is designed to complete the series of Studies in the National Income and Expenditure of the United Kingdom edited by Professor R. Stone. It will provide a consistent and comprehensive set of national accounts for all years from 1860, with detailed estimates of income, expenditure, and real output. Some of the material has already been published, but it will also include new estimates; in particular, for profits, personal incomes, and personal and corporate savings in the inter-war years.



33. Some preliminary results have been published in papers listed in the Fifth Report and it is hoped to have the complete study, which is being undertaken by Dr C.H. Feinstein, ready for publication by July 1967.

#### *Economies of Large-scale Production*

34. The research on this topic has been continued by Mr C.F. Pratten during the period under review and is now nearing completion. It is intended to publish the results in a book describing the economies of scale in twenty-five manufacturing industries. The estimates of economies of scale for individual industries are based on information obtained from companies engaged in the industries concerned and from published studies. The volume will also have sections discussing the use of company accounts and census of production data for the estimation of economies of scale, and a discussion of how far the research enables generalizations to be made about scope for, and the relative importance of, economies of large-scale production in British industry.

35. One of the industries included in the study is the manufacture of rubber products (other than tyres). This study was prepared at the request of the Economic Development Committee for the industry.

#### *Economic Aspects of the British Patent System*

36. Research on the economic effects of the patent system started in the Department of Applied Economics in 1961 with the help of a grant from the Nuffield Foundation. Mr A. Silberston was in charge of the project and Mr K.H. Boehm was engaged to carry out the research from 1961 to 1965. Its results are to appear in two volumes. The first is a study of the history, law, and administration of the British Patent System, and the second a study of its economic effects. The volume on history, law, and administration has been completed and is to be published by the Cambridge University Press in the autumn of 1967. This volume contains the results of a new investigation into patent statistics completed by the Department. For the purposes of this investigation, patents issued between 1931 and 1960, and originally classified under the normal patents classification, were reclassified according to the Standard Industrial Classification of 1958. For the first time, therefore, statistics of patents by industry rather than by type of invention will be available.

37. Work is now proceeding on the second volume which will be concerned with the economic implications of the patent system. The core of this volume will be case studies of individual industries. These will include chemicals, electronics, pharmaceuticals, and oil refining. In addition, the relationship between the statistics of patents granted and other economic magnitudes will be investigated, and attention will be paid to other patent systems. The volume will end with an appraisal of the economic effects of the British Patent System, together with any proposals for changes in the system that the analysis might suggest.

38. A further investigation has now been started in which an attempt will be made to study historical patent statistics over the last hundred years or so. These statistics will be classified by industry and compared with other economic series to see whether the results suggested by work carried out in this field in the United States are supported by British experience. This work is to be undertaken by Dr B.R. Mitchell. An article, 'The Patent System', by Aubrey Silberston, is to appear in *Lloyds Bank Review* early in 1967.

#### *Service Industries*

39. This investigation into post-war trends in capital, employment, output, productivity, and technical change in the service industries in the United Kingdom began in October 1964. The first stage of the work was undertaken by Mr B.M. Deakin and Mr K.D. George under the general direction of Mr W.B. Reddaway. The main results include a comparison of productivity trends in 'measured' services as a whole (i.e. an aggregation of those service industries where output measures were judged sufficiently accurate for meaningful productivity calculations) with those in the 'goods' sector of the economy. The fitting of a Cobb-Douglas type production function to these results enabled attributions to be made of productivity change to changes in labour and capital input separately and, as a residual and combined element, change in technical and organizational knowledge. Labour input was adjusted for hours and quality (for changes over time in the proportion of part-time workers and female workers on an inter-sectoral and intra-sectoral basis). These results appeared in 'Productivity Trends in the Service Industries, 1948-63', by B.M. Deakin and K.D. George, published in the *London and Cambridge Economic Bulletin*, March 1965 (Reprint

no. 237). Later stages in this investigation are reported below under Productivity in Distribution and Capital, Employment, Output, Productivity, and Technical Change in Transport and Communication.

#### *Productivity in Distribution*

40. The first stage of this research, which has been carried out by Mr K.D. George, has been a statistical analysis based on the 1961 Census of Distribution. The main objectives were: to examine productivity in retailing by studying inter-town differences in labour productivity as measured by sales per person engaged; to see whether the difference between towns conformed to any systematic patterns; to see whether productivity differences could be related to some other systematic factors such as the tightness of the labour market, or the size of shop, or the proportion of sales done by multiple shops; and to examine the extent to which a regression analysis would give a statistical explanation of differences in productivity between towns. The results of this research have been published in an Occasional Paper by K.D. George entitled *Productivity in Distribution*.

41. The next stage in the research is to examine the role of investment in increasing productivity in large retail companies.

#### *Capital, Employment, Output, Productivity, and Technical Change in Transport and Communication*

42. This research was started in April 1965 as a development of the Service Industries project. The work is being undertaken by Mr B.M. Deakin and Miss T. Seward under the general direction of Mr W.B. Reddaway. The project has three principal objectives. First, to investigate post-war trends in capital, employment, output, quality of output, productivity, technical change, and capacity utilization in passenger and freight transport in Great Britain. Second, to study economic relationships between transport and the economy in average and marginal terms, and third, to examine alternative organizational concepts for a road service industry supplying road facilities and traffic regulation facilities to all road users, and to measure productivity trends in such an industry. It is hoped to publish the results of this work in the form of an article by Mr B.M. Deakin on relationships between transport and the economy, and an Occasional Paper by Mr B.M. Deakin and Miss T. Seward on all the other aspects of the project. It is expected that the research will be completed by the autumn of 1967.

#### *The Investment Policies of Nationalized Industries*

43. Mr R.W.S. Pryke is undertaking this project under the general direction of Mr M.V. Posner. Its original purpose was to examine how the nationalized industries draw up their investment programmes and assess rates of return on particular items of capital expenditure. However, it became apparent that such an investigation was too restricted. Investment decisions are affected by the pricing policy adopted, by the economic guidelines laid down in 1961, and, in the case of coal, gas, and electricity, by general fuel and power policy and prospects. After Mr Pryke and Mr Posner had written a lengthy paper on the economic and financial rules by which the nationalized industries should operate, it was decided to divide the project into two parts. First, a collection of studies, including the paper on economic and financial rules, will present and round out the material assembled in the course of the investment study. Second, a study of the fuel and power industries. It is hoped to publish the former by the end of 1967. It will include an introductory paper on the productivity, investment, reorganization, profits, and financing of the nationalized industries; an essay on Government policy towards these industries and how they have been used in the regulation of the economy; and papers on international productivity comparisons for the coal industry, on the West Midlands Gas Board, on B.R.S. Parcels, and on the National Coal Board.

#### *(b) Industrial Relations, Sociology, and Politics*

##### *The Causes of Small Strikes*

44. The Fifth Report of the D.A.E. noted that this project had reached the writing-up stage. The following publications have resulted (or are due to appear shortly):

'How Unofficial Strikes Help Industry', by Garfield Clack (*Business*, July 1965)

'Strikes and Dissatisfaction with Assembly-line Work in Car Factories', by Garfield Clack (*Cambridge Opinion*, November 1966).



*Industrial Relations in a British Car Factory*, by Garfield Clack (Department of Applied Economics, Occasional Paper no. 9).

45. Material gathered in connexion with this project has also been used extensively in *Labour Relations in the Motor Industry: a Study of Industrial Unrest and an International Comparison* by H.A. Turner, Garfield Clack, and Geoffrey Roberts (London: Allen and Unwin, 1967).

#### *Job Evaluation*

46. The main objective of this project is an assessment of the possible use of job evaluation techniques for national wage and incomes policy. The study began in 1965 and is being carried out by Dr Clack under the direction of Professor H.A. Turner.

47. The main work to date has consisted in (a) a review of the technical literature, (b) discussion with employers' associations, firms, consultants, and trade union officials having experience of the techniques concerned—as well as with management institutes and university departments having knowledge of (or opinions on) these systems, and (c) an on-the-spot following through of the detailed negotiations for the revision of the jute industry's wage-structure, as a substantial case study of an attempt to apply job evaluation on an 'industry-wide' basis.

48. Offers have been received from two engineering firms to co-operate in detailed studies of revisions of their own wage-systems, but it has seemed preferable—whilst keeping in touch with their experience—to concentrate on a wider survey of the practice of industrial consultants in this area, and on the experience of the Civil Service Pay Research Unit, as offering much broader ranges of information and material.

#### *Demarcation Rules and Related Practices*

49. The objective of this study is to survey and analyse the trade union rules, collective agreements, and industrial conventions which define the allocation of work between workers of different skills or degrees of skill. The Shipbuilding and Printing Industries were chosen as an area suitable for investigation. The study was started in 1964 and is being undertaken by Mr G. Roberts under the direction of Professor H.A. Turner. A general examination has been made of the extent and operation of demarcation rules in the shipbuilding industry. To find out how differences in such rules, and in yard or local practice, influence decisions on demarcation a detailed study was carried out on the North East Coast. From Ministry of Labour records detailed statistical analyses have been made of the historical part played by demarcation disputes in shipbuilding strikes, of the distribution of disputes between areas and the major shipbuilding crafts, and of the particular incidence of disputes in the North East centres. An analysis has also been made of the 'productivity agreements' and other negotiations for the re-organization of labour use and conditions of employment which have recently taken place in a number of yards and districts. An investigation along similar lines is now being carried out in the printing industry. From the shipbuilding section of the study, an Occasional Paper, *Demarcation Rules in the Shipbuilding Industry*, and a Report for the Royal Commission on Trade Unions and Employers' Associations, are being prepared.

#### *Labour Relations in Mining*

50. The object of this study, which began in October 1965, is to survey and analyse post-war developments in labour relations in the U.K. coal industry. Among several topics of interest the recent changes in the coal-mining wages structure and the post-war pattern of strike frequency figure very prominently in the research programme. The project is being conducted by Mr L.J. Handy under the direction of Professor H.A. Turner. Both the N.C.B. and the N.U.M. have been of considerable assistance. Discussions have been held with union officers and management within the industry and several pits have been visited. The N.C.B. have supplied raw statistical information of both a general and detailed nature and an analysis has been made of Ministry of Labour strike records for coal mining.

51. Attention was directed recently to coal-miners' absenteeism and an article by Mr Handy and Professor Turner, 'Absenteeism in the Mines', appeared in *New Society*, 7 April 1956. A more detailed analysis of absence trends by Mr Handy is now in draft form. Indirectly related to the project, a paper 'Research Needs in Automation' was prepared and read by Professor Turner and Mr Handy for the Social Science Research Council in London in January 1966.

#### *Conditions of Employment of Manual and Non-manual Workers*

52. The objects of this enquiry were outlined in the Fifth Report of the Department (p. 21, paragraph 90). Mrs J.C. Craig and Mrs R. Crompton are engaged on the research under the direction of Mrs D.E. Wedderburn. Mr P. Jenner also worked on it until mid-1965.

53. Since January 1965, two detailed case-studies have been made in very different industrial settings, but both in firms where management was considering the introduction of new 'staff status' schemes.

54. The first was at Star Paper Mills in Blackburn. This is a 'family' firm with about 500 employees. 132 hourly paid workers and 25 male staff were interviewed early in 1965, and a full report on the findings was presented to the company and the trade unions in June 1965. The object of these interviews was to investigate attitudes to existing differentials, and to test certain questions and approaches with a view to future case-studies.

55. In June 1965 I.C.I. agreed to a larger scale enquiry being made at their Wilton chemical site, on Tees-side. This site includes six major production works in addition to services and maintenance works, and this was an ideal opportunity to investigate worker attitudes in a large and complex organization, with a variety of technologies, at a time when management was negotiating with the unions on the granting of 'staff status' for manual workers in return for the right to re-organize the content of jobs in a way which would cut across craft and non-craft lines. By November 1965, 490 hourly paid men and 77 staff and foremen had been interviewed. A first report was ready by April 1966, and a final report will be completed by December 1966.

56. In addition to these separate reports, a paper is being prepared for publication describing the light these two case-studies throw on the nature and extent of differentials between different groups of workers, the awareness of, and attitudes towards, such differentiations, and the relative importance of differentials as a source of satisfaction or dissatisfaction compared with other aspects of the work situation.

57. Such general background information as already exists which illustrates differences in terms and conditions of employment has been analysed, and this analysis is also being prepared for publication.

58. Discussions have been held with trade unions, employers' organizations, and individual firms about their policies on matters affecting differentiation of various kinds. The Ministry of Labour have agreed to co-operate in drawing a sample for a large-scale postal enquiry among manufacturing industries to collect basic information about fringe benefits. It is hoped that this enquiry will start early in 1967.

#### *Attitudes to Work in relation to Production Systems and Community Structure: The New Working Class*

59. The data described in the account of this project in the Fifth Report have now been analysed and the work of writing-up is well advanced. The following papers have already appeared—'Attitudes and Behaviour of Car Assembly Workers: A Deviant Case and a Theoretical Critique', by J.H. Goldthorpe (*British Journal of Sociology*, September 1966); 'Some Sources of Variation in Working Class Images of Society', by D. Lockwood (*Sociological Review*, November 1966); 'The Affluent Worker and the Thesis of *Embourgeoisement*: Some Preliminary Research Findings', by J.H. Goldthorpe, D. Lockwood, F. Bechhofer, and J. Platt (*Sociology*, January 1967). Mr Goldthorpe also presented two papers reporting on the project to the Sixth World Congress of Sociology, held at Evian in September 1966. In September 1965 the project was the subject of a documentary television film made by Rediffusion Limited. Two monographs, *The Affluent Worker: Political Attitudes and Behaviour*, and *The Affluent Worker: Industrial Attitudes and Behaviour*, are nearing completion. It is intended that they should be the first publications in a new series of Monographs and Occasional Papers to be called Cambridge Studies in Sociology.

#### *Adaptation of Engineering Graduates to Industry*

60. This project was described in the Fifth Report. Mr Bechhofer has carried out some coding and analysis of the data which had been collected, but was unable to complete the work before he left the Department in September 1965. It is hoped that the next Report will announce the completion of this project.



### *Social Mobility and Patterns of Anxiety*

61. During 1965-66 the Department has assisted Mr E.I. Hopper with this project, which is concerned with the problem of specifying some of the structural conditions in which upward social mobility is likely to be associated with various patterns of anxiety, especially with feelings of relative deprivation. The literature on this subject being scarce, special attention is being given to conceptual classification and development of hypotheses. Preliminary findings will be based on analysis of data collected through an interview-questionnaire from 200 people aged from 30 to 35 born and living in England. There are plans to extend the study, using a larger and more representative sample in England, as well as a similar sample in the United States.

62. Mr Hopper presented a paper, 'A Typology for the Classification of Educational Systems', at the Sixth World Congress of Sociology at Evian in September 1966. This is to be published in *Sociology* during 1967.

### *British Elections*

63. This project was conceived in 1963 by three members of the research staff who were interested in psephological studies, Mr K.H. Boehm, Dr B.R. Mitchell, and Mr F.G. Pyatt, with the aim of collecting data on post-war electoral history and analysing it in more sophisticated terms than the usual 'swing' concept.

64. Mr Pyatt left the Department in late 1964 before it was possible to start collecting data. As Mr Boehm was also to leave in September 1965 it seemed best to limit the immediate aims to (1) the publication of a book containing the basic data of recent electoral history in a form more convenient for psephologists than anything previously published, and (2) recording these data on Cope-Chat cards for future analytical work. These aims were achieved during 1965. *British Parliamentary Election Results 1950-1964*, by B.R. Mitchell and Klaus Boehm, was published by the Cambridge University Press in March 1966. The completed Cope-Chat cards have been sent to Mr Pyatt. The further analytical work is to be carried out by him, though not in the Department.

## IV. OTHER ACTIVITIES

### *Seminars*

65. During the period under review sixteen research papers, of which five were contributed by visiting economists, have been read at seminars held under the joint auspices of the Department and of the Faculty of Economics and Politics.

66. Fifteen papers were given in the series of seminars on Mathematical Economics and Econometrics. Visiting economists contributed ten of these.

### *University Relationships*

67. Teaching officers of the Faculty of Economics and Politics continue to participate in the Department's research programme, many of the projects being under their immediate direction. Several members of the Department's staff have given lectures or taken classes for the Faculty. Almost all members of the Department are engaged in supervising undergraduates studying economics, economic history or sociology, thus making it possible to provide supervision for the growing numbers of students in the Faculty. The Department has provided secretarial and computing assistance, as well as advice on electronic programming and data analysis, to Faculty teaching officers. In various ways it has also assisted Research Students attached to the Faculty.

68. The University Mathematical Laboratory has helped the Department with computational facilities and advice which are greatly appreciated.

### *Relationships with Other Bodies*

69. In addition to financial assistance, mentioned in Section II, which outside bodies have given the Department, help of other kinds has come from many sources, including the Board of Trade, the National Economic Development Office, the Ministry of Overseas Development, the Ministry of Labour, the Central Statistical Office, the Social Science Research Council, the Bank of England, the Industrial Welfare Society, and a large number of industrial and business firms, trade associations, and trade unions.

### *Visitors from Abroad*

70. The following distinguished economists from abroad have worked in the Department as visiting members:

1964-65

Dr J.W. Lee of the University of Indiana.

Dr S.J. Locufier of the University of Ghent.

Dr J. Stahan of the Institute of Economics, Zagreb, Yugoslavia.

1965-66

Mr H. Bhattacharya of the Indian Statistical Institute, Calcutta.

Mr M. Cuhadar of the Turkish State Institute of Statistics.

Mr B. Isaev of the Central Economic and Mathematical Institute, Science Academy of the U.S.S.R.

Dr S. Rossi of the University of Florence.

### *Reprint Series*

## V. PUBLICATIONS

71. This series consists of selected papers which members of the Department's research staff and others working in direct collaboration with the Department have contributed to learned journals and other publications. During the period the following twenty-six new titles have been added. They are listed in alphabetical order of authors:

ARMSTRONG, ALAN and SILBERSTON, AUBREY. Size of Plant, Size of Enterprise and Concentration in British Manufacturing Industry 1935-58 (*Journal of the Royal Statistical Society, Series A (General)*, vol. CXXVIII, part 3, 1965; Reprint no. 246).

BROWN, A., LEICESTER, C. and PYATT, F.G. Output, Manpower and Industrial Skills in the United Kingdom (*The Residual Factor and Economic Growth*, O.E.C.D., Paris 1964; Reprint no. 244).

HARCOURT, G.C. The Accountant in a Golden Age (*Oxford Economic Papers*, vol. XVII, no. 1, March 1965; Reprint no. 241).

HARCOURT, G.C. and WHITTINGTON, G. The Irrelevancy of the British Differential Profits Tax: A Comment (*Economic Journal*, vol. LXXV, no. 298, June 1965; Reprint no. 242).

MARRIS, R.L. Incomes Policy and the Rate of Profit in Industry (paper read to the Manchester Statistical Society, December 1964; Reprint no. 238).

MARRIS, R.L. and SINGH, A.A. Measure of a Firm's Average Share Price (*Journal of the Royal Statistical Society, Series A (General)*, vol. CXXIX, part 1, 1966; Reprint no. 258).

MATTHEWS, R.C.O. Some Aspects of Post-War Growth in the British Economy in Relation to Historical Experience (paper read to the Manchester Statistical Society, November 1964; Reprint no. 240).

PANIC, M. and SEWARD, T. The Problem of U.K. Exports (*Bulletin of the Oxford Institute of Economics and Statistics*, February 1966; Reprint no. 256).

PRYKE, RICHARD. Towards a Payments Surplus (*Bankers' Magazine*, September 1965; Reprint no. 243).

REDDAWAY, W.B. Reasons for Rising Prices (English version of a paper published in Italian in *Rivista Internazionale di Scienze Economiche e Commerciali*, October 1964; Reprint no. 230).

REDDAWAY, W.B. Suspended Judgment (*London and Cambridge Economic Bulletin*, no. 54, June 1965; Reprint no. 239).

REDDAWAY, W.B. The Australian Economy, 1937 and 1965 (*Journal of the Economic Society of Australia and New Zealand*; Reprint no. 251).

REDDAWAY, W.B. Rising Prices for Ever? (*Lloyds Bank Review*, July 1966; Reprint no. 255).

REVELL, JACK. The Wealth of the Nation (*Moorgate and Wall Street*, Spring 1966; Reprint no. 249).

SILBERSTON, AUBREY. Problems Involved in International Comparisons of Labour Productivity in the Automobile Industry (*Labour Productivity*, edited by J.T. Dunlop and V.P. Diatchenko, 1964; Reprint no. 231).

SILBERSTON, AUBREY. The Motor Industry 1955-1964 (*Bulletin of the Oxford Institute of Economics and Statistics*, vol. XXVII, no. 4, 1965; Reprint no. 248).

SILBERSTON, AUBREY. The Cambridge Business Game (*Cambridge Research*, April 1966; Reprint no. 254).

SLATER, LUCY JOAN. Computing the State of the Economy (*The Computer Journal*, vol. IX, no. 1, May 1966; Reprint no. 253).



- STONE, RICHARD. Models for Demand Projections (*Essays on Econometrics and Planning*, Pergamon Press, 1965; Reprint no. 236).
- STONE, RICHARD. The Changing Pattern of Consumption (*Problems of Economic Dynamics and Planning*, Polish Scientific Publishers, Warsaw 1965; Reprint no. 245).
- STONE, RICHARD. Transitional Planning: The Adaptation of the Economy to a Higher Rate of Growth (*On Political Economy and Econometrics: Essays in Honour of Oskar Lange*, Polish Scientific Publishers, Warsaw 1965; Reprint no. 247).
- STONE, RICHARD. The Cambridge Growth Project (*Cambridge Research*, October 1965; Reprint no. 250).
- WARD, MICHAEL. Are Credit Cards Inflationary? (*Banker*, July 1966; Reprint no. 257).
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- WIGLEY, K.J. The Cambridge Growth Project and the Fuel and Power Industries (*The Advancement of Science*, vol. XXIII, no. 108, June 1966; Reprint no. 252).
- WIGLEY, K.J. The Development of the National Plan (*Journal of the Royal Statistical Society, Series A (General)*, vol. CXXIX, part 1, 1966; Reprint no. 259).

#### Monograph Series

72. No further volumes were added during 1965-66 to the twelve listed in previous Reports, but a new edition has appeared of:

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#### Forthcoming titles:

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#### Studies in the National Income and Expenditure of the United Kingdom

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## VI. FACILITIES

### Library

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78. During the period January 1965 to September 1966 the library has acquired 185 books, 874 pamphlets and reprints, and 578 British Government publications.

### Equipment

79. The equipment mentioned in the Fifth Report remains in use. Five additional electric desk calculating machines have been purchased, bringing the total to twenty-seven.

80. The arrangement with the Cambridge Language Research Unit for the joint use with them of a Hollerith 1202 computer is shortly to come to an end, and the Department will instead make use of the Financial Board's newly-installed 1901 computer.

81. The more elaborate calculations continue to be undertaken by the Titan computer at the University Mathematical Laboratory, to the Director of which, Professor M.V. Wilkes, the Department is greatly indebted.

## VII. STAFF

### Research Staff

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*Junior Research Officers:* Mr T.S.BARKER, M.A. (Edin.), Fellow of Downing College; Mrs R. CROMPTON, B.Sc. (Sociology) (London); Mr M.J.GREEN, B.A. (Exeter); Mr L.J.HANDY, B.A. (Leeds); Mr S.J.POTTER, B.A. (Cantab.).

*Holder of Unestablished Research Post:* Mr A.G.ARMSTRONG, B.A. (Cantab.).

*Research Consultants:* Mr P.V.HILLS, B.Sc. (Econ.) (Southampton); Mr J.P.MOYLE, B.Sc. (Manchester), F.R.I.C.S.; Mr J.O.N.PERKINS, Ph.D., M.A. (Cantab.); Mr C.T.TAYLOR, M.A. (McGill); Mr F.E.TOWNSON.

83. The following, although not formally holding University posts in the Department, are closely associated with the Department's research activities:

*Faculty Teaching Officers*

Mr P.ABRAMS, Ph.D., M.A. (Cantab.), Fellow of Peterhouse, Assistant Lecturer in Sociology.  
Miss P.M.DEANE, M.A. (Cantab.), M.A. (Glasgow), Fellow of Newnham College, Lecturer in Economics.

Mr C.H.FEINSTEIN, Ph.D. (Cantab.), B.Comm. (Witwatersrand), Fellow of Clare College, Lecturer in Economics.

Mr J.H.GOLDTHORPE, M.A. (Cantab.), B.A. (London), Fellow of King's College, Lecturer in Sociology.

Mr E.I.HOPPER, M.A. (Cantab.), M.A. (Washington), Assistant Lecturer in Sociology.

Mr D.LOCKWOOD, Ph.D. (Econ.), B.Sc. (Econ.) (London), Fellow of St John's College, Lecturer in Sociology.

Mr R.L.MARRIS, M.A. (Cantab.), Fellow of King's College, Lecturer in Economics.

Mr C.ST J.OHERLIHY, M.A. (Cantab.), B.A. (N.U.I.), Lecturer in Economics.

Mr M.V.POSNER, M.A. (Oxon.), M.A. (Cantab.), Fellow of Pembroke College, Lecturer in Economics.

Professor E.A.G.ROBINSON, C.M.G., M.A. (Cantab.), F.B.A., Fellow of Sidney Sussex College, Emeritus Professor of Economics.

Mr A.SILBERSTON, M.A. (Cantab.), Fellow of St John's College, Lecturer in Economics.

Mr A.SINGH, M.A. (Cantab.), M.A. (Howard), B.A. (Punjab), Fellow of Queens' College, Assistant Lecturer in Economics.

Professor RICHARD STONE, C.B.E., Sc.D., M.A. (Cantab.), F.B.A., Fellow of King's College, P.D. Leake Professor of Finance and Accounting.

Professor H.A.TURNER, Ph.D. (Manchester), M.A. (Cantab.), B.Sc. (Econ.) (London), Fellow of Churchill College, Montague Burton Professor of Industrial Relations.

*Other Research Associates*

Mr F.BECHHOFFER, M.A. (Cantab.).

Mr J.R.C.LECOMBER, B.A. (Oxon.), Fellow of Clare College; on secondment from Department of Economic Affairs.

Mrs D.E.WEDDERBURN, M.A. (Cantab.).

Mr M.ST J.WRIGHT, M.A. (Oxon.); on secondment from the Bank of England.

84. During the period covered by this Report the following members of the research staff left the Department to take the posts mentioned in brackets:

Mr J.E.G.UTTING, M.A. (Cantab.), Assistant Director. (Professor of Economics and Dean of Chancellor College, University of Malawi.)

Mrs D.E.WEDDERBURN, M.A. (Cantab.), Senior Research Officer. (Lecturer at the Imperial College of Science and Technology, University of London.)

Mr M.O.L.BACHARACH, Ph.D., B.A. (Cantab.), Research Officer. (Research Fellow of Nuffield College, University of Oxford.)

Mr J.K.S.GHANDHI, Ph.D. (Cantab.), M.A., B.Sc. (Econ.) (Pennsylvania), Research Officer. (Associate Professor of Finance, University of Pennsylvania.)

Mr F.BECHHOFFER, M.A. (Cantab.), Junior Research Officer. (Lecturer in Sociology, University of Edinburgh.)

Mr K.H.BOEHM, B.A. (Cantab.), Junior Research Officer. (Projects Director of the Careers Research and Advisory Centre.)

Mr J.C.ODLING-SMEE, B.A. (Cantab.), Junior Research Officer. (Assistant Research Officer, Oxford Institute of Economics and Statistics.)

*Assistant Staff*

85. The following is a list of the assistant staff at September 1966:

*Secretary:* Mr H.LOSHAK.

*Librarian:* Miss O.E.HICKSON.

*Secretarial and Clerical Staff:* Mrs L.E.SILK (Senior Typist); Miss J.S.BURSEY; Miss J.E.CANWELL; Miss J.CHAPMAN; Miss J.R.DOGGETT; Miss C.A.HUDSON; Miss E.M.LUDLOW; Miss V.A.SADDINGTON-SHATFORD; Miss S.D.SEAL; Miss A.C.TWYMAN.

*Computing and Statistical Staff:* Miss M.R.CLARKE (Senior Computer); Mr E.BOUGOURD (Statistician); Mrs N.I.CHAPMAN; Miss D.M.DAY; Mr J.A.EASTABROOK; Mrs V.J.LEA; Miss R.LEVERETT; Miss J.M.SCARR; Mr I.P.TATHAM; Miss S.UMMAT, M.A. (Agra); Miss P.A.WARREN.

86. Mr R.M.D.DAVIES, B.A. (London), who had been secretary of the Department since 1949, resigned in April 1966 on his election as Member of Parliament for Cambridge.