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W. C. Farrell

UNIVERSITY OF CAMBRIDGE

DEPARTMENT OF
APPLIED ECONOMICS

FIFTH REPORT
ACTIVITIES IN THE YEARS
1958-64



April 1965

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UNIVERSITY OF CAMBRIDGE
DEPARTMENT OF APPLIED ECONOMICS

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Assistant Director

J. E. G. UTTING

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Dr R. F. HENDERSON, Professor R. F. KAHN, Dr A. R. PREST, Mr A. D. ROY, Mr J. E. G. UTTING, and Dr M. YOUNG were also members of the Committee of Management during the period covered in this Report.

FIFTH REPORT OF THE DEPARTMENT OF
APPLIED ECONOMICS

(covering the period January 1958 to December 1964)

I. GENERAL

1. The following Report describes the role and work of the Department of Applied Economics with particular reference to developments during the years 1958-64.

2. The Department is a research institute within the Faculty of Economics and Politics. The decision to establish such a Department was taken by the University in 1939, but it did not come into active existence until 1945 when Mr Richard Stone was appointed as the first Director. In 1955 Mr Stone was elected to the P. D. Leake Chair of Finance and Accounting, and was succeeded as Director of the Department by Mr W. B. Reddaway, M.A., Fellow of Clare College.

3. The work of the Department is under the general control of a Committee of Management consisting of the Director, six members appointed by the Faculty Board to serve for three years, and up to three members co-opted annually to serve for the remainder of the calendar year in which they are elected. The Chairman of the Committee of Management is Head of the Department. The Director of the Department, who is appointed by the Appointments Committee of the Faculty, is responsible for promoting and directing research in his subject and supervising the work of the Department.

4. Although the Department has a separate identity it is closely associated with the rest of the Faculty of Economics and Politics. Holders of University posts on the research staff of the Department are automatically made members of the Faculty, and are eligible for election as members of the Faculty Board. They may also be appointed by the Faculty to serve as members of the Department's Committee of Management. Teaching officers of the Faculty who are not members of the Department's research staff take an active part in the research activities of the Department. The majority of the research projects being undertaken by the Department in 1964-65 were initiated by teaching officers of the Faculty and were under their immediate direction. In particular, Professor Richard Stone directs the Department's research into the problems of a faster rate of economic growth and, as the P. D. Leake Professor of Finance and Accounting, has his office and his own research unit within the Department.

5. It had originally been envisaged that the constitution of the Department would involve 'the appointment of a University officer to undertake and direct research in applied economics with a few (say, half-a-dozen) research workers under his general supervision and a small staff of computers and other assistants'. However, by the end of the first decade of its existence the number of research workers, in addition to the Director, had increased to twenty-four, and in 1956 the University approved the establishment of twenty-five University posts in the Department, in addition to the Directorship, one of these posts being that of Assistant Director. The remaining twenty-four posts were to be in the grades of Special Appointment, Senior Research Officer, Research Officer, and Junior Research Officer, the number of posts to be filled in each of these grades being determined by the General Board on the recommendation of the Committee of Management and subject to the concurrence of the Financial Board. In 1964 the University agreed to increase the number of University posts in the Department to twenty-nine in addition to the Directorship, and also agreed to the employment, on an unestablished basis, of up to ten graduate research workers subject to the necessary finance being available. Approval was also given to increase to twenty-nine the number of assistant staff employed in the Department, plus an assistant employed on domestic duties.

6. The Department's maximum permitted staff accordingly now consists of the Director, the Assistant Director, twenty-eight other holders of University posts, up to ten graduate research workers not holding University posts, and thirty assistants: a total of seventy. This number does

not include research associates and visiting members who are not employed by the Department; nor does it include research consultants appointed on a fee basis.

7. The actual working strength of the Department, however, has never in practice reached the permitted limit. At the time when this Report was prepared (March 1965), the actual staff and associated members of the Department, in addition to the Director and the Assistant Director, was made up as follows: one Special Appointment, five Senior Research Officers, thirteen Research Officers, six Junior Research Officers, three holders of unestablished research posts, five research consultants, four visiting members, eleven research associates (teaching officers of the Faculty actively associated with research projects within the Department), and thirty full-time or part-time assistants.

8. The principal developments during the years 1958-64 have been:

First, an increase in the scale and scope of the Department's research activities, notably in the field of sociological research (after the scope of the Faculty had been enlarged to cover sociology) and in the provision for research into the economic problems of developing countries (which now constitutes an optional paper in the Tripos).

Secondly, increased support and collaboration from government departments and public bodies, and from industrial and financial institutions.

Thirdly, wider and more active participation by teaching officers of the Faculty in the Department's research programme.

Fourthly, the occupation with the Faculty and the Marshall Library of Economics of a new building on the Sidgwick Avenue Site.

Fifthly, the increased use of more advanced methods of electronic computing and data analysis—partly on the machines in the Mathematical Laboratory, and partly on an H.E.C. 1202 computer provided at a very low rental by International Computers and Tabulators for the joint use of the Department and the Cambridge Language Research Unit.

Sixthly, the provision in the Department of equipment and facilities for tape and card punching for use in connexion with the above machines or with a counter-sorter, which has been installed in the Department for simple operations.

Seventhly, the introduction of two new series of publications, both designed to ensure more rapid publication of research results than is possible with the monograph series—*A Programme for Growth*, published for the Department by Chapman and Hall Limited and containing progress reports on the work on economic growth by Professor Stone, and a series of *Occasional Papers* published by Cambridge University Press covering all other topics.

II. FINANCE

9. The increasing scale of the Department's research activities during 1958-64 is reflected, along with higher prices and pay-scales, in its annual expenditure, which rose from £38,115 in 1958-59 to £66,869 in 1963-64. Over eighty per cent. of this expenditure is on stipends, wages, and related payments.

10. Since 1956 the Department has received a fixed grant from the University, rather than an annual grant based on approved estimates, and in this respect differs from other University Departments. The University's grant is increased from time to time by a proportion (eleven-eightieths) of the cost of increases in scales of stipends and wages for a notional establishment comprising, in addition to the Director and the Assistant Director, one Special Appointment, four Senior Research Officers, ten Research Officers, nine Junior Research Officers, and twenty-one assistants in various grades. This represents the proportion of Department staff in these grades not covered by outside finance in 1956, when a fixed grant for the Department was first instituted. Increases in University grant do not, therefore, correspond to the actual cost to the Department of increases in scales of stipends and wages, quite apart from the fact that no account has been taken of the increase in the Department's permitted establishment of research and assistant posts, or in the numbers of research workers and assistants actually employed in the Department. In addition, no allowance is made for higher prices of the things which the Department has to buy,

or of the increased quantities required for a larger staff. The grant from the University has in consequence been increased only from £26,000 in 1957-58 to £33,800 in 1963-64, while expenditure in the same period rose from £38,700 to £66,869.

11. The Department also differs from other University Departments in that, in proposing research appointments, it must be able to show that sufficient funds are at its disposal, including the fixed grant from the University, to cover all its commitments for the whole period of the appointments. Since the University's grant now covers only about half of the Department's annual expenditure, which necessarily includes a considerable overhead element, it is essential for the Department to have the support of outside bodies for the majority of its research projects in order to maintain the present level of its research activity.

12. A substantial reserve fund is also needed to absorb the very large year to year fluctuations in the amount of outside finance which can be obtained. During 1958-64 the proportion of Department expenditure covered by outside finance has varied between only seven per cent. in 1960-61 and as much as fifty-one per cent. in 1963-64. In 1960-61 the reserve fund was practically exhausted and financial limitations prevented the recruitment of staff to finish one project (see page 12) and the starting of others.

13. During 1958-64, or at least in the second half of the period, the Department has received very generous support from a number of outside bodies, grants worth over £175,000 being promised to the Department in this period. Seventeen of the thirty-seven research projects mentioned in this Report have attracted outside finance, while thirteen of the eighteen projects included in the 1964-65 research programme are supported by outside bodies.

14. The following is a list of the grants offered to the Department during the period under review:

Donors	Year	Amount	Project
Rockefeller Foundation	1962	£15,550	Capital Formation and the Stock of Assets in Britain (see paragraphs 65-6)
Ford Foundation	1961	£30,000	Empirical Models of Economic Growth (see paragraphs 24-30)
Nuffield Foundation	1958	£6,000	The Economic Circumstances of Old People (see paragraphs 78-9)
	1961	£7,600	Economic Aspects of the British Patent System (see paragraph 75)
Social Science Research Council	1958	£3,125	<i>Abstract of British Historical Statistics</i> (see paragraphs 63-4)
	1963	£3,841	The Growth of the U.K. Economy since the War (see paragraphs 67-8)
	1964	£1,577	
Esmée Fairbairn Trust	1962	£7,000	The Growth of Public Companies and its Finance (see paragraphs 52-3)
	1964	£3,500	
Various Financial Institutions ¹	1963	£25,000	Financial Aspects of British Economic Growth (see paragraphs 31-6)
Ministry of Overseas Development	1964	£45,000	The Economics of Developing Countries (see paragraph 56)
Department of Scientific and Industrial Research	1962	£3,315	Attitudes to Work in relation to Production Systems and Community Structure (see paragraphs 85-6)
	1964	£3,420	The Causes of Small Strikes (see paragraphs 87-8)
	1964	£2,542	Demarcation Rules and Related Practices (see paragraph 89)
	1964	£8,738	Conditions of Employment of Manual and Non-manual Workers (see paragraph 90)

¹ Bank of England, British Insurance Association, London Clearing Banks, Building Societies Association, Halifax Building Society, Finance Houses Association, London Stock Exchange, and Association of Unit Trust Managers.

Donors	Year	Amount	Project
Rees Jeffreys Road Fund	1962	£4,000	The Economics of Car Parking (see paragraphs 54-5)
British Railways Board	1963	£3,000	Redundancy in Railway Workshops (see paragraphs 72 and 84)
National Economic Development Office	1963	£3,000	Empirical Models of Economic Growth (see paragraphs 24-30)
	1964	£2,015	Determinants of Rates of Return on Capital (see paragraphs 50-1)

15. These grants bring the total amount of outside finance given to the Department from 1945 to 1964 to a little over £300,000. The main donors have been:

Rockefeller Foundation	£73,500
Ford Foundation	£45,500 ¹
Ministry of Overseas Development	£45,000
Nuffield Foundation	£34,000
Department of Scientific and Industrial Research	£18,000
Social Science Research Council	£17,500
Esmée Fairbairn Trust	£10,500

16. In addition to these grants to the Department for work on specific projects, the Department has also received various gifts to its research account, which can be used for a wide range of purposes, not necessarily connected with any specified project. The more important of these gifts have been made in recognition of the fact that some member of the Department's staff had rendered a service to the donor without taking a fee, and the most important use of the fund has been to cover the expenses involved in publishing Occasional Papers, where the Department bears the whole cost, since the Cambridge University Press does the work on commission. The total income of the research account during the six years 1958-64 was over £5,000.

III. RESEARCH ACTIVITIES, 1958-64

17. During the years 1958-64 work has been completed on a dozen projects referred to in the Department's Fourth Report, while twenty-five new projects have been undertaken. In the following paragraphs these projects have been arranged under five heads:

- Econometric Studies.
- Studies in Economic Analysis.
- Studies in Economic History.
- Studies in Industrial Economics.
- Sociological Studies.

Many, if not most, of the projects described below could be placed in another group. However, the classification followed serves to draw attention to the continued increase in research into the actual structure and working of the economy, and the extent of the provision which has been made during the period for sociological research.

(a) Econometric Studies

The Analysis of Family Budgets

18. During 1958-59 Mr F.G. Forsyth undertook an econometric analysis of some of the family budget material in the Ministry of Labour's 1953-54 Household Expenditure Inquiry, with the object of testing the hypothesis that equivalent adult scales can satisfactorily describe the observed differences between the expenditure of households with the same income but different family composition. The results of this study, leading to the conclusion that the models so far constructed provided only a rough approximation to observed patterns of family expenditure, are contained in a paper entitled 'The Relationship between Family Size and Family Expenditure' (*Journal of the Royal Statistical Society* (Series A), vol. cxxiii, part 4, 1960; Reprint no. 169).

¹ In January 1965, the Ford Foundation promised a further £50,000.

Factors Determining Stock Exchange Prices

19. This project, described in paragraphs 40 and 41 of the Fourth Report, was completed by Mr G.R. Fisher in September 1958. Mr Fisher presented a paper on the project to the European meeting of the Econometric Society in August 1957, and subsequently read two papers summarizing the results of the work to the Research Seminar in Quantitative Economics at the University of Michigan in October 1958 and April 1959.

20. The following articles by Mr Fisher arising out of the inquiry have been published:
- 'Maximum Likelihood Estimators with Heteroscedastic Errors' (*Review of the International Statistical Institute*, vol. xxv, no. 1/3, 1957; Reprint no. 146).
 - 'An Econometric Approach to the Analysis of Stock Exchange Prices' (*Econometrica*, vol. xxvi, 1958).
 - 'Some Factors Influencing Share Prices' (*Economic Journal*, vol. lxxi, no. 281, 1961; Reprint no. 175).
 - 'Iterative Solutions and Heteroscedasticity in Regression Analysis' (*Review of the International Statistical Institute*, vol. xxx, no. 2, 1962).

Input-Output Tabulation

21. Work on this project, which was undertaken by Dr A. Ghosh, Miss D.C. Paige, and Mr J.M. Bates was completed by Dr Ghosh in 1960. Using a model of the United Kingdom economy based on an input-output table for 1948, values were predicted for 1948-55 and compared with those predicted by other methods of forecasting and with the observed data. The results obtained led to the conclusion that quantitative predictions made by input-output models are superior to those made by simple 'blow-up' methods, and possibly also to those made by regression methods, but that predictions about prices are less accurate than those about quantities. An account of the work was published in a volume by Dr Ghosh entitled *Experiments with Input-Output Models: An Application to the Economy of the United Kingdom, 1948-55* (Cambridge University Press, 1964; Department Monograph no. 9).

The Dynamics of Consumer Demand

22. This project was undertaken during 1957-58 to 1959-60 with the object of developing a theory of consumers' behaviour which takes into account the past and expected future income and composition of the individual household, and the accumulation and decumulation of durable goods and other assets during its normal life cycle. The inquiry was undertaken under Professor Stone's direction by Messrs J.A.C. Brown, J.S. Cramer, A.D. Bain, F.G. Pyatt, J.M. Bates, and M.O.L. Bacharach.

23. The results of the investigation are contained in the following books and papers:
- 'Seasonality and Elasticity of the Demand for Food in Great Britain since Derationing', by J.A.C. Brown (*Journal of Agricultural Economics*, December 1958; Reprint no. 148).
 - 'Trends in the Consumption of Citrus Fruit in the United Kingdom', by J.A.C. Brown and A.D. Bain (*Journal of Agricultural Economics*, vol. xiii, no. 1, 1960; Reprint no. 158).
 - 'A Dynamic Approach to the Theory of Consumer Demand', by J.S. Cramer (*Review of Economic Studies*, vol. xxiv, no. 64, 1957; Reprint no. 130).
 - 'Ownership Elasticities of Durable Consumer Goods', by J.S. Cramer (*Review of Economic Studies*, vol. xxv, no. 67, 1958; Reprint no. 140).
 - 'The Depreciation and Mortality of Motor Cars', by J.S. Cramer (*J.R.S.S.* (Series A), vol. cxxi, part 1, 1958; Reprint no. 145).
 - 'Private Motoring and the Demand for Petrol', by J.S. Cramer (*J.R.S.S.* (Series A), vol. cxxii, part 3, 1959; Reprint no. 159).
 - The Ownership of Major Consumer Durables*, by J.S. Cramer (Cambridge University Press, 1962; Department Monograph no. 7).
 - 'A Dynamic Model of Demand', by Richard Stone (*Przegląd Statystyczny*, vol. vii, no. 3, 1960; Reprint no. 167).
 - 'Models of Consumers' Behaviour and their Application', by Richard Stone and Giovanna Croft-Murray (*Social Accounting and Economic Models*, Bowes and Bowes, London, 1959; ch. iv).

- 'The Market Demand for Durable Goods', by Richard Stone and D.A. Rowe (*Econometrica*, vol. xxv, no. 3, 1957).
- 'Dynamic Demand Functions: Some Econometric Results', by Richard Stone and D.A. Rowe (*Economic Journal*, vol. LXVIII, 1958).
- 'The Durability of Consumers' Durable Goods', by Richard Stone and D.A. Rowe (*Econometrica*, vol. xxviii, no. 2, 1960).
- 'Population Mathematics, Demand Analysis and Investment Planning', by Richard Stone (*Przegląd Statystyczny*, vol. viii, no. 2, 1961; Reprint no. 176).

Empirical Models of Economic Growth

24. Work on this project began in 1960 under Professor Stone's direction with the object of indicating various courses which the British economy could take over the years 1960-70. In addition to Professor Stone, the following have been engaged on the project: Mr J.A.C. Brown, Dr L.J. Slater, Dr Z. Pawlowski, Dr F.G. Pyatt, Mr O.T. Hooker, Mr K.J. Wigley, Mr A.G. Armstrong, Mr M.O.L. Bacharach, Mr J.M. Bates, Mr C.S. Leicester, Mr C.J. Bliss, and Mr R. Lecomber (who was seconded from the National Economic Development Office).

25. The project is built round a mathematical model of the economy with the following three features: First, it has an accounting framework in which every transaction in the economy appears in broad aggregates. This framework takes the form of a social accounting matrix in which the incomings and outgoings, both current and capital, of the various branches of the economy are set out in a system of 253 accounts grouped into fifteen sets or classes.

26. Secondly, it contains numerical estimates of the technological and behavioural relationships which run between production, consumption, and accumulation in Britain and between Britain and the rest of the world.

27. Thirdly, the model is convertible into a computing programme, so that the equations in which the accounting, technological and behavioural relationships are expressed can be solved either simultaneously or iteratively, and solved not once but several times, according to the different assumptions to be examined.

28. The purpose in constructing this model has been to develop a suitable tool for exploring the consequences of different growth rates, and thus to provide a basis for policy discussions both at the national and at the industrial level.

29. Progress reports of the work on the project are being issued in a series, entitled *A Programme for Growth*, of which six numbers have so far been published (see page 29).

30. The following is a list, arranged under headings in approximate order of writing, of the main published and unpublished papers based on the project:

General

- 'An Econometric Model of Growth: The British Economy in Ten Years Time', by Richard Stone (*Discovery*, vol. xxii, no. 5, 1961; Reprint no. 172).
- 'How Fast Can Britain Grow?', by Richard Stone (*The Director*, vol. xiii, no. 11, 1961; Reprint no. 171).
- 'A Long-term Growth Model for the British Economy', by Richard Stone and J.A.C. Brown (in *Europe's Future in Figures*, North-Holland Publishing Co., Amsterdam, 1962; Reprint no. 190).
- 'A Demonstration Model for Economic Growth', by Richard Stone (*The Manchester School*, vol. xxx, no. 1, 1962; Reprint no. 182).
- 'Behavioural and Technical Change in Economic Models', by Richard Stone and Alan Brown (to be published by the International Economic Association).
- A Computable Model of Economic Growth* (no. 1 in *A Programme for Growth*, Chapman and Hall, London, 1962).
- 'Three Models of Economic Growth', by Richard Stone (in *Logic, Methodology and Philosophy of Science*, Stanford University Press, 1962; Reprint no. 194).
- 'Models of the National Economy for Planning Purposes', by Richard Stone (*Operational Research Quarterly*, vol. xiv, no. 1, 1963; Reprint no. 200).

- 'Transitional Planning: The Adaptation of the Economy to a Higher Rate of Growth', by Richard Stone (to be published in a volume of essays in honour of Professor O. Lange).
- 'Consistent Projections in Multi-Sector Models', by Richard Stone (to be published by the International Economic Association).
- 'Computational Analogue of Economic Growth', by Richard Stone (*ABTOMATNIKA* (Kiev), no. 5, 1963).
- 'Possible Worlds', by Richard Stone (*The Investment Analyst*, no. 6, 1963; Reprint no. 209).
- 'Computer Models of the Economy', by Richard Stone (*New Scientist*, vol. xxi, no. 381, 1964).
- 'A Framework for Economic Decisions', by Richard Stone (*Moorgate and Wall Street*, Spring 1964; Reprint no. 222).
- The Model in its Environment: A Progress Report* (no. 5 in *A Programme for Growth*, Chapman and Hall, London, 1964).
- 'The Methodology of Planning Models: A Preliminary Survey', by Richard Stone and Colin Leicester (to be published by the National Bureau of Economic Research in a conference volume).

The Accounting Framework

- 'Multiple Classifications in Social Accounting', by Richard Stone (*Bulletin de L'Institut International de Statistique*, vol. xxxix, no. 3, 1962; Reprint no. 220).
- A Social Accounting Matrix for 1960* (no. 2 in *A Programme for Growth*, Chapman and Hall, London, 1962).

Demand Relationships

- 'A Post-War Expenditure Function', by Richard Stone and D.A. Rowe (*The Manchester School*, vol. xxx, no. 2, 1962; Reprint no. 188).
- 'Private Saving in Britain: Past, Present and Future', by Richard Stone (*The Manchester School*, vol. xxxii, no. 2, 1964; Reprint no. 224).
- 'Demand Analysis and Projections for Britain, 1900-1970: A Study in Method', by Richard Stone, Alan Brown and D.A. Rowe (in *Europe's Future Consumption*, North-Holland Publishing Co., Amsterdam, 1964; Reprint no. 212).
- 'Models for Demand Projections', by Richard Stone (to be published in a volume in honour of Professor P.C. Mahalanobis).
- 'The Changing Pattern of Consumption', by Richard Stone (to be published in a volume in honour of Professor M. Kalecki).
- 'Output and Investment for Exponential Growth in Consumption', by Richard Stone and J.A.C. Brown (*Review of Economic Studies*, vol. xxix, no. 80, 1962; Reprint no. 192).

Supply Relationships

- 'Input-Output Problems in Relation to Projections and Programming', by John Bates (in *Input-Output Tables, their Compilation and Use*, Hungarian Academy of Sciences, Budapest, 1962; Reprint no. 205).
- Input-Output Relationships, 1954-1966* (no. 3 in *A Programme for Growth*, Chapman and Hall, London, 1963).
- 'A Measure of Capital', by Graham Pyatt (*Review of Economic Studies*, vol. xxx, no. 3, 1963; Reprint no. 208).
- 'A Production Functional', by Graham Pyatt (European Conference of the Econometric Society, 1963; mimeographed).
- Capital, Output and Employment, 1948-1960* (no. 4 in *A Programme for Growth*, Chapman and Hall, London, 1964).
- 'A Production Functional Model', by Graham Pyatt (in *Econometric Analysis for National Economic Planning*, Butterworths, London, 1964; Reprint no. 234).

Manpower

- 'Output, Manpower and Industrial Skills in the United Kingdom, 1948-1970' (O.E.C.D. Conference, 1963; mimeographed. To be published).

Computing Problems

- 'A Programme for Economic Growth', by Richard Stone and Alan Brown (*Data Processing*, vol. v, no. 2, 1963; Reprint no. 197).
'A Dynamic Programming Process', by L.J. Slater (*The Computer Journal*, vol. vii, no. 1, 1964; Reprint no. 226).

Results

- Economic Growth and Manpower*, by Richard Stone, Alan Brown, Graham Pyatt, and Colin Leicester (British Association for Commercial and Industrial Education, London, 1963).
'British Economic Balances in 1970: A Trial Run on Rocket', by Richard Stone (in *Econometric Analysis for National Economic Planning*, Butterworths, London, 1964; Reprint no. 229).
Exploring 1970: Some Numerical Results (no. 6 in *A Programme for Growth*, Chapman and Hall, London, 1965).

Financial Aspects of British Economic Growth

31. The object of this project, which began in October 1963, is to add a study of the financial problems involved in British economic growth to the above work on Empirical Models of Economic Growth.

32. Work on the project will be spread over three or four years and will proceed in three stages: (a) an accounting statement of financial flows and stocks in the base years; (b) an analysis of the trends in financial relationships into the future; and (c) a projection of financial flows and stocks into the future obtained by combining the results of stages (a) and (b) with the projections of real flows and stocks worked out in the parent project.

33. During the first year, when it was not possible to engage academic staff for the project, the work concentrated on a survey of the holders of ordinary shares, analysing the shareholders of a sample of 180 companies quoted on the London Stock Exchange in order to determine the pattern of holders at the end of 1962 and 1963 and the extent of transactions during 1963. The results, now being compiled, will be published during the summer of 1965.

34. The major task during the current year is to compile a complete set of financial accounts for the year 1963, comprising opening and closing balance sheets, flow-of-funds tables, and tables showing the revaluations of assets and liabilities.

35. The eventual aim is to project probable financial relationships in the year 1970 and to consider the implications for the different types of financial institution.

36. The research staff working under Professor Stone on the project are Messrs J.R.S. Revell, D.R. Gray, M. St J. Wright (seconded for two years from the Bank of England), J.P. Moyle, and F.E. Townson. The following papers have been published: 'Insurance Company Investments', by J.R.S. Revell (*The Policy Holder*, January 1964), and 'Private Saving in Britain, Past, Present and Future', by Richard Stone (*The Manchester School*, vol. xxxii, no. 2, 1964; Reprint no. 224).

(b) Studies in Economic Analysis

Capital, Employment, and Output

37. This project was begun in October 1956 with the object of obtaining a satisfactory measure of changes in industrial efficiency which would take account of changes in the quantity of both labour and capital. The method adopted was to find the rise in output at 1948 prices, first in the case of industry groups and later industries, and to attempt to discover how much would be needed to remunerate extra labour and extra capital, and how much represents net technological progress.

38. The work was undertaken by Miss M.C. Vidakovic and Mr A.D. Smith, under Mr Reddaway's direction. Miss Vidakovic, however, left the Department in September 1958, and the following September Mr Smith left to join the International Labour Office, at first temporarily and later on a permanent basis. In view of the Department's difficult financial position in 1960-61, and the possibility of an overlap with work on models of economic growth, it was decided not to replace him on the project.

39. The results for the fourteen industrial orders of the standard industrial classification were published in a paper by Mr Reddaway and Mr Smith entitled 'Progress in British Manufacturing Industries in the Period 1948-54' (*Economic Journal*, vol. LXX, no. 277, 1960; Reprint no. 157). Some unpublished material is available on the work undertaken to produce corresponding figures for about thirty specific trades, and to explain the varying rates of progress in different industries and the varying proportions in which the fruits of progress were shared among consumers, workers and the providers of capital.

British Export Performance

40. This research was carried out by Dr S.J. Wells during 1958-61. Interim results were given in a paper by Dr Wells entitled 'U.K. Export Performance: A Comparative Analysis' (*London and Cambridge Economic Bulletin*, no. 30, June 1959; Reprint no. 152), and the final results in *British Export Performance: A Comparative Study* (Cambridge University Press, 1964). In this book Dr Wells analyses, on a commodity and country market basis, the decline in Britain's share of world trade in manufactures which took place between 1953 and 1959. Domestic economic conditions and policies in the U.K., and their effect on export performance, are compared with those in Germany, France, Japan, and Italy. Detailed case studies of certain industries—motor vehicles, electrical engineering, pharmaceuticals, hosiery, and pottery—illustrate various aspects of the U.K. export problem. Dr Wells' conclusions emphasize the importance of growth policies and the need for an alternative to 'stop-go' policies, such as a flexible exchange rate.

Forward Business Orders

41. This inquiry, which began in 1956, investigated some of the economic implications of the placing of forward orders by distributors and by manufacturers (for their components) and of the booking of forward orders by manufacturers. Its purpose was to obtain information about the normal business practices in this respect of a number of industries, and to examine the role of orders and other factors (including stocks) in business decisions. The study was carried out by Dr M. Wray and Mr T.A.B. Corley both of whom left the Department in September 1958.

42. The following papers were published as a result of the project:

- 'Seasonal Demand and Uncertainty in Consumer Goods Industries: Some Case Study Data', by Margaret Wray (*Journal of Industrial Economics*, vol. vii, no. 1, 1958; Reprint no. 148).
'Professor Shackle's Theory and Short Period Entrepreneurial Decisions in the Women's Clothing Industry', by Margaret Wray (*Metroeconomica*, vol. xi, nos. 1-2).
'How Do Businessmen Plan Production? A Case Study of the Radio and Television Industry, 1951-60', by T.A.B. Corley (*Journal of Industrial Economics*, vol. x, no. 2, 1962; Reprint no. 187).

A Study of National Capital

43. This project started in 1957 with the object of estimating an annual series of sector balance sheets for the years 1957-61. A monograph giving the results of the study is nearly ready for the press. Balance sheets will be provided for the conventional sectors used in national income accounting as well as for five further sectors of financial institutions. Assets and liabilities, distinguished under a large number of categories, will be carried into the balance sheets at current market value or the nearest possible approach to this valuation.

44. The tasks involved in this work were of two kinds: first, obtaining balance sheet information for those sectors lacking regular statistical series for the whole or part of the period, and secondly, adjusting to market values items reported in the balance sheets of different types of economic units. Among tasks of the first kind were sample studies of the balance sheets of charities, unquoted companies, and other companies not covered by the regular Board of Trade statistics, as well as many sample studies designed to provide more detailed information for various sectors than official statistics provide. Under this heading the problem of using estate duty statistics for building up balance sheets of the personal sector has received a great deal of attention. Under the second heading the major tasks have concerned the valuation of land and buildings and the translation into market values of the book values available for the security holdings of insurance

companies and some other financial institutions. Studies were also undertaken, from the registers of the issuing bodies, of the distributions of the holders of different types of securities.

45. The staff working on the project were Mr J.R.S. Revell, Mr G.C. Hockley, Mr J.P. Moyle, and Mr F.E. Townson.

46. The following papers have been published:

'Who Owns Ordinary Share Capital?', by C.H. Feinstein and J.R.S. Revell (*The Times*, 23 March 1960).

'A Survey of the Holders of Local Authority Debt', by J.R.S. Revell and G.C. Hockley (*Local Government Finance*, vol. LXIV, nos. 7 and 12, 1960; Reprint no. 166).

'Trustee Holdings of Gilt-Edged Stocks', by J.R.S. Revell (*The Times*, 11 July 1961).

'Investments of Building Societies', by G.C. Hockley (*The Building Societies Gazette*, September 1961; Reprint no. 184).

'Assets and Age', by J.R.S. Revell (*Bulletin of the Oxford Institute of Statistics*, vol. xxiv, no. 3, 1962; Reprint no. 201).

'The Holders of Building Society Shares and Deposits', by J.R.S. Revell (*Building Societies Gazette*, March 1963).

Asset Portfolios

47. This project, which is being undertaken by Dr M.R. Fisher with assistance from the Department, is an attempt to test simple theories of decision-making under uncertainty against observed movements in the principal categories of assets held by British investment trusts over the period 1950-61. It is hoped to publish the results of this study in an Occasional Paper.

Take-over Bids in the British Economy

48. This project, which began in 1962, is being undertaken by Mr R.L. Marris and Mr A. Singh. It is a systematic study of take-overs, and take-over bids, for public quoted companies in the U.K. during 1948-61, with the object of developing and testing a theory to explain take-overs in terms of the economic and financial characteristics of the firms concerned. The work is based on the standardized accounting data for quoted public companies during 1948-61 made available by the Board of Trade.

49. It is hoped to publish the results of the inquiry in an Occasional Paper. The following papers have been written in connexion with the work: 'A Measure of a Firm's Average Share Price', by R.L. Marris and A. Singh (to be published in *Journal of the Royal Statistical Society*, Series A); and 'Preliminary Notes on a Theory of Take-Over Bids', by A. Singh (available in mimeographed form).

Determinants of Rates of Return on Capital, 1950-60

50. Mr R.L. Marris and Mr A. Singh began work on this project in 1964. It is an investigation into the rates of return on capital, dividend retention policies, and related aspects of the public companies in the United Kingdom. The results of the work are likely to be of great interest for their implications in connexion with the National Incomes Policy, and for the light they will throw on various problems in the general area of the theory of the firm. In the latter field it is intended to test directly the assumptions and predictions of the theory of the firm contained in Mr R.L. Marris's *Economic Theory of 'Managerial' Capitalism* (Macmillan, 1964). Variables from the data obtained for the study of take-over bids will also be used in this research.

51. It is proposed to publish the results of this investigation in the form of journal articles. A paper on 'Incomes Policy and the Rate of Profit in Industry' which Mr Marris presented to the Manchester Statistical Society in December 1964 is to be published in the Society's *Proceedings*.

The Growth of Public Companies and its Finance

52. This project began in 1962 and is being carried out by Dr J.K.S. Ghandhi and Mr G. Whittington. It aims to systematize and analyse the accounts of all public companies quoted on a U.K. stock exchange during the period 1949-61 which are engaged in manufacture or trading.

Shipping, property, and agricultural companies, those engaged primarily in overseas trading, and financial institutions, are excluded. The work is an extension of an earlier study undertaken by Tew and Henderson at the National Institute of Economic and Social Research, and utilizes in addition the data subsequently collected by the Board of Trade.

53. The main object of the research is to examine, over a wide range of industries and over a long period, whether, and, if so, how, the financial structure of firms is related to economic performance. The highly disaggregated data provide an opportunity to study other problems, such as the varying impact of policies on different industries and different types of firms. At a later stage it is hoped to study, for a sample of firms, the effect of different types of control of the firm. Unfortunately, the large amount of data processing required has been delayed by a series of setbacks and machine failures in connexion with the new TITAN computer.

The Economics of Car Parking

54. Work on this project was carried out during 1960-64 by Mr G.J. Roth with the assistance of a Committee on which the Department of Land Economy were represented. The object of the inquiry was to estimate the demand for parking space and the cost of providing it.

55. Information was obtained from local authorities and commercial operators and by surveys in Cambridge, Luton, and Liverpool. The results of the work are to be published shortly in an Occasional Paper, *Parking Space for Cars—Assessing the Demand*. A number of papers were prepared by Mr Roth for the Smeed Committee on Road Pricing, of which he was a member. The following articles have also been published in connexion with the inquiry:

'A Pricing System for Road Space in Town Centres', by G.J. Roth (*Journal of the Town Planning Institute*, November 1961).

'Restraint of Traffic in Congested Areas', by M.E. Beesley and G.J. Roth (*Town Planning Review*, vol. xxxiii, no. 3, 1962; Reprint no. 195).

'Road Pricing: A Cure for Congestion?', by G.J. Roth and J.M. Thomson (*Aspect*, no. 3, 1963; Reprint no. 204).

'The Application of Some Economic Concepts to the Study of Urban Traffic Congestion', by G.J. Roth (presented to the Second International Symposium on the Theory of Road Traffic Flow, London, 1963).

'The Relief of Traffic Congestion by Parking Restrictions', by G.J. Roth and J.M. Thomson (*Town Planning Review*, vol. xxxiv, no. 3, 1963; Reprint no. 218).

'The Equilibrium of Traffic on Congested Streets', by G.J. Roth (*Review of the International Statistical Institute*, vol. xxxi, no. 3, 1963; Reprint no. 232).

The Economics of Developing Countries

56. 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. Mr E. Bennathan and Mr A.R. Jolly were appointed to research posts in the Department in connexion with this arrangement from October 1964, and the latter was immediately seconded to work for eighteen months as Adviser on Manpower Planning for the Government of Zambia. It is hoped to make a third appointment in 1965.

Current Economic Assessments

57. Assessments of the current economic position continued to be published quarterly during 1958-64, with the co-operation of *The Times*, in the *London and Cambridge Economic Bulletin*, which is edited by Mr Reddaway. The statistical and computing work for these assessments was done in the Department, which also provided secretarial assistance for the L.C.E.S. Dr C.H. Feinstein was statistician to the Service from 1959 until June 1962, since when he has been Assistant Editor. The position of statistician has since been filled by two other members of the Department's research staff, first by Mr G.J. Mungeam, and, from December 1963, by Miss T. Seward.

58. Dr Feinstein and Miss Seward were mainly responsible for the supplementary publication produced by the London and Cambridge Economic Service of which a first edition, *Key Statistics of the British Economy* (covering 1900–1962), was published by The Times Publishing Co. Limited, in 1963. A revised and enlarged edition, *The British Economy: Key Statistics 1900–1964*, appeared in 1965.

(c) *Studies in Economic History*

Domestic Capital Formation in the United Kingdom, 1920–38

59. This work has now been completed, and a volume will be published in 1965 containing annual estimates of capital formation, capital stock and depreciation for each sector of the economy, with separate details for each type of asset. In addition to a full description of the sources and methods of estimation there is a brief summary of findings and a comparison with previous estimates.

60. Work on the project was begun in 1950 by Dr K. Maywald; he was assisted by Mr J.J.C. McGibbon until 1956 and also by the late Mr Arthur Adams. In 1959 the work of revising the estimates and preparing a final version of the text for publication was taken over by Dr C.H. Feinstein.

61. Articles covering preliminary aspects of the work were published by Dr Maywald as follows:

- 'An Index of Building Costs in the United Kingdom, 1845–1938' (*Economic History Review*, vol. vii, no. 2, 1954; Reprint no. 91).
- 'The Construction Costs and Value of the British Merchant Fleet, 1850–1938' (*Scottish Journal of Political Economy*, vol. iii, no. 1, 1956; Reprint no. 115).
- 'Fire Insurance and the Capital Coefficient in Great Britain, 1866–1952' (*Economic History Review*, vol. ix, no. 1, 1956; Reprint no. 122).
- 'Domestic Capital Formation in the United Kingdom' (*London and Cambridge Economic Bulletin*, no. 34, 1960; Reprint no. 165).

62. The final, and completely revised, work will be published as *Domestic Capital Formation in the United Kingdom, 1920–1938* by Charles Feinstein (Cambridge University Press, 1965).

Long-term Economic Growth in the United Kingdom

63. This inquiry into long-term trends in the national income and its major components was started in 1954–55. It was one of a series of similar studies for selected countries sponsored by the Committee on Economic Growth of the Social Science Research Council under the inspiration of Professor Simon Kuznets. A conference of research workers concerned in some of the associated European inquiries (from France, Germany, Holland, Norway, Sweden, and Denmark as well as the United Kingdom) was held at the Department in July 1957, with Professor Kuznets in the Chair; and another meeting was held at Portoroz in Yugoslavia in the course of the 1959 meeting of the International Association for Research in Income and Wealth.

64. The results of the Department's inquiry are contained in the following publications:
- British Economic Growth, 1688–1959*, by Phyllis Deane and W.A. Cole (Cambridge University Press, 1962; Department Monograph no. 8).
 - Abstract of British Historical Statistics*, by B.R. Mitchell and Phyllis Deane (Cambridge University Press, 1962).
 - 'The Implications of Early National Income Estimates for the Measurement of Long-term Economic Growth in the United Kingdom', by Phyllis Deane (*Economic Development and Cultural Change*, vol. iv, no. 1, 1955; Reprint no. 109).
 - 'Contemporary Estimates of National Income in the First Half of the Nineteenth Century', by Phyllis Deane (*Economic History Review*, vol. viii, no. 3, 1956; Reprint no. 119).
 - 'The Industrial Revolution and Economic Growth: The Evidence of Early British National Income Estimates', by Phyllis Deane (*Economic Development and Cultural Change*, vol. v, no. 2, 1957; Reprint no. 128).
 - 'The Output of the British Woolen Industry in the Eighteenth Century', by Phyllis Deane (*Journal of Economic History*, June 1957; Reprint no. 133).

'Contemporary Estimates of National Income in the Second Half of the Nineteenth Century', by Phyllis Deane (*Economic History Review*, vol. ix, no. 3, 1957).

'Trends in Eighteenth-Century Smuggling', by W.A. Cole (*Economic History Review*, vol. x, no. 3, 1958; Reprint no. 143).

'The Measurement of Industrial Growth', by W.A. Cole (*Economic History Review*, vol. xi, no. 2, 1958; Reprint no. 151).

Capital Formation and the Stock of Assets in Britain, 1830–1960

65. This inquiry is a continuation of the study of long-term growth (see previous paragraph), with the object of exploring in greater depth the relationship between capital formation and economic growth in the United Kingdom. Miss P.M. Deane and Dr B.R. Mitchell began work on the inquiry while the monograph and abstract from the earlier study were going through the press, but it was not until 1962 that the project was effectively launched. Dr C.H. Feinstein, whose prior capital formation estimates constitute a major part of the basic material, took part for the first year of full operation; and Miss Thelma Seward, who joined the Department's research staff in autumn 1962, was also working on the inquiry at that stage. At present (spring 1965) the team consists of Miss B.A. Mercer, Dr Mitchell, and Mr M.P. Ward with Miss Deane in general charge of the project, and is assisted by an advisory committee including Professor E.A.G. Robinson, Dr C.H. Feinstein, and Mr D.G. Champernowne.

66. The following two preliminary articles have been published:

- 'Capital Formation in Britain before the Railway Age', by Phyllis Deane (*Economic Development and Cultural Change*, vol. ix, no. 3, 1961; Reprint no. 185).
- 'The Coming of the Railway and United Kingdom Economic Growth', by B.R. Mitchell (*Journal of Economic History*, vol. xxiv, no. 3, 1964; Reprint no. 228).

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

67. This is part of an international study of the economic growth of selected countries, designed to examine the post-war performance of each country in the light of its historical experience. The work is sponsored by the Social Science Research Council of New York, and the other countries participating are France, Germany, Italy, Japan, Sweden, and the United States of America. The separate studies are co-ordinated by means of a series of meetings of all participants, and as far as possible a broadly similar approach will be adopted for each inquiry. The framework is a statistical analysis of output in post-war and earlier periods, related to the inputs of labour, capital and other factors. Hypotheses to explain the trends and fluctuations in demand, output, and productivity, will then be explored in detail.

68. The British inquiry is being undertaken by Mr R.C.O. Matthews and Dr C.H. Feinstein with the assistance of Mr J.C. Odling-Smee. Work was begun in the autumn of 1963 and some preliminary results are given in a paper by Mr Matthews entitled 'Some Aspects of Post-War Growth in the British Economy in relation to Historical Experience'. This will be published in 1965 in the *Proceedings* of the Manchester Statistical Society.

National Income, Expenditure, and Output of the United Kingdom, 1860–1960

69. This will be the final volume in the series of Studies in the National Income and Expenditure of the United Kingdom. It is intended to complete and pull together the work in earlier volumes in the series and that done by other national income statisticians in a form consistent with the estimates currently prepared by the Central Statistical Office. It will thus provide a consistent and comprehensive set of national accounts covering the period since 1860. The work is being undertaken by Dr C.H. Feinstein. The main estimates are now complete and some preliminary results have been published in the following papers by Dr Feinstein:

- 'Income and Investment in the United Kingdom, 1856–1914' (*Economic Journal*, vol. lxxi, no. 282, 1961; Reprint no. 179).
- 'Production and Productivity in the United Kingdom, 1920–1962' (*London and Cambridge Economic Bulletin*, December 1963; Reprint no. 215).
- 'National Income and Expenditure, 1870–1963' (*London and Cambridge Economic Bulletin*, June 1964; Reprint no. 225).

Vertical Integration in British Industry

70. During 1958–59 Dr P.L. Cook investigated the causes and implications of vertical integration in industry, making a detailed study of the salt industry in which marketing outlets are particularly important and where the relationship between marketing and structure is complex and mainly determines the industry's development. It is hoped to publish the results of this study in a volume by Dr Cook. During 1960 she undertook a similar study of the blanket industry, and published the results in an article entitled 'Orderly Marketing or Competition? The Blanket Manufacturers' Agreement' (*Economic Journal*, vol. LXXI, no. 283, 1961; Reprint no. 178).

The Utilization of Industrial Capacity

71. Dr P.L. Cook and Mr G.J. Mungeam worked on this subject during 1960–63 following the study of vertical integration (see previous paragraph). A detailed study was made of the brick industry where the difficulties and consequences of fluctuations in the level of utilization are clearly and neatly demonstrated. It is hoped to publish a volume by Dr Cook based on this study.

The Contraction of Railway Workshops

72. This was a study by Dr P.L. Cook of the plan, announced by British Railways in 1962, for the contraction and reorganization of their main workshops, involving a substantial reduction in their staff and the closure of several large workshops. Special facilities were given to Dr Cook by the Railways Board to enable her to investigate the factors underlying the decision and the problems which were involved. The results of this unique opportunity to study a major industrial reorganization while it was taking place were published in *Railway Workshops: The Problems of Contraction* by P. Lesley Cook (Cambridge University Press, 1964; Department Occasional Paper no. 2). A related study by Mrs D.E. Wedderburn of the social consequences for the men employed in the railway workshops is described in paragraph 84 below.

Economies of Large-scale Production

73. This research began in March 1961 and is still continuing. It is under the general direction of Mr A. Silberston but both Professor Robinson and Mr Reddaway have taken a keen interest in the work. Mr R.M. Dean worked with Mr Silberston on the project until December 1962, when he left the Department, and he was succeeded in July 1963 by Mr C.F. Pratten. The first results of this research, based on case studies, of the steel industry, oil refining, footwear manufacture, and book printing, are being published in 1965 in an Occasional Paper by Pratten and Dean entitled *Economies of Large-Scale Production in British Industry: An Introductory Study*. Research is now being undertaken on a further group of industries. It is hoped eventually to publish a comprehensive volume bringing together studies of economies of scale made by various authors, and discussing how far the research gives rise to generalizations about the scope for economies of large-scale production in British industry.

Productivity in the Coal Industry

74. During 1958 and 1959 Mr M.J. Farrell, with the assistance for a short period of Mr A.R. Jolly, undertook an analysis of a large body of statistical information on Hollerith cards made available by the National Coal Board. This consisted of observations on some fifty variables for each of 818 collieries in 1955. A first analysis of the data has been published in an article by Farrell and Jolly entitled 'The Structure of the British Coal Mining Industry in 1955' (*Journal of Industrial Economics*, vol. II, no. 3, 1963; Reprint no. 207). Much of the information was transferred to tape and analysed by multiple regression methods. This analysis, involving the number of observations mentioned above and regression equations with up to twenty predetermined variables, was performed with the help of Dr L.J. Slater on EDSAC II, for the use of which we are indebted to the Cambridge University Mathematical Laboratory. It is hoped to publish the results of this analysis as soon as the final computations can be performed on TITAN.

A by-product of the project was a paper by M.J. Farrell and M. Fieldhouse entitled 'Estimating Efficient Production Functions under Increasing Returns to Scale' (*Journal of the Royal Statistical Society, Series A*, vol. CXXV, part 2, 1962; Reprint no. 191).

Economic Aspects of the British Patent System

75. This investigation, begun in 1961, is being carried out by Mr K.H. Boehm, under the general supervision of Mr A. Silberston. Its results are to appear in two volumes. The first, which it is hoped to publish in 1965, will be a study of the history, law, and administration of the British patent system. This has involved preparing, from Patent Office sources, patent statistics by industry since 1931, and should prove a valuable addition to existing information about the patent system. The second volume will include a study of the working of the patent system in four selected British industries—chemicals, pharmaceuticals, electronics and petroleum—an analysis of the relationship between patents activity and other economic indicators, and a study of the effects of the patent system on the economy as a whole.

Service Industries

76. This investigation into post-war trends in capital, employment, output, and productivity in the service industries began in October 1964, and is being undertaken by Mr B.M. Deakin and Mr K.D. George under the direction of Mr W.B. Reddaway. The main results of the first stage, productivity trends in service industries as a whole compared with those in the 'goods' sector, appear 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). More detailed research is now going on into productivity trends in transport and communications, and in the distributive trades.

The Investment Policies of Nationalized Industries

77. Work on this project began in October 1964. It is being undertaken by Mr Richard Pryke under the general direction of Mr Michael Posner. With the help of several publicly owned undertakings a survey is being made of the methods by which they arrive at their investment decisions. The survey covers the criteria by which individual investment projects are assessed and the way in which the size and financing of the overall investment programmes are determined. Background material for the study is being obtained by a careful examination of the evidence which the Select Committee on Nationalized Industries has published.

(e) *Sociological Studies*

The Economic Circumstances of Old People

78. The objects of this study were described in paragraphs 35 and 36 of the Fourth Report. During 1958–64 work on the project has been undertaken by Mrs Dorothy Cole Wedderburn and Mr J.E.G. Utting, with assistance from Miss M. Pearse and Mrs J.C. Craig. The pilot inquiry in Bedfordshire and Greenwich was completed and a report submitted in June 1958. During the second half of 1959 and the first half of 1960 interviews were conducted with a random sample of over 1,300 individuals over retirement age in Hexham R.D., Seaton Valley, Salisbury, East Ham, Wimbledon, Leicester, and Glasgow.

79. An interim report was published in January 1962, *The Economic Circumstances of Old People*: Dorothy Cole with John Utting (Codicote Press, Welwyn). Other papers containing results of the inquiry have been published as follows:

'Economic Aspects of Ageing', by Dorothy Cole Wedderburn (*International Social Science Journal*, vol. xv, no. 3, 1963; Reprint no. 233).

'Financial Resources Available to Older People: Lessons for Social Policy', by Dorothy Wedderburn (paper read to the Sixth International Congress of Gerontology in 1963 and published in *Age with a Future*, Munksgaard, Copenhagen, 1964).

'Pension Problems', by Dorothy Wedderburn (*London and Cambridge Economic Bulletin*, no. 49, 1964; Reprint no. 219).

'Poverty in Britain Today—The Evidence', by Dorothy Wedderburn (*Sociological Review*, vol. x, no. 3, 1962; Reprint no. 196).

'Financial Provision for the Aged', by Dorothy Wedderburn (to be published in *Trends in Social Welfare*, Pergamon Press).

80. The main report on the study has been delayed by the prolonged failure of outside contractors to complete tabulations, but is expected to be published in 1966, probably incorporating some more recent work done by Dorothy Wedderburn. In 1961 she became co-director, with Professor Peter Townsend of the University of Essex, of the British contribution to a cross-national study of ageing in three countries (U.S.A., Britain, and Denmark). This was financed by the National Institute of Mental Health of the Public Health Service of the United States. Dorothy Wedderburn is joint author of, and has contributed the financial section to, the first national report on this inquiry which is to be published in 1965 as *The Aged in the Welfare State*, by the Codicote Press, Welwyn.

Survey of Graduate Employment, 1961-63

81. This inquiry, which was undertaken by Mrs J.C. Craig for the Cambridge University Appointments Board, was carried out at the Department under the general direction of Mr J.E.G. Utting. The object of the survey was to obtain information about the careers of Cambridge graduates who had left the University some years before. A postal questionnaire was sent out in the summer of 1961 to 4,200 men and women graduates of 1952 and 1953. Completed questionnaires were returned by 3,125 graduates and the findings of the survey were published in a book by Mrs Craig entitled, *The Employment of Cambridge Graduates* (Cambridge University Press, 1963).

Adaptation of Engineering Graduates to Industry

82. This project, on which Mr F. Bechhofer began work in 1964, follows a thesis on which he was engaged in 1960 under the general direction of the Engineering Department of Industrial Management. Its aims are, first, to describe and examine the changes in the attitudes of a sample of young engineering graduates to their work, to the engineering profession, and to their University and post-graduate training; secondly, to determine the effects of differing technological and industrial environments on these attitudes; thirdly, to relate certain internal differentiations in the sample to their changing attitudes; and, fourthly, to investigate the extent to which these differences result from adaptation or from role selection. Questionnaires and a programme of interviews have resulted in a considerable body of data, which is now being analysed. It is hoped to bring the project to a successful conclusion in 1965 or 1966.

White-collar Redundancy

83. This was a study by Mrs Dorothy Wedderburn of the social and economic repercussions of redundancy, following the cancellation of a government missile contract, in the new town of Stevenage. Interviews were conducted in the winter of 1962 with a random sample of 120 of the dismissed men. The report was published as *White-collar Redundancy—A Case Study* by Dorothy Wedderburn (Cambridge University Press, 1964; Department Occasional Paper no. 1).

The Effects of Redundancy in Railway Workshops

84. As a follow-up to the white-collar study a more ambitious inquiry began in 1963 into the economic and social consequences, for the men employed, of the closure of British Railway workshops. In this we had the active support of the British Railways Board who made a grant towards the cost of the study. Two workshops were selected for study, one in Darlington, the other at Gorton, Manchester. The inquiry was designed to discover the impact of the closure upon a stable workforce, consisting of skilled men with long service with the railways, and with older men predominating. The fieldwork of interviews with a random sample of 200 men of each workshop were carried out in 1963 and 1964 by Mrs Dorothy Wedderburn, Mrs J.C. Craig, Mr Peter Jenner, and a small team of interviewers. They investigated how long it took the men to find other work, what sort of jobs they found, and how well they adjusted to them. The inquiry also studied the hardships suffered and the extent to which the financial provisions made by the British Railways Board for handling the redundancy went towards mitigating such hardship. The final report, *Redundancy and the Railwaymen*, by Dorothy Wedderburn, will be published in 1965 as an Occasional Paper. (A study by Dr P.L. Cook of the industrial aspects of the contraction of the railway workshop is referred to in paragraph 72 above.)

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

85. Mr J.H. Goldthorpe and Dr D. Lockwood are directing this project, which began in 1962. Miss J. Platt and Mr M. Rose have worked on the project; Mr F. Bechhofer is now working on it. Its main aim is to test the proposition that the 'affluent' manual worker in Britain is becoming 'middle-class'. Two hundred and fifty manual workers, all married men between the ages of twenty-one and forty-five and earning relatively high incomes, have been interviewed at their place of work in three Luton factories with different types of production systems. Most of them, as well as fifty-three white-collar workers from two of these factories, have also been interviewed at their homes. These interviews have produced data on the relationship between workers and their jobs as determined by the production system; the structure of social relationships between workers and supervisory staffs; norms and attitudes to work; leisure time activities, conjugal roles, kinship and community affiliations, social and economic aspirations, and political attitudes; and data on income, savings and possessions. Analysis of this data should throw light on two alternative explanations of the class position of 'affluent' workers—that they are being assimilated into a traditional middle-class; or that they and lower white-collar workers are converging towards a new style of life, neither traditionally working class nor traditionally middle-class.

86. A seminar on 'Attitudes and Behaviour of Assembly Line Workers', based on the first results of this analysis, was given by Mr Goldthorpe in December 1964. Mr Goldthorpe and Dr Lockwood have published two articles arising from the project—'Not so Bourgeois After All' (*New Society*, vol. 1, no. 3) and 'Affluence and the British Class Structure' (*Sociological Review*, vol. xi, no. 2, July 1963; Reprint no. 213).

The Causes of Small Strikes

87. This study began in 1962 at Leeds University. It was transferred to the Department on Professor H.A. Turner's appointment to the Montague Burton Chair of Industrial Relations at Cambridge in 1964. Throughout this period Dr Garfield Clack has been working with Professor Turner on the project.

88. In the first instance the study has been based on systematic analysis of the Ministry of Labour's records of industrial disputes. It was then decided to concentrate on one of the industrial sectors where the increased frequency of small disputes has been most marked. In view of previous work by Professor Turner (together with Mr John Bescoby, now of Newcastle University) in this area, the motor vehicle industry was chosen. Dr Clack has carried out a programme of interviews with managements and trade union representatives, and has also worked as a 'participant observer' in several motor and engineering factories. This part of the research is now at the writing-up stage.

Demarcation Rules and Related Practices

89. The objective of this investigation, which began in 1964, is a survey and analysis of union rules, collective agreements, and industrial conventions defining the allocation of work between workers of different skills or different degrees of skill. It is being carried out by Mr G. Roberts under the direction of Professor H.A. Turner.

Conditions of Employment of Manual and Non-manual Workers

90. This is a study of the differences which exist in British industry in the terms and conditions of employment of manual and non-manual workers. The object is to build up a picture of the differences in the total economic situation of different strata of employees. This will cover differences in income and job security, fringe benefits, etc., together with any status differentiation enforced in the work environment (lavatories, canteens, etc.). It is hoped to relate this information to current discussions about changes in the class situation of different groups of workers as well as to the attitudes both of management and of workers to the maintenance or narrowing of differentials of this kind. It is intended to conduct a large-scale postal inquiry among a random sample of some 3,000 firms to collect basic information about fringe benefits. Parallel with this will be some intensive case studies of a group of some thirty firms. The work is being undertaken by Mrs Dorothy Wedderburn and Mrs J.C. Craig.

Political Socialization

91. During 1964 the Department assisted Dr Philip Abrams with a study of the political and social attitudes of young people in the fifteen to thirty age group. A sample of young people are being interviewed in Cambridgeshire and the West Riding of Yorkshire in connexion with this inquiry. This work forms part of a series of comparative studies by Dr Abrams designed, first, to analyse the content and organization of political knowledge in a variety of environments, and then to try to establish relationships between patterns of ideology and particular forms of political behaviour and commitment.

Seminars

92. The Department has continued to hold periodical seminars in applied economics conducted either by its own members or by others closely associated with its work, and by a number of distinguished visitors. Since the Easter Term of 1963 these seminars have been under the joint auspices of the Department and of the Faculty of Economics and Politics. Sixty research papers have been read at seminars during the years under review, of which thirty-eight have been contributed by visiting economists.

93. Beginning in 1962 a series of seminars in Mathematical Economics and Econometrics, arranged by Dr F. H. Hahn and Professor Richard Stone, have also been held. Visiting economists have contributed ten of the nineteen papers presented.

University Relationships

94. During the years 1958-64 the Department has progressively become more closely integrated with the Faculty of Economics and Politics, with which it now shares accommodation and a number of common services. Secretarial and computing assistance, and advice on electronic programming and data analysis, have been made available to teaching officers, and help has been given to research students attached to the Faculty. Both the Chairman and the Secretary of the Faculty Board are members of the Department's Committee of Management. During the period teaching officers of the Faculty have increasingly participated in the Department's research programme, and the majority of projects are now under their immediate direction. Many members of the Department's staff have contributed to Faculty teaching by giving courses of lectures or by taking classes.

95. The Department is indebted to the University Mathematical Laboratory for the computational facilities and advice which it has provided. The mechanical failures of EDSAC II and delays in getting the new computer, TITAN, into working order have seriously delayed work on a number of projects (notably the research on the finance of public companies described in paragraphs 52 and 53), and the Department is very grateful to the Laboratory's staff for their efforts to overcome these difficulties. The Chemical Engineering Laboratory has also been of great assistance in enabling the Department to use equipment for transferring data from punched cards to tape.

96. Valuable financial assistance and co-operation has been received from the Department of Land Economy in connexion with the study of the economics of car parking, with which they were associated.

97. From 1963 onwards the Director has been a Syndic of the Cambridge University Press.

Relationships with Other Bodies

98. The grants which the Department has received from various bodies have been indicated in Section II. In addition, the Department has received a great deal of help of a non-financial kind from many sources.

99. The Department has continued to receive valuable co-operation from a number of government departments and institutions, particularly the Central Statistical Office, the Inland Revenue, the Ministry of Labour, the Board of Trade, the National Economic Development Office, the Ministry of Overseas Development (formerly the Department of Technical Co-operation), and the Department of Scientific and Industrial Research.

IV. OTHER ACTIVITIES

100. Co-operation and assistance have been given by a number of local authorities, notably Luton, Cambridge, and Liverpool, in connexion with work on the demand for parking space (see paragraphs 54 and 55).

101. The Bank of England agreed in 1964 to second Mr M. St J. Wright, a member of their Economic Intelligence Department, to work in Cambridge during 1964-65 and 1965-66 in connexion with the study of the financial aspects of economic growth (see paragraphs 31-6).

102. The Department's work on models of economic growth (see paragraphs 24-30) has involved continuous consultation with a large number of firms, trade associations, and government departments, in order to keep abreast of technical trends in the use of materials and manpower and in the modernization of capital.

103. The British Aircraft Corporation gave invaluable co-operation in connexion with the study of the redundancy which occurred at their factories in Stevenage and Luton (see paragraph 83). Two of the main unions concerned, A.S.S.E.T. and D.A.T.A., also co-operated fully.

104. The British Railways Board helped in every way, both nationally and at local level, with the studies of railway redundancy and of the plan for contraction (see paragraphs 72 and 84). The National Union of Railwaymen at local and national level were also extremely co-operative.

105. Valuable contacts with the Industrial Welfare Society have been made in connexion with the Department's study of the conditions of employment of manual and non-manual workers (see paragraph 90).

106. Much of the data for Mr Bechhofer's study of the adaptation of engineering graduates to the requirements of industry (see paragraph 82) has been provided by employees of the English Electric Company.

107. The Department has given financial and other assistance to the Social and Economic Archive Committee, which was set up in 1964 following a conference of social scientists held at the Department in December 1963.

108. During 1958-61 the Director served as a member of the Committee of Inquiry into the Fishing Industry under the chairmanship of Sir Alexander Fleck (now Lord Fleck), and from 1962 to 1963 was a member of the Royal Commission on the Press.

International Conferences and Visits Abroad

109. The Department has continued to keep in touch with economic and social research abroad by attendances at international conferences and visits abroad, and by affording facilities to foreign scholars to work for a time in Cambridge.

110. The following is a list of visits abroad and of international conferences attended during 1958-64 by members of the Department and by research associates:

Year	Country	Visitors	Purpose of visit
1958	Pakistan	Mr W. B. Reddaway	Refresher course for Pakistani economists organized by International Economic Association, at Murree
1958	Italy	Mr J. A. C. Brown	Work for United Nations Food and Agriculture Organization, at Rome
1959	Brazil	Miss P. M. Deane	Conference of International Association for Research in Income and Wealth, at Rio de Janeiro
1959	Yugoslavia	Miss P. M. Deane Dr W. A. Cole Mr J. E. G. Utting Mrs D. E. Wedderburn	Conference of I.A.R.I.W., at Portoroz
1959-60	India	Mr W. B. Reddaway (on sabbatical leave)	
1960	Poland	Professor R. Stone	Work as Research Associate at Center for International Studies (M.I.T.), at Delhi Lecture on consumers' behaviour to School of Planning and Statistics, at Warsaw

Year	Country	Visitors	Purpose of visit
1960	Italy	Professor R. Stone	O.E.E.C. Conference on Regional Economic Development at Bellagio
1960	Ethiopia	Miss P. M. Deane	Conference of I.A.R.I.W. at Addis Ababa
1960	Hong Kong	Miss P. M. Deane	Conference of I.A.R.I.W.
1960	Germany	Miss P. M. Deane	Conference of International Economic Association, at Konstanz
1961	Irish Republic	Professor R. Stone	Lecture to Economic Research Institute, at Dublin
1961	Germany	Professor R. Stone Miss P. M. Deane Mr J. E. G. Utting	Conference of I.A.R.I.W., at Tutzing
1961	France	Professor R. Stone	
1961	Hungary	Mr J. M. Bates	Conference of Centre National de Recherches Scientifiques, at Grenoble
1961			International conference on statistical problems, organized by Hungarian Academy of Sciences, at Budapest
1961	Argentina	Miss P. M. Deane	To advise Faculty of Economics of the University of Buenos Aires on their teaching programme
1962	Austria	Mr J. A. C. Brown	Conference of International Economic Association, at Vienna
1962	Turkey	Miss P. M. Deane	Conference of I.A.R.I.W., at Istanbul
1962	Argentina	Miss P. M. Deane	To advise Faculty of Economics of the University of Buenos Aires on their teaching programme
1962	England	Professor R. Stone	Conference of Operational Research Society, at Cheltenham
1963	Iraq	Mr W. B. Reddaway	To give special address (<i>Economic Progress for Under-Developed Countries</i> , Reprint no. 217) to annual conference of Iraq Federation of Industries, at Baghdad; also to conduct a seminar at University of Baghdad
1963	Argentina	Mr W. B. Reddaway	To give a special Seminar Course for selected economic students from University of Buenos Aires
1963	India	Mr W. B. Reddaway	Representing British Association for the Advancement of Science, at meeting of Indian Science Congress, at Delhi
1963	U.S.S.R.	Mr W. B. Reddaway	To give a talk (on the economic position in the U.K.) to the U.S.S.R.—Great Britain Society, at Moscow
1963	England	Professor R. Stone	To read a paper to the Conference of the International Economic Association, at Cambridge
1963	Denmark	Professor R. Stone	European Conference of the Econometric Society, at Copenhagen
1963	England	Mr R. C. O. Matthews Dr C. H. Feinstein	London Conference of participants in S.S.R.C. inquiry into long-term trends in national income
1963	England	Professor R. Stone	
1963	Vatican City	Professor R. Stone	Conference of the British Society for the Philosophy of Science, at Oxford
1963			Study Week of the Pontifical Academy of Sciences

Year	Country	Visitors	Purpose of visit
1963	Italy	Mr F. G. Pyatt	Seminar on Planning, organized by the University of Urbino, at Ancona
1963	Greece	Miss P. M. Deane	Conference of I.A.R.I.W. at Corfu
1963	France	Miss P. M. Deane	Two meetings of the O.E.C.D. Development Centre, in Paris
1963	Sweden	Mrs D. E. Wedderburn	To organize a Research Seminar, at Markangd, in connexion with the Sixth International Congress of Gerontology
1963	Denmark	Mrs D. E. Wedderburn	To attend Sixth International Congress of Gerontology, in Copenhagen
1964	Argentina	Mr W. B. Reddaway	To advise on the Argentine economic development plan (as part of the U.K. technical assistance programme)
1964	England	Professor R. Stone Mr F. G. Pyatt	Symposium of Colston Research Society, at Bristol, both giving papers
1964	England	Professor R. Stone	
1964	Argentina	Miss P. M. Deane	Conference of the British Computer Society and U.K. Automation Council, in London
1964			To advise Faculty of Economics of the University of Buenos Aires on their teaching programme
1964	Zambia	Miss P. M. Deane	To advise on the organization of the Zambian national accounts unit
1964	Italy	Mr R. C. O. Matthews	Conference on the Italian part of the S.S.R.C. inquiry into long-term trends in national income, at Ancona
1964	Italy	Dr C. H. Feinstein	To read a paper to the Conference of the International Economic Association, at Palermo

Visitors from Abroad

111. A number of distinguished economists from abroad have worked in the Department as visiting members during 1958–64, while others have been welcomed on shorter visits. Among visitors to the Department for longer periods have been the following:

1957–58

Professor W. Fellner of Yale University.
Mr K. L. Kinsman of the Bureau of Agricultural Economics, Canberra.
Mr S. Long of Northwestern University, U.S.A.
Mr T. Marschak of Stanford University, U.S.A.

1958–59

Dr A. Bajt of Ljubljana University, Yugoslavia.
Professor J. M. Henderson of Harvard University.
Dr N. Islam of Dacca University.
Professor L. Johansen of Oslo University.

1959–60

Dr Z. Hellwig of Wroclaw University, Poland.
Mr S. D. Khosla of Delhi University.
Professor A. D. Scott of the University of British Columbia.

1960–61

Mr A. Bose of Delhi University.
Professor N. G. Butlin of the Australian National University.
Dr A. K. Chakraverti of the Indian Statistical Institute.
Mr S. S. Dell of the United Nations Department of Economic and Social Affairs.
Professor D. Fand of the South Methodist University, Dallas.

Dr R.H.Khandker of the Government Planning Commission, Pakistan.
 Dr D.V.Ramana of Andhra University.
 Mr M.T.Wegner of the University of Heidelberg.

1961-62

Mr E.L.Jenkins of the Department of Primary Industry, Canberra.
 Professor A.Jezierski of Warsaw University.
 Professor L.Kohr of the University of Puerto Rico.
 Dr D.V.Ramana of Andhra University.
 Professor S.Reiter of Purdue University, U.S.A.

1962-63

Professor E.J.R.Booth of Oklahoma State University.
 Dr S.Divitcioglu of Istanbul University.
 Professor L.Fishman of the University of Colorado.
 Professor W.F.Railing of South Dakota State College.
 Dr T.Suzuki of Waseda University, Japan.

1963-64

Mr G.Fløystad of the Michelsen Institute, Norway.
 Mr S.Hoshino of the Economic Planning Agency of the Japanese Government.
 Professor A.Hunter of the University of New South Wales.
 Mr J.Kordos of the Central Statistical Office, Warsaw.
 Mr C.Sirison of the National Economic Development Board, Thailand.
 Dr W.Welfe of the University of Lodz, Poland.

V. PUBLICATIONS

112. During 1958-64 ninety-three titles have been added to the Department's reprint series, and a further seven monographs have been published. In addition, two new series of publications have been instituted: *A Programme for Growth* containing progress reports on the work of the Growth project, and a series of *Occasional Papers*. Details of these and other publications during the period are given below.

Reprint Series

113. This series contains selected papers contributed to learned journals and other publications by members of the Department's research staff and others working in direct collaboration with the Department. During the seven years, ninety-three new titles have been added to the series, of which fifty-four have been mentioned in Section III in connexion with the research projects to which they are related. The following is a list of the other thirty-nine reprints published during 1958-64, arranged in alphabetical order of authors:

ARMSTRONG, A.G. Output and Employment, 1961-1963 (*London and Cambridge Economic Bulletin*, no. 48, 1963; Reprint no. 214).
 BRIGGS, F.E.A. The Estimation of Regression Equations when Independent Variables are Otherwise Related to the Dependent Variables (*Metroeconomica*, vol. XII, nos. 2-3, 1960; Reprint no. 193).
 BRIGGS, F.E.A. The Influence of Errors on the Correlation of Ratios (*Econometrica*, vol. xxx, no. 1, 1962; Reprint no. 183).
 COLE, D.E. The Income, Expenditure and Saving of Old People Households in Cambridgeshire (*Proceedings of the Fourth Congress of International Association of Gerontology*, 1957; Reprint no. 156).
 DEANE, PHYLLIS. The Long-term Trends in World Economic Growth (*Malayan Economic Review*, October 1961; Reprint no. 181).
 DEANE, PHYLLIS. Measuring Soviet Economic Growth (*Soviet Studies*, vol. xiv, no. 2, 1962; Reprint no. 203).
 FEINSTEIN, C.H. Stocks and Stockbuilding (*London and Cambridge Economic Bulletin*, nos. 44 and 45, 1962-63; Reprint no. 199).

FISHER, M.R. Business Savings and Profits in the Light of the Permanent Income Hypothesis (*Economie Appliquée*, vol. x, no. 4, 1957; Reprint no. 142).
 FISHER, M.R. A Sector Model: The Poultry Industry of the U.S.A. (*Econometrica*, vol. xxvi, no. 1, 1958; Reprint no. 139).
 FORSYTH, F.G. A Further Study of the Productivity of Large and Small Farms in Cambridgeshire (*Farm Economist*, vol. viii, nos. 11 and 12, 1958; Reprint no. 141).
 GHOSH, A. Input-Output Analysis with Substantially Independent Groups of Industries (*Econometrica*, vol. xxviii, no. 1, 1960; Reprint no. 160).
 GHOSH, A. Input-Output Approach in an Allocation System (*Economica*, vol. xxv, no. 97, 1958; Reprint no. 138).
 GHOSH, A. A Note on Leontief Models with Non-Homogeneous Production Functions (*Metroeconomica*, vol. xii, no. 1, 1960; Reprint no. 174).
 IRONMONGER, D.S. A Note on the Estimation of Long-Run Elasticities (*Journal of Farm Economics*, vol. xli, no. 3, 1959; Reprint no. 153).
 JOHANSEN, LEIF. Rules of Thumb for the Expansion of Industries in a Process of Economic Growth (*Econometrica*, vol. xxviii, no. 2, 1960; Reprint no. 162).
 KALISKI, S.F. Extraneous Estimates and Goodness of Fit: A Problem in Empirical Economics (*The Manchester School*, vol. xxviii, no. 1, 1960; Reprint no. 163).
 KALISKI, S.F. Some Recent Estimates of 'the' Elasticity of Demand for British Exports (*The Manchester School*, vol. xxix, no. 1, 1961; Reprint no. 173).
 MARRIS, R.L. A Model of the 'Managerial' Enterprise (*Quarterly Journal of Economics*, May 1963; Reprint no. 216).
 REDDAWAY, W.B. The Argentine Economy, A Visiting Economist's Questions (*The Review of the River Plate*, September 1963; Reprint no. 211).
 REDDAWAY, W.B. Economic Progress for Underdeveloped Countries (Address to the 1963 Conference of the Iraqi Federation of Industries; Reprint no. 217).
 REDDAWAY, W.B. The Economics of Newspapers (*Economic Journal*, vol. lxxiii, no. 290, 1963; Reprint no. 206).
 REDDAWAY, W.B. Economics of Under-developed Countries (*Economic Journal*, vol. lxxiii, no. 289, 1963; Reprint no. 202).
 REDDAWAY, W.B. The Implications of a Free Trade Area for British Taxation (*British Tax Review*, March 1958; Reprint no. 137).
 REDDAWAY, W.B. Importance of Time Lags for Economic Planning (*Economic Weekly*, vol. xii, nos. 4, 5, and 6, 1960; Reprint no. 161).
 REDDAWAY, W.B. Phasing a Development Plan (*Economic Weekly*, June 1960; Reprint no. 164).
 REDDAWAY, W.B. Some Limitations of the Capital-Output Ratio (*Pakistan Economic Journal*, vol. viii, 1958; Reprint no. 150).
 REDDAWAY, W.B. Some Observations on the Capital-Output Ratio with particular reference to India's Third Five Year Plan (*Indian Economic Review*, vol. v, no. 1, 1960; Reprint no. 168).
 REDDAWAY, W.B. Wage Flexibility and the Distribution of Labour (*Lloyds Bank Review*, New Series, no. 54, 1959; Reprint no. 155).
 REVELL, J.R.S. Building Societies and the Common Market (*Building Societies' Gazette*, June 1962; Reprint no. 189).
 REVELL, J.R.S. Settled Property and Death Duties (*British Tax Review*, May-June 1961; Reprint no. 180).
 SLATER, L.J. Some Experiences in Price Mapping (*Computer Journal*, vol. vi, no. 4, 1964; Reprint no. 221).
 SLATER, L.J. Regression Analysis (*Computer Journal*, vol. iv, no. 4, 1962; Reprint no. 186).
 STEWART, I.G. Input-Output Table for the United Kingdom (*London and Cambridge Economic Bulletin*, no. 28, 1958; Reprint no. 147).
 STONE, RICHARD. The A Priori and the Empirical in Economics (*L'Industria*, vol. iv, no. 4, 1963; Reprint no. 223).
 STONE, RICHARD. A Comparison of the Economic Structure of Regions Based on the Concept of Distance (*Journal of Regional Science*, vol. ii, no. 2, 1960; Reprint no. 170).

- STONE, RICHARD. Consumers' Wants and Expenditures: A Survey of British Studies since 1945 (*L'Evaluation et le Rôle des Besoins de Biens de Consommation dans les divers Régimes économiques* (Editions du Centre National de la Recherche Scientifique, Paris 1963); Reprint no. 210).
- STONE, RICHARD. The Housekeeper and the Steersman (*L'Industria*, October 1962; Reprint no. 198).
- STONE, RICHARD. Social Accounting and Standardized National Accounts (Published in Spanish in *Información Comercial Española*, no. 356, 1963; English version, Reprint no. 227).
- STONE, RICHARD. Social Accounts at the Regional Level: A Survey (*Regional Economic Planning: Techniques of Analysis*, 1961, being proceedings of a Conference on Regional Economic Development held at Bellagio, Italy, in June 1960; Reprint no. 177).

Monograph Series

114. This series, which is published by the Cambridge University Press, contains reports of investigations which have been carried out by members of the Department's research staff and others directly collaborating in its work. The titles of the first five volumes were listed in the Fourth Report. Subsequent titles are as follows:

- No. 6. *Productivity and Technical Change*. By W.E.G. SALTER (1960).
- No. 7. *The Ownership of Major Consumer Durables*. By J.S. CRAMER (1962).
- No. 8. *British Economic Growth, 1688-1959*. By PHYLLIS DEANE and W.A. COLE (1962).
- No. 9. *Experiments with Input-Output Models*. By A. GHOSH (1964).
- No. 10. *The Economics of Capital Utilization*. By R. MARRIS (1964).
- No. 11. *Priority Patterns and the Demand for Household Durable Goods*. By F. GRAHAM PYATT (1964).
- No. 12. *The Growth of Television Ownership in the United Kingdom since the War*. By A.D. BAIN (1964).

Studies in the National Income and Expenditure of the United Kingdom

115. This series is published by the Cambridge University Press under the joint auspices of the Department and the National Institute of Economic and Social Research, and contains the results of research undertaken in both institutions under the general direction of Professor Richard Stone. The titles of the first three volumes were given in the Fourth Report. No further volumes were published in the years under review, but much work has been done on the following three volumes, all of which are expected to be published in 1965 or 1966:

- The Measurement of Consumers' Expenditure and Behaviour in the United Kingdom, 1920-1938*, vol. II. By RICHARD STONE and D.A. ROWE.
- Domestic Capital Formation in the United Kingdom, 1920-1938*. By CHARLES FEINSTEIN.
- National Income, Expenditure and Output of the United Kingdom, 1860-1960*. By CHARLES FEINSTEIN. This will incorporate the work by JOHN UTTING on the income and expenditure of public authorities, 1920-38.

Occasional Papers

116. This series, published for the Department by the Cambridge University Press, is designed for the rapid publication of research results which have a topical interest. The following have been published:

- No. 1. *White-Collar Redundancy: A Case Study*. By DOROTHY WEDDERBURN (1964).
- No. 2. *Railway Workshops: A Study of the Problems of Contraction*. By P. LESLEY COOK (1964).
- Forthcoming titles:
- Redundancy and the Railwaymen*. By DOROTHY WEDDERBURN.
- Economies of Large-scale Production in British Industry: An Introductory Study*. By C.F. PRATTEN and R.M. DEAN.
- Parking Space for Cars—Assessing the Demand*. By G.J. ROTH.
- Wage Trends, Wage Policies, and Collective Bargaining: The Problems for Underdeveloped Countries*. By H.A. TURNER.
- The Role of Take-over Bids in the British Economy*. By R.L. MARRIS.

A Programme for Growth

117. This series is published by Chapman and Hall Limited, and describes the progress of the work on economic growth undertaken at the Department under the direction of Professor Richard Stone. The aim of the project is to study quantitatively in as great detail as possible the present structure and future prospects of the British economy, the possibilities of stimulating its rate of growth, and the problems to which this would give rise. The following have been published:

- No. 1. *A Computable Model of Economic Growth* (1962).
- No. 2. *A Social Accounting Matrix for 1960* (1962).
- No. 3. *Input-Output Relationships, 1954-1966* (1963).
- No. 4. *Capital, Output, and Employment, 1948-1960* (1964).
- No. 5. *The Model in its Environment: A Progress Report* (1964).
- No. 6. *Exploring 1970: Some Numerical Results* (1965).

Forthcoming numbers:

- Consumption Functions, 1900-1970*.
- Production Functions and Technical Change*.
- An International Survey of Planning Models*.

Other Books

118. The following books have also been published during 1958-64 by members of the Department's research staff and by others associated with the work of the Department:

- Effects of Mergers*. By P. LESLEY COOK and RUTH COHEN. Allen and Unwin (1958).
- The Motor Industry*. By GEORGE MAXCY and AUBREY SILBERSTON. Allen and Unwin (1959).
- Social Accounting and Economic Models*. By RICHARD STONE and GIOVANNA CROFT-MURRAY. Bowes and Bowes (1959).
- National Income and Expenditure*. By RICHARD and GIOVANNA STONE. Bowes and Bowes (1961) (7th revised edition, 1964).
- The Economic Circumstances of Old People*. By DOROTHY COLE with JOHN UTTING. Codicote Press (1962).
- Abstract of British Historical Statistics*. By B.R. MITCHELL and PHYLLIS DEANE. Cambridge University Press (1962).
- The Development of the Indian Economy*. By W.B. REDDAWAY. Allen and Unwin (1962).
- The Employment of Cambridge Graduates*. By CHRISTINE CRAIG. Cambridge University Press (1963).
- British Export Performance*. By S.J. WELLS. Cambridge University Press (1964).
- The Economic Theory of 'Managerial' Capitalism*. By ROBIN MARRIS. Macmillan (1964).

Premises

VI. PREMISES AND FACILITIES

119. In January 1962 the Department moved to a new building on the University's Sidgwick Avenue Site. This building was designed by Sir Hugh Casson and Partners. In addition to accommodation for the Department it contains the offices of the Faculty, rooms for Faculty teaching officers, a joint common room, a lecture-room and two seminar rooms, the Marshall Library of Economics, an African Studies Centre, and the offices of the Royal Economic Society. Some forty rooms on the third and fourth floors of the building are occupied by the Department, including the P.D. Leake Professor and his staff. Ten of these offices are occupied by computing, statistical, and secretarial staff. Most of the remaining research rooms are capable, when necessary, of accommodating two persons and are at present being used in this way. Storage space and accommodation for the counter-sorter, which is used jointly by the Faculty and the Department, have been provided in the basement of the building.

120. Thanks to a grant from the University Grants Committee for initial furniture and equipment, and a generous subvention from the Mary Marshall Fund, it was possible to re-furnish the Department on moving into the new building.

Library

121. The Department's working library, which is on the third floor of the new building, receives seventy-one British and eighty-five foreign periodical series. Of the periodicals received, thirty-one are in exchange for the Department's reprint series and fifty-three are gifts, the remainder being purchased.

122. During 1958-64, some 450 books, 2,040 pamphlets and reprints, and 1,414 British government publications have been added to the library.

Equipment

123. During 1958-64 the Department has obtained a Creed reproducer and, more recently, a Friden flexowriter for punching data and programme tapes in connexion with electronic computations, together with Hollerith card-punching and verifying equipment and a counter-sorter.

124. In 1963 the Department made arrangements with the Cambridge Language Research Unit for the joint use with them of a Hollerith 1202 electronic computer with a card input, primarily for use in analysing survey data. The Department pays the rental and maintenance costs and provides an assistant to service and operate the equipment, and to write programmes for it.

125. The Department now has twenty-two electrical desk calculating machines, which are used both by the computing staff and by research workers, together with four hand-operated calculating machines, and five simple adding machines.

126. More elaborate calculations are undertaken on the University Mathematical Laboratory's electronic computer, and the Department is greatly indebted to the Director of the Laboratory, Dr M. V. Wilkes, for this assistance.

127. The Department possesses the usual office equipment. Together with the Faculty of Economics and Politics, it shares the use of a Xerox 914 copier with the Cambridge Language Research Unit.

Research Staff

VII. STAFF

128. The following is a list of the research staff at December 1964:

Director: Mr W. B. REDDAWAY, M.A. (Cantab.), Fellow of Clare College.

Assistant Director: Mr J. E. G. UTTING, M.A. (Cantab.), Fellow of Fitzwilliam House.

Special Appointment: Miss L. J. SLATER, Ph.D. (Cantab.), D.Litt., Ph.D., M.A. (London).

Senior Research Officers: Mr E. BENNATHAN, M.Com. (Birmingham), M.A. (Cantab.), Fellow of Jesus College; Mr B. M. DEAKIN, M.A. (Oxon.); Mr J. R. S. REVELL, M.A. (Cantab.), B.Sc. (Econ.) (London); Mrs D. E. WEDDERBURN, M.A. (Cantab.).

Research Officers: Mr M. O. L. BACHARACH, B.A. (Cantab.); Mr G. CLACK, Ph.D. (London), B.A. (Witwatersrand), B.Econ. (Natal); Mrs J. C. CRAIG, B.Sc. (London); Mr K. D. GEORGE, M.A. (Wales); Mr J. K. S. GHANDHI, Ph.D. (Cantab.), M.A., B.Sc. (Econ.) (Pennsylvania); Mr O. T. HOOKER, B.Sc. (Econ.) (London); Mr A. R. JOLLY, M.A. (Cantab.), M.A. (Yale); Mr B. R. MITCHELL, Ph.D. (Cantab.), M.A. (Aberdeen); Mr C. F. PRATTEN, B.A. (Bristol); Mr R. W. S. PRYKE, B.A. (Oxon.); Mr G. WHITTINGTON, B.Sc. (London); Mr K. J. WIGLEY, M.A. (Cantab.).

Junior Research Officers: Mr F. BECHHOFFER, M.A. (Cantab.); Mr K. H. BOEHM, B.A. (Cantab.); Mr C. S. LEICESTER, B.A. (Cantab.); Mr J. C. ODLING-SMEE, B.A. (Cantab.); Miss T. SEWARD, B.Sc. (Econ.) (London); Mr M. P. WARD, B.A. (Exeter).

Holders of Unestablished Research Posts: Mr A. G. ARMSTRONG, B.A. (Cantab.); Mr G. ROBERTS, B.Com. (Manchester); Mr A. SINGH, M.A. (Howard), B.A. (Punjab).

Research Consultants: Mr C. J. BLISS, B.A. (Cantab.), Fellow of Christ's College; Mrs H. B. FORMAN, M.A. (Oxon.); Mr J. W. LEE, D.B.A., M.A. (Indiana), M.B.A., B.A. (Pusan); Miss B. A. MERCER, M.A. (Toronto), B.A. (McGill); Mr J. P. MOYLE, B.Sc. (Manchester), F.R.I.C.S.; Mr F. E. TOWNSON.

129. 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; Assistant Lecturer in Economics.

Mr J. H. GOLDTHORPE, M.A. (Cantab.); M.A. (London); Fellow of King's College; 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 R. C. O. MATTHEWS, M.A. (Oxon.); M.A. (Cantab.); Fellow of St John's College; 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; Professor of Economics.

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

Professor J. A. C. BROWN, M.A. (Cantab.); Professor of Econometrics at the University of Bristol.

Mr J. R. C. LECOMBER, M.A. (Oxon.); on secondment from the National Economic Development Office.

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

130. The following is a list of members of the research staff during the period covered in this Report who have left the Department:

Year of leaving	Name	Post in Department*	Post taken
1958	Mr T. A. B. Corley, M.A. (Oxon.)	J.R.O.	Assistant Lecturer in Economics, Queen's University, Belfast. (Now Lecturer in Political Economy, University of Reading.)
1958	Mr G. R. Fisher, M.Com. (Birmingham)	J.R.O.	Research Associate in Quantitative Economics, University of Michigan. (Now Professor of Econometrics, University of Southampton.)
1958	Mr F. G. Forsyth, M.A. (Cantab.), M.Sc. (Econ.) (London)	R.O.	Statistician, Establishments Division, Inland Revenue. (Now Statistician, Ministry of Labour.)
1958	Mr K. Maywald, Ju.Dr. (Brno), M.A. (Cantab.)	S.A.	Senior Professional Statistician (National Income Section), Central Statistical Office, Salisbury, Southern Rhodesia.
1958	Miss S. H. Meadows, B.A. (London)	J.R.O.	Research Assistant, London School of Hygiene and Tropical Medicine.
1958	Miss D. C. Paige, M.A. (Cantab.), B.Sc. (Econ.) (London)	R.O.	Now in charge of Health and Housing Research, National Institute of Economic and Social Research, London.
1958	Miss M. C. Vidakovic, M.A. (Oxon.)	J.R.O.	Lecturer in Economic History, University of Bristol.
1959	Mr W. A. Cole, Ph.D., M.A. (Cantab.)	R.O.	Post at Centre de Recherches et de Documentation sur la Consommation, Paris. (Now Professor of Mathematical Economics, University of Amsterdam.)
1959	Mr J. S. Cramer, M.A. (Amsterdam)	R.O.	Secretary of Institute of Community Studies, London.
1959	Mr H. S. Dickinson, A.M.I.C.A.	S.R.O.	Post in Department of Economics, Jadavpur University, Calcutta.
1959	Mr A. Ghosh, D.Phil., M.A. (Calcutta)	R.O.	Post in International Labour Office, Geneva.
1960	Mr A. D. Smith, B.A. (Nottingham)	J.R.O.	Assistant Lecturer (now Lecturer), Faculty of Economics and Politics, University of Cambridge.
1961	Mr A. D. Bain, B.A. (Cantab.)	J.R.O.	Lecturer in Statistics, Warsaw University.
1961	Mr Z. Pawlowski, Ph.D., M.Econ. (Warsaw)	R.O.	Lecturer in Banking, University College of North Wales. (Now Lecturer in Economics, University of Sussex.)
1961	Mr S. J. Wells, Ph.D., B.Sc. (Econ.) (London)	R.O.	Lecturer in Economics, University of Nottingham.
1962	Mr J. M. Bates, B.A. (Nottingham)	J.R.O.	British Technical Assistance Adviser to the Planning Commission, Ghana.
1962	Mr R. M. Dean, M.A. (Oxon.)	R.O.	

* Abbreviations: S.A., Special Appointment; S.R.O., Senior Research Officer; R.O., Research Officer; J.R.O., Junior Research Officer.

Year of leaving	Name	Post in Department*	Post taken
1962	Miss P. M. Deane, M.A. (Cantab.), M.A. (Glasgow)	S.R.O.	Lecturer, Faculty of Economics and Politics, University of Cambridge.
1962	Mr G. C. Hockley, B.A. (Nottingham)	J.R.O.	Lecturer, Department of Industrial Economics, University of Nottingham.
1962	Mr J. Longden, M.A. (Oxon.)	R.O.	Lecturer in Economics, University College of Addis Ababa. (Now Lecturer in Economics, University of Adelaide.)
1963	Miss P. L. Cook, Ph.D., M.A. (Cantab.)	R.O.	Lecturer in Economics, University of Sussex.
1963	Mr C. H. Feinstein, Ph.D. (Cantab.), B.Com. (Witwatersrand)	R.O.	Assistant Lecturer, Faculty of Economics and Politics, University of Cambridge.
1963	Mr G. J. Mungeam, B.A. (Nottingham)	J.R.O.	Post at H.M. Treasury.
1964	Mr J. A. C. Brown, M.A. (Cantab.)	S.R.O.	Professor of Econometrics, University of Bristol.
1964	Mr P. Jenner, B.A. (Cantab.)	J.R.O.	Assistant Lecturer in Sociology, University of London.
1964	Miss J. A. Platt, B.A. (Cantab.)	J.R.O.	Lecturer in Sociology, University of Sussex.
1964	Mr F. G. Pyatt, M.A. (Cantab.), B.A. (Manchester)	R.O.	Assistant Lecturer, Faculty of Economics and Politics, University of Cambridge. (Now Professor-elect of Mathematical Economics, University of Warwick.)
1964	Mr M. J. Rose, B.A. (Cantab.)	J.R.O.	Research Fellow, Department of Management Studies, College of Advanced Technology, Salford.
1964	Mr G. J. Roth, M.A. (Cantab.), B.Sc. (London)	R.O.	Private practice, as Consultant.

* Abbreviations: S.A., Special Appointment; S.R.O., Senior Research Officer; R.O., Research Officer; J.R.O., Junior Research Officer.

Assistant Staff

131. The following is a list of assistant staff at December 1964:

Secretary: Mr R. M. D. DAVIES, B.A. (London).

Administrative Officer: Mr H. LOSHAK.

Librarian: Miss O. E. HICKSON.

Secretarial and Clerical Staff: Mrs L. E. SILK (Senior Typist); Mrs S. B. BUTLER; Miss J. CHAPMAN; Mrs P. M. CHENERY; Miss J. R. DOGGETT; Miss J. E. ENNALS; Miss C. A. HUDSON; Miss E. M. LUDLOW; Miss V. A. SADDINGTON; Miss S. D. SEAL; Miss A. C. TWYMAN; Mrs M. WHINNERAH.

Computing and Statistical Staff: Mrs B. K. ADAMS; Miss R. BAXENDALE, B.Sc. (Sociology) (London); Mrs B. BELLABY, B.A. (Oxon.); Mrs N. I. CHAPMAN; Miss M. R. CLARKE; Miss D. E. COUSINS; Mrs A. DACKOMBE; Miss D. M. DAY; Mr B. C. JOHNSON; Miss R. LEVERETT; Mrs J. M. MONAGHAN; Mr A. M. W. NIGHTINGALE; Miss J. ROBINSON; Mr M. P. ROY; Miss J. M. SCARR; Miss S. UMMAT, M.A. (Agra).

132. We record with regret the death of Mr GILBERT WARREN, Senior Computer, on 6 December 1962.