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# STATISTICAL NEWS

## Developments in British Official Statistics

# Note by the Editor

*H. E. Bishop*

The aim of *Statistical News* is to provide a comprehensive account of current developments in British official statistics and to help all those who use or would like to use official statistics.

It appears quarterly and every issue contains two or more articles each dealing with a subject in depth. Shorter notes give news of the latest developments in many fields, including international statistics. Some reference is made to other work which, though not carried on by government organisations, is closely related to official statistics. Appointments and other changes in the Government Statistical Service are also given.

A full, cumulative index provides a permanent and comprehensive guide to developments in all areas of official statistics.

It is hoped that *Statistical News* will be of service and interest not only to professional statisticians but to everybody who uses statistics. The Editor would therefore be very glad to receive comments from readers on the adequacy of its scope, coverage or treatment of topics and their suggestions for improvement.

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# Developments in British official statistics

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# 37th Session of the International Statistical Institute

It has been rumoured that London's weather was seasonally adjusted for the benefit of the statisticians attending the 37th Session of the International Statistical Institute. Although the Organising Committee denies all responsibility for this September phenomenon, the Committee certainly did everything that was within its power to make this, the first Session to be held in London for thirty-five years, a highly successful and memorable occasion.

Held here at the invitation of the Royal Statistical Society, the 37th Session owed much of its undoubted success to smooth and efficient organisation, from the registrations at Senate House, through all of the formal and social meetings, to the final banquet at Grosvenor House.

Occasions of this nature are invaluable in allowing and indeed stimulating an exchange of ideas and techniques between statisticians from all parts of the world. Acknowledging this in his address at the opening ceremony, the Prime Minister said: 'It is not of course only this country, but all countries throughout the world which derive great benefit from the science of statistics and its manifold applications and will have cause to be grateful to you for coming together to pool your experience and technical knowledge.'

Certainly the 758 delegates took every opportunity to do just this – and displayed remarkable stamina in doing so – in a packed week of formal sessions, social functions and private get-togethers. 48 countries and 5 international organisations were represented and a large number of the delegates were government statisticians, including nearly all the heads of government statistical services.

The social programme, which took in receptions by the Lord Mayor at the Guildhall and by the Government, culminated in the banquet at which the Royal Statistical Society were the hosts. The principal speaker was the Prime Minister[1], himself a statistician and a Fellow of the RSS for more than 25 years. Earlier in the Session, he had recalled his 'apprenticeship days' when 'we had to do statistics the hard way . . . before the new age of computers.' He went on: 'Lord Beveridge and I used to compete, he with his four foot bamboo slide rule, me with my Otis King.'

(1)The Prime Minister's speech at the banquet, which includes a large section on current developments in U.K. official statistics, is reproduced in full on page 7.6

Inevitably, computers were to provide the subject for one of the formal meetings (see below); and, although an immense amount of interchange took place during the social occasions and private entertaining, the justification for the Session was of course the formal scientific programme. Altogether there were 37 invited papers which were organised with some of the 123 contributed papers into 14 meetings[2]. In addition, there were special meetings – for example, one on geology arranged by the International Association for Statistics in the Physical Sciences.

This is not the place for a full account of the proceedings which are, in any case, expected to be published by mid-1970 as a volume of the Bulletin of the ISI. But readers may be interested in the following résumé of the main sessions dealing with economic and social subjects.

**Problems of capital planning**

Three invited papers were read at this meeting.

The first was on 'Capital planning in the public sector' by M. O'Donoghue. This dealt with difficulties in evaluating a range of dissimilar projects which are potentially eligible for inclusion in a final budget. This is a problem which is common to both public and private sectors. Also it is necessary in both sectors to consider the financing of a given budget, involving problems such as the balance between short and long term financing. In the public sector, financing may be undertaken by means of taxation or borrowing but there are difficulties in project evaluation because monetary return, which may be appropriate for the private sector, is not likely to decide such activities as hospital building. The objectives in public spending are many and diverse. They include defence, education, welfare, regional development, etc. Much work has been done in recent years in clarifying the problems and suggesting possible solutions.

There was discussion on whether financing by borrowing was a burden on the present or future generations, or in the interaction of various projects with each other and on the difficulties of obtaining basic data for cost benefit analysis and the large errors which may be involved in these calculations.

The second paper dealt with 'Capital planning and

(2) A complete list of the meetings is given in an annex on page 7.5

capacity projection in Japan' by S. Shishodo, N. Jinsengi and A. Kohno. This presented a method of estimating the potential g.n.p. of Japan and using this to compare the interaction of actual and potential by g.n.p. for 1968–71 especially with regard to investment, capital planning and capacity projection. There was discussion on whether the model should have made provision for structural changes in the economy, for the substitution of capital for labour, for greater price inflation and less export surplus.

The third paper was on 'Planning of capital investment in Hungary' by J. Tar and was about capital investment in a communist country. There was some discussion about the effect of price control, the absence of a free market and the balance of payments on investment planning.

**Computers and data banks**

Two interesting sessions were held concerning the impact of computers on statistics. The first considered mainly the technical possibilities opened up when powerful computers were used to control the collection, storing and processing of statistical data; the second concerned itself principally with the ethical problems and moral duties of statisticians resulting from these technical advances.

In the field of official statistics, the respondents, the producers and the users all stand to benefit so long as the groundwork is sufficiently well prepared. The users' need for data in the various planning fields – as indicated by a paper highlighting the sophistication of econometric work now being undertaken with computers – is continually increasing and they are now requiring more detailed information in an ever quicker timescale.

But this increased demand must not be allowed to increase the burden on respondents. Instead, by carefully considering the data to be collected so as to avoid duplication, by then indexing and storing the data in a methodical way, it is becoming possible, with the aid of flexible retrieval programs to form and extract a wide variety of aggregated tables and to carry out many and diverse analyses. Data which in the past had been collected and processed for a particular application only is now seen as a valuable commodity which can be readily stored for future use.

Routine computing work can be readily undertaken by machine, leaving the statistician more time to consider the interpretation and implications of his data. Inventiveness should now be even more highly valued because the potential pay-offs are enormously greater. Management problems in an ever-changing environment are accentuating the need for re-orientation and re-training in methodology and research. No longer are standard tabulations adequate and sufficient, but it is to be hoped that the newer techniques of character and graphical display will be fully exploited in helping to train statisticians and in the presentation of information to users.

The fact that it is now technically possible to 're-use' data is seen as a benefit but also as a challenge to statisticians. Care must be exercised to see that any re-use is in the proper context and that the confidentiality and privacy guaranteed to respondents is fully respected.

Excellent surveys of the various data bank schemes being operated in different countries were presented and these served to emphasize the need for a professional code of conduct to be laid down for both statisticians and computer specialists. Doubtless the professional societies will have to give serious consideration to this in the coming years. The public at large would have to be fully informed about the benefits to be obtained from a greater centralisation of records for both administrative and statistical purposes and to be assured that confidentiality would be fully respected. Without such assurances, the confidence which now exists between the public and statisticians would be eroded and the quality of replies to questionnaires and surveys would suffer accordingly. Thus to be able fully to exploit the technical benefits now being offered by computer systems, continuing efforts are needed in all aspects of education and communication with the public.

**A review of input-output applications**

One of the papers read in the meeting on Econometrics was 'A review of input-output applications', by A. G. Armstrong, Department of Applied Economics, Cambridge and D. C. Upton, Central Statistical Office.

The popular interest in indicative national planning in recent years has brought more attention to the micro-economic analysis technique of input-output analysis reviewed in this paper. Whilst national economic planning is under a considerable cloud in the United Kingdom (and France) at present this is not necessarily the last chapter in the story. In the planned economies increasing use is being made of input-output analysis and similar econometric techniques to improve the traditional Russian physical planning system and to help solve their particular problem of determining prices. In the market economies the star growth performer, Japan, makes considerable use of micro-economic analysis as do Norway and Holland. In the USA and West Germany national economic projections are made without much publicity. The USA is of course the home of the use of such techniques by

major corporations for medium and long-term planning of their own development.

The trend away from subjective qualitative analysis and forecasting, and towards quantitative micro-economic analysis is unlikely to be reversed in the computer age and the paper tries to present the broader background to the part played by input-output analysis. It is quite remarkable that this econometric technique has achieved wide acclaim in both the USA and the USSR in the same decade.

**Index-number problems in the measurement of capital stock**

This topic was covered in three invited papers. In the first paper Sir Richard Hicks (United Kingdom) drew a distinction between the values placed on assets by the market, a measure of wealth which could be used to analyse the distribution of property, and the valuation of real capital as a factor of production. The widely-acknowledged difficulties of measuring real capital were considered in some detail, and a suggestion made that deflation of fixed capital formation by the consumption price-index might provide an acceptable solution to the problem of finding satisfactory capital price-indices. In the discussion of this paper Sir Roy Allen pointed out that the problems of measuring real capital arose from the fact that imputed rather than actual transactions were involved; similar difficulties existed where imputed transactions were included in the national accounts (for example, the measurement of physical changes in stocks). Colin Clark drew attention to the undervaluation of structures in developing countries relative to advanced countries, arising from significantly lower labour costs in the former; he also suggested that it was important not to overlook the point (attributed to Jorgenson) that in measuring capital as a factor of production we are in fact concerned with the flow of service provided, not the value of stock itself.

The second paper, from Professor Duane Evans (USA), drew attention to the constraint imposed on the quantification of production functions by the use of value-added data as a measure of output. He suggested that the relevance of continuous, differentiable production functions to modern industrial economies was in doubt, and that other avenues of study might be more fruitful. In discussing the paper Mr. J. Hibbert of the United Kingdom Central Statistical Office put forward the view that perpetual inventory estimates of capital stock had a useful part to play, provided that users understood not only the limitations of the estimates but also their full potential value; the collection of data on actual service lives would be a particularly useful development.

In the third paper, given by Professor Irving Siegel (USA), the author set out to design consistent index number formulae for the measurement of capital. Having developed the idea of a multiplicative module for capital variables, other compatible aggregates and index numbers were considered by Professor Siegel. In the final section of the paper he suggested that for the measurement of economic growth compatible indices of the type described should be preferred to the production functions currently proposed for this purpose.

**Manpower projection**

The Session was chaired by H. P. Lacroix (ILO) who had arranged for the presentation of three invited review papers.

Mr. Ypsilantis (ILO) in his paper 'Projection of manpower supply', described the basic method for labour force projection used by ILO. Projections are made of the size and composition (by age, sex and region) of the population using standard demographic techniques. Sex/age/regional-specific activity rates (i.e. proportions economically active) are calculated and themselves projected by e.g. ratio-linkage, and these rates applied to the population figures. The ways in which experience in one geographical area may be used to improve the projections for other areas were described.

Mr. Vimont's paper 'Projection of manpower demand' reviewed a number of possible ways of presenting labour force demand. He described as the most commonly used method one which relates the level of employment in each sector of the economy to projected production levels and productivity indices, and which usually breaks down the figures within each sector by occupation or other classifications of labour. Some of the problems encountered in practice were discussed, e.g. the problem of allowing for the consequences of technological change, of the relationships between productivity and skills-composition within each sector, of providing for changes in quality of public services.

The third paper by Dr. Johnston (USA) on 'Integration of supply and demand' described the many difficulties in the way of establishing a satisfactory integration of the supply and demand approaches, especially when occupations, skills or educational levels are being studied, as they are likely to be if the projections are to have practical value. He concluded that despite the difficulties the outlook was promising. He drew attention particularly to the work of Almon and Alterman in the USA, to the 'more ambitious and methodologically challenging' work of Stone and Leicester in

the UK, and to the US National Planning Association activities.

In discussion a number of important problems were identified, and in particular, the difficulties in allowing adequately for migration, and for the rate of change in the apparent activity rates of women in rapidly developing economies. There was considerable interest in the studies commissioned by the Engineering Industry Training Board, which were described by Mrs. Venning (UK).

Very little time was left for the presentation of the two remaining papers. The first dealt with a cohort-analysis approach with particular reference to female activity rates and was presented briefly by L. Herberger (Germany).

The second described the Canadian job-vacancy survey and its value as a measure of labour demand. It was presented by A. Sunter (Canada) and the few questions which were permitted in the time available were answered by his co-author, Dr. Sylvia Ostry.

**Evaluation of social programmes**

This meeting was mainly concerned with two papers, one from Margaret A. Mod of Hungary on 'Social programmes and the level of living in Hungary' and the other from P. Gavanier of Luxembourg on 'The social accounts of the member countries of the European Community'.

Mrs. Mod's paper described how social benefits had grown faster than national income in Hungary and now took a relatively bigger share than in many wealthier countries. Benefits in kind predominated over cash benefits and one of the problems arising was that this tended to work to the disadvantage of pensioners or families with many children. Various household surveys had been undertaken to help evaluate social programmes. These studied income in relation to such factors as family size, occupation and social strata; and a new survey was being prepared relating to the conditions of low-income households.

The discussion which followed drew attention to the importance of distinguishing between social services provided and those which were needed. It was necessary to study different aspects of individual services as well as the combined effect of social programmes in general on incomes. A brief description was given of some of the work being done in the UK on the effect of social benefits and taxation on the redistribution of incomes.

M. Gavanier's paper described how the need to assess and compare the extent and content of social expenditure and the different ways of financing it in the various countries of the European Community had led to the preparation of a social accounting scheme. Particular care had been taken to maintain co-ordination between social and national accounts and to ensure consistency of definitions and nomenclatures. The social accounts so far were limited to current expenditure and receipts but would later be supplemented by a capital account and an inventory of social investments.

In discussion, some concern was expressed about the inadequacies of official exchange rates to convert national currencies to a common basis and the extent to which it had in fact been possible to apply common definitions to topics such as housing, education and family allowances where administrative and tax systems differed substantially from country to country. The problem was made the more difficult by the inadequate state of the information on public services already in the national accounts.

**Exhibitions**

One of the exhibitions organised in connection with the conference will remain on display until 18th January 1970. Entitled 'Uses of Statistics', it is mounted by the British Museum in its North Entrance Hall adjacent to the Senate House. It is in two sections, one on Political Arithmetic and one on Statistics in Archaeology. The latter is largely the work of Dr. F. R. Hodson of the Institute of Archaeology, University of London. It illustrates the use of multivariate techniques, such as cluster analysis, for classifying archaeological material.

During the conference, two other exhibitions were mounted in Senate House. Dr. Buckland of the EIU organised an exhibition of statistical books and journals – which is now lodged with the National Book League and which may be borrowed for use at similar events; and a display of portraits and manuscripts of former eminent statisticians was arranged by Mr. B. P. Emmett, BBC Head of Audience Research.

**In conclusion**

The objective of the International Statistical Institute is to develop and improve statistical methods and their application throughout the world by (among other activities) 'encouraging the international association of statisticians, the exchange among them of professional knowledge and the growth among them of a collective interest in the advancement of such knowledge'. No one who took part in the 37th Session will doubt its success in furthering that objective.

In his banquet speech, the Prime Minister said: 'I know that your discussions and the contribution made by statisticians from all over the world have been of the greatest value to British statisticians . . . I want to leave you in no doubt that in deciding on developments we are constantly influenced by experience

abroad and by discussions on international bodies. We owe much to our official and academic colleagues abroad.' It is to be sincerely hoped that overseas visitors too were able to gain something from contacts with British statisticians during their stay. Certainly in the many meetings which took place between official statisticians from different countries there was a continuous two-way flow of ideas and experience.

The success of this and similar ventures depends so much on what the delegates themselves are prepared to put into it. Equally, the best cannot be got out of such an occasion without smooth and comprehensive organisation; and it does not seem excessive once more to pay tribute to those who contributed so much to achieving this both before and during the conference and in particular to the members of the Royal Statistical Society's Organising Committee:

Honorary President: Sir Harry Campion CB, CBE, Former Director of the CSO.

Chairman: Professor Sir Roy Allen, CBE, FBA, President of the RSS.

Secretary: Dr. J. A. Heady, Social Medicine Research Unit of the Medical Research Council.

Other Members:

Professor P. Armitage, London School of Hygiene and Tropical Medicine.

Professor M. S. Bartlett, FRS, University of Oxford.

Dr. B. Benjamin, Greater London Council.

Professor D. R. Cox, Imperial College, London.

Miss S. V. Cunliffe, Arthur Guinness & Co.

Mr. B. P. Emmett, British Broadcasting Corporation.

Mr. E. Jowett, British Steel Corporation.

Miss J. E. Keen, General Electric Company Limited.

Dr. M. G. Kendall, Scientific Controls Systems Ltd.

Professor C. A. Moser, CBE, FBA, Director of the Central Statistical Office.

Dr. S. Rosenbaum, Central Statistical Office, Hon. Secretary of the RSS.

Mr. W. Rudoe, Department of Health and Social Security, Hon. Treasurer of the RSS.

Sir Paul Chambers, KBE, was chairman of the Finance sub-committee and Lady Allen chairman of the Ladies' sub-committee.

**Annex**

*Invited paper meetings of the 37th Session*

4 September: Uses and limitations of regression techniques
Problems of capital planning

5 September: Econometrics
Multiple contingency tables
The impact of the computer on methods of statistical analysis

6 September: Data banks, including questions of confidentiality

8 September: Statistics in the physical sciences
Index-number problems in the measurement of capital stock
Practical applications of stochastic processes

9 September: Manpower projections
Optimal stopping rules and sequential design
Multivariate analysis

10 September: Statistical topics in operational research
Evaluation of social programmes

# The Prime Minister's speech at the International Statistical Institute banquet on 10 September 1969 at Grosvenor House

Mr. Chairman and President of the Royal Statistical Society, President of the International Statistical Institute, Members of the Institute, Fellows of the Royal Statistical Society, Ladies and Gentlemen.

You have been through a packed programme since I greeted you last Thursday at the formal opening of your Session – and indeed so have I, my programme including continued assimilation of governmentally vital statistics, supplied by the Government Statistical and economic services – and as is my wont further requests for still more statistical information from your members. Your own programme has included this afternoon's joint meeting of the ISI with the Royal Statistical Society conducted in our traditional fashion with the RSS President in the chair.

We Fellows in this country are all proud of our own Society's international status; about one in five of its Members is resident outside the United Kingdom, and there are of course many ISI Members who are Fellows, including many here this evening. Recently the Society has established Associated Membership for corporate bodies and some overseas organisations have already taken advantage of this along with some of the leading companies and institutions in this country including, I am pleased to say, the House of Commons Library.

I have referred to my own connection with the RSS. One hundred years ago one of my predecessors at Downing Street had the unique privilege of being President of the Royal Statistical Society as well as Prime Minister. This was Mr. Gladstone who was President of the RSS from 1867–69 and became Prime Minister while in office as president of the Society. In his case, unlike mine, his assumption of the Premiership did not involve leaving the Council. In his day the Society numbered some four or five hundred; now the membership is approaching 4,000.

I have not been able to trace any similar close connection between No. 10 and the Society in the 100 years between. I'm beginning to wonder what at any rate some of my peacetime predecessors did with their time.

History, indeed the authorised history of the Institute, does record that an earlier Prime Minister did play some part in the fourth international statistical congress held in London in 1860. A letter from Mr. Disraeli to his wife describes a reception held by Lady Palmerston.

> 'Her crowded salons were fuller even than usual for she had invited all the deputies of the Statistical Congress, a body of men who, for their hideousness, the ladies declare, were never equalled. I confess myself to a strange gathering of men with bald heads and all wearing spectacles. You associate these traits often with learning and profundity but when one sees 100 bald heads and 100 pairs of spectacles, the illusion, or the effect, is impaired.'

Clearly international statisticians have improved their image, as well as their professional techniques in the intervening 109 years.

I am sure that Mr. Gladstone, and still more Lady Palmerston, would have had difficulty recognising many of the subjects which you have been discussing this week as falling within the field of statistics. For example this afternoon I understand you have been discussing topics in operational research, a daughter discipline of statistics like econometrics, market research and others demonstrating how fertile the mother science of statistics continues to be.

Some of the topics are more familiar and I know that your discussions, and the contributions made by statisticians from all over the world have been of the greatest value to British statisticians. Although I am going to speak about developments in this country, I want to leave you in no doubt that in deciding on developments we are constantly influenced by experience abroad, and by discussions in international bodies. We owe much to our official and academic colleagues abroad.

In every country, advanced and developing, the demand for, and the need for trained statisticians is growing and by no means only in economic and industrial administration. In the Government Statistical Service in Britain, the number of professional statisticians is now around 250.

Government statisticians in this country are deployed throughout virtually all our departments and this has the advantage of enabling them to play their full part in the process of policy formulation, but at the same time they constitute a unified statistical service working together as a corps with a professional identity under the leadership now of Professor Claus Moser, who succeeded Sir Harry Campion as Director of the CSO.

The growth in the number of Government statisticians will continue but it will most certainly be accompanied by a greater statistical knowledge and understanding among those in the Government Service who are not professional statisticians.

Lord Fulton's Committee, which last year reported on the future of the Civil Service in this country, laid particular stress on the need for senior managers not only in the Civil Service but throughout the economy, to be able to handle problems which are expressed in numerical terms.

Indeed I am modestly glad that Lord Fulton's historic report embodied a thought I had frequently expressed when talking in earlier days about reorganisation of the Government machine, that literacy is no longer enough, that everyone concerned in the administrative process, whether in central Government, local Government or industry, needs to be not only literate but numerate as well.

The major reforms now proceeding in the Civil Service, post Fulton, not only provide great opportunities for our statisticians; they lay on them the responsibility of ensuring that the training in statistics of managers and administrators is right and is soundly used on the job. Within Government departments we can be confident that the advice of statisticians will be sought more often by administrators and that statisticians themselves will become to an even greater extent members of policy teams. For increasingly in Government as in industry, statistical advice is indispensable for the decisions which have to be taken. And in our reforms the ending of past demarcations within the Civil Service, the equality of opportunity enabling each to get to the top administrative jobs means that we do not think of statisticians just as back room boys; if some of their work has to be in the back room, we still want them to have the same chance to use the front door as everyone else and to get to the top.

Statistical techniques too need constantly to be developed. It was a predecessor of mine, Mr. Harold Macmillan, who, ten years ago on the occasion of the 125th Anniversary of the foundation of the Royal Statistical Society, said that 'to have any hope of carrying out their policies the Government of the day must have knowledge of the facts as they are, together with such information as will help it to deduce future trends.' He went on to repeat his well-known comment on the timeliness of statistics – like trying to look up this year's trains in last year's Bradshaw (which for the benefit of our visitors from overseas I should explain was a famous railway time-table); which led me as his opposite number to say that this faculty enabled him to see what trains he had missed.

A great deal of work and method is going into speeding the provision of early and accurate information. More and more use is being made of statistical techniques to obtain early estimates before all the data are collected.

We are now using these techniques in this country to calculate the series of preliminary estimates of consumers' expenditure which we have recently started to publish. And we have found that we can issue worthwhile preliminary estimates one month after the end of the quarter, instead of waiting until the end of the following quarter for more comprehensive information. Altogether to improve the speed of statistics is now one of our top priorities in Government machinery.

Perhaps the most significant and well-known line of attack today in improving the statistical information for decision taking, common to every country, is through the growing use of computers, the realisation through modern technology of the vision of Charles Babbage, one of the founding fathers of the RSS. With processing powers 100 or even 1,000 times greater than those in use only a few years ago computers enable us much more readily to process, store and disseminate information. Moreover, the modern computer systems also enable us to make further analysis of the data that has been stored in the form of data banks which you have discussed at one of your meetings. Unlike financial banks these are as yet incapable of issuing overdrafts, but I am sure that armed with your latest techniques nothing is beyond you.

There has in this country been a growing awareness of the potential of modern statistics for our economic and social development. Parliament has been involved in this; in 1966 a Committee of the House of Commons – the Estimates Committee – issued a report on the Government's Statistical Services. Sir Harry Campion, whom we are all pleased to see here tonight, was then Director of the Central Statistical Office and the excellence of the Committee's report is in no small measure due to the quality of the evidence given by him and the other Government statisticians as well as by outside experts.

The Director of the CSO, Professor Moser, has already gone a great way in close and full co-operation with his statistical colleagues in all the Departments in putting into effect the recommendations of the Estimates Committee Report – and indeed has gone far beyond their recommendations in the improvements he has introduced. I am able to give you first-hand assurance that in this work he has the complete support of the Government because it happens that the CSO is centrally located in the Cabinet Office free from all departmental pressures, and I myself have the ministerial responsibility for it. The work of making official

statistics speedier, more reliable and more comprehensive has been given authoritative backing by the creation in this country of a standing Ministerial Committee chaired by Mr. Edmund Dell, Minister of State at the Board of Trade, and himself an experienced industrial executive in one of Britain's largest industrial firms. The Committee include juniors Ministers, as well as senior statisticians and other officials, drawn from all the principal economic and social departments, and reports to me.

I should now like to say something about the latest developments in the Government's statistical services in this country. First, we are making a fundamental change from the traditional system of industrial statistics. We have at present a mixture of short-period enquiries differing from industry to industry, from the very good to almost non-existent. Some of these enquiries are sponsored privately, some by Government, others jointly, and they are rarely wholly compatible, either with each other, or with the Census of Production which has been held by the Board of Trade at approximately five-yearly intervals since 1907 and is, as in most other countries, the main source of industry statistics.

We are about to replace this time-honoured but increasingly inadequate system with a more comprehensive scheme of quarterly reporting of production which will be supplemented by annual enquiries into such matters as purchases, fixed capital formation and stock-building, thus creating what amounts to an annual Census of Production with a strong quarterly element; and where there is need for them, monthly enquiries will also be included in the system. One important result of this will be a much improved Index of Industrial Production.

We have set up – as part of the Board of Trade but closely linked with the Central Statistical Office – a new Business Statistics Office which has the task of integrating the various streams of industrial statistics into the new system. The structure of this new system has evolved through discussions between Government statisticians and representatives of industry and also through the evidence given to the Estimates Committee.

Under the new arrangements the Government Statistical Service and industry are working more and more as partners. Each industrial sector is being fully consulted about the form the new inquiry should take to ensure that the statistics will be of the greatest possible use to them and to the nation while being obtained at the least possible cost and inconvenience to industry and commerce as well as to the Government. The development of this service to users outside the Government is now one of our greatest priorities.

The new system of industrial statistics will get the best of both centralisation and decentralisation. We shall achieve in the Business Statistics Office a centralised collection, storage and retrieval of data. But at the same time the analysis and interpretation of that data will be in the hands of statisticians in the various policy-making departments.

We consider that the development of social statistics is no less important than that of industrial statistics. Parallel to the Business Statistics Office, we now envisage an arrangement under which the collection and processing of certain data on the social side is centralised, with a combination of the censuses of population, social surveys and vital registration and statistics in one organisation.

In the collection and publication of these statistics we need to look more at the social conditions of individuals, households and families; the interdependency of social groups and the extent to which social problems are inter-related. Some of these ideas will be developed in the new CSO publication *Social Trends* which we hope will provide the background to public discussion of social policies.

We are, of course, fortunate in already having a very important regular source of information about households in this country, obtained through the Family Expenditure Survey which for many years now has provided information about the expenditure and other characteristics of households at various income levels. And very shortly we will be piloting a second household survey which will provide for the regular study of other crucial social factors such as the educational, housing and employment characteristics of households.

In other fields, too, new and valuable statistical information is now being gathered. The Department of Employment and Productivity has just carried out an important new type of earnings survey based on a random sample of employees which has provided valuable information about the distribution of earnings by occupation and by industry and the relationship between earnings and hours worked. The Department is also planning periodical employment censuses supplemented by sample surveys which will provide improved employment statistics, particularly for local areas.

In the field of qualified manpower the eventual aim is to draw up a statistical picture of the available qualified people. The fifth triennial survey of scientific and technological manpower was carried out in 1968 by the Ministry of Technology and the Department of Employment and Productivity and results are now becoming available.

The Population Census of 1966 contained for the first time a question on all types of higher qualifications obtained after leaving school and the tabulations and

analyses relating to this question are also being published.

There must be a common framework for all these studies which reflects the links that exist between economic development and social changes, between social investment and changes in social conditions and welfare, and between changes in social conditions in the country as a whole and for the various groups in the community. Such an integrated system will help us to relate the provision of various kinds of social services, for example health and education facilities, to their utilisation and benefits.

I see these as greatly expanding fields in the future. In this century much the most dramatic progress has been made in economic and industrial statistics, even though there remains much to be done. Social statistics have not been developed to the same extent and have been relatively starved of resources. To some extent this may be because social scientists have not seen so clearly as economists how essential statistics can be to their disciplines.

I have used deliberately the plural word 'disciplines'; the social sciences cover a wide area, and if society as the object of their study draws them together then it is clear that statistics as the sinews of their researches bind them even more strongly. The Social Science Research Council which was set up only a few years ago as a counterpart to the established Research Councils in other fields, has recognised the vital role of statistics in its projects and is doing all it can to encourage statistical research.

In organisation and techniques we are passing through a revolutionary period in the development of the Government's statistical services. Indeed there is so much going on at present in so many departments that I can appreciate that it is not easy for the users of official statistics to keep up to date. We have attempted to do something to solve this problem of communication by publishing the new journal of the Government Statistical Services *Statistical News*, which reports the latest developments and which I was pleased to have a hand in launching last year.

But in a wider sense there is a two-way problem of communications for all statisticians in all countries, and that is the communication of their ideas to the non-expert and the understanding by statisticians of his problems and needs. It is a common belief, however unfair, that statisticians are a cold calculating lot who are interested in people only in the mass and as statistical units rather than as individuals with particular needs and problems. I deprecate this criticism. It is not true and never has been true. Indeed one of the first women members of the then Statistical Society of London over a century ago was Florence Nightingale who campaigned so strenuously about the state of hospitals, venting her considerable wrath on Government Department. She was known as 'the passionate statistician' and I am assured that this title was on the grounds both of her passionate devotion to causes she served and her passionate interest in the statistics she applied to them.

And just as our objective today is to bring about compassionate as well as efficient societies and the statistician has a very important contribution to make towards the achievement of both, in a very real sense I find we are breeding a new type of compassionate statistician.

Mr. Chairman, I have this evening tried to outline some of the developments now in progress in the Government Statistical Service of this country. These developments owe an immense amount to what our statisticians here have learnt from their opposite numbers abroad, from discussions in international bodies and from the technical contributions of their academic colleagues. I have also given an assessment of the vital and growing contribution which statisticians are making in many fields throughout the world. And we can be confident that that contribution will further expand and develop in the years ahead in Government, in industry, in commerce and trade, and in the academic world.

It is therefore with pleasure and with confidence that I ask you to join me in drinking to the health of the President and members of the International Statistical Institute and to the other delegates from abroad.

# Census of Distribution for 1966

**J. R. L. Schneider,** *Statistician and* **J. C. Suich,** *Chief Executive Officer, Business Statistics Office*

The results of the sample Census of Distribution and Other Services for 1966 will be published shortly. (Provisional results were published in the *Board of Trade Journal* of 23 February 1968.) This article describes the processes involved in conducting the census and how some of the technical problems which arose were dealt with. The Board of Trade wishes to acknowledge the advice and help it has received from the Census of Distribution Advisory Committee, and the co-operation it has received from the firms which completed the census form.

## Introduction

The 1966 inquiry was the second *sample* census of distribution: the first was for 1957, between the *full* censuses of 1950 (the first comprehensive inquiry into distribution to be conducted in the United Kingdom) and 1961. The censuses are conducted under the Statistics of Trade Act 1947. They provide information on the structure of retail trade and some service trades including the information required as a base and a sampling frame for other inquiries. These provide short-term indicators of retail sales, consumer credit, stockbuilding and capital expenditure of retailers and also estimates of consumer expenditure in the national income accounts. Provisional results of the 1966 inquiry have already been used for these purposes. Outside the Government, the results of the censuses are widely used by local planning authorities, the National Economic Development Council and its committees, market research organisations and, not least, retail traders themselves.

The 1966 census covered retail trade, radio and television relay services, shoe repairing, hairdressing, laundering and dry cleaning, and automatic vending machine operators. The sampling scheme used in the inquiry is described later in this article; it was designed to give reliable statistics for Great Britain as a whole and limited information for the standard regions. Northern Ireland held its first census of distribution in respect of 1965. Data for an individual town or local authority area are available only if the area was included in the sample.

## Preparatory work

In 1964, the President of the Board of Trade appointed an Advisory Committee, consisting of representatives of retail traders (co-operative societies, multiples and independents), accountants, the trade unions with members in the field covered by the census, market research organisations, the Central Statistical Office and the Board of Trade. The committee, which met six times, considered the scope of the census, the questions to be asked, and the nature of the sampling scheme. In these discussions much attention was given to the need to keep to a minimum the burden on businesses of completing the returns, as well as to the resources available for conducting the census, and to the needs of those who use the statistics.

### The register for the census

The first requirement before any census can be conducted is a register or list of those to whom the census questionnaire is to be sent. At present there is no permanent and continuously updated register of all retail and service traders. For each census of distribution it has been necessary to construct a new register by field-listing of establishments. For co-operative societies the register of organisations was compiled with the help of the Co-operative Union, for multiple retailers (i.e. those with ten or more branches) from 1961 census information and for credit traders, mail order firms, relay services, laundries, etc. and automatic vending machine operators, from a variety of sources (1961 census, directories, trade associations, advertisements, etc.). Large establishments of independent retailers were listed from 1961 census information. The co-operative societies and multiples on the register were asked for lists of their branches so that these could be area-coded, and any overlap with shops listed in the field sample of independent traders eliminated. For the sample register of the remaining independent retail and service establishments, field teams were sent during the spring and summer of 1966 to each area chosen for the sample, to note down names and addresses and the apparent kind of business of all shops and other premises within the scope of the inquiry. 73,000 establishments were listed by the enumerators and forms were sent to 67,000 of them; the balance of 6,000 proved to be branches of multiples or were found to be outside the scope of the census. Holders of open stalls and other itinerant traders (other than mobile shops operating from fixed premises) were not included in the census.

One of the tasks of the Government's new Business Statistics Office is to compile a Central Register of Businesses, which will include retail shops and service establishments, and to keep the register up to date; this is a very considerable task which will take several years to complete but when such a register becomes available the work preparatory to conducting a census will be considerably reduced.

**The census sample**

*Traders covered in full:* The census covered in full those traders who were either known to be large or who formed groups of limited size but special interest for which registers could be compiled without field listing. They were:

(a) Whole organisations:

co-operative societies;

multiple retailers and shoe repairers with ten or more establishments;

mail order businesses;

radio and television relay firms with 500 or more subscribers;

automatic vending machine operators;

laundries, launderettes, and dry cleaners (but see also below under *sample field*).

(b) Individual establishments:

large independents, that is retail establishments not belonging to a co-operative society or to a multiple retailer (having ten or more establishments), with a turnover in 1961 of more than £50,000 (more than £20,000 for booksellers/stationers and off-licences);

credit traders calling on customers.

*Traders sampled* (*the sample field*)*:* Of the remaining traders only a sample was covered, viz.

small or new independent retail establishments;

independent shoe repair establishments;

hairdressing establishments;

launderettes and dry cleaners not already on the register.

As was done for large independents all data in this field were collected for individual establishments, not the whole business. This was necessary because the sample was essentially one of areas. (If a business had, say, four branches, one of which was found in the sample, and the data had related to the whole business, it would have been necessary, in grossing up the sample, to compute its chances of selection from the separate chances of the various sampling units in which it had branches, selected or not.)

The remainder of this section deals with the sample field only.

The sample was a *sample of areas*, i.e., it consisted of establishments in the sample field which were situated in the areas selected for the sample.

In some areas, all shops were listed. In some of these areas all the shops listed were sent a form; in other areas, only a sample of these shops were sent a form, namely a systematic sample of 1 in 5 establishments in the sample field with a random starting point in each area.

*Greater London* (*GLC area*)

Central London – an approximation in terms of whole wards (existing in 1961) to the central area used in the census of population – was enumerated in full and a sample of the shops listed was covered.

33 out of 76 other shopping centres (mostly defined at the 1961 Census of Distribution) were enumerated in full and all shops in them were covered.

The remainder was covered by a sample of wards or remainders of wards existing in 1961, stratified by inner/outer, 'shopping' or mixed/'non-shopping'. About 1 in 20 wards (i.e. 41 out of 800) were selected systematically, with a random start within each stratum.

6 wards where major shopping development had taken place since 1961 were enumerated in full and all shops listed were covered.

*Large towns*

60 large towns (selected by their mid-1964 home population and varying between 50,000 or more and 120,000 or more, according to the standard region in which they are situated) were covered by a sample of streets.

Any street containing more than 20 small independent shops in 1961 was divided into segments containing between 10 and 20 such shops.

Within any one town these streets or segments were sampled systematically with a random start for each of the following four strata: shopping centre(s), and of the remainder, those with 0, 1–4 and 5–20 establishments recorded in 1961 and belonging at that time to small independents.

Street segments where major shopping development had taken place since 1961 and new streets were covered in full; in covered markets, holders of lockable shops and stalls were listed and a sample covered.

*Special areas*

32 special areas where there had been rapid development since 1961 were enumerated in full and the list

of shops sampled. Twenty-nine of these areas were whole local authority areas and three were parts of Scottish districts of county.

*Local authority area sample*

The remainder of Great Britain consisted of 1,687 local authority areas of which 168 were selected as a sample. In each area selected, all shops were covered.

The sample was stratified by:

standard regions (excluding the GLC area) and their sub-divisions into conurbations and remainders as well as the Outer Metropolitan Area;

urban and rural areas;

total retail turnover in 1961;

the proportion of economically active males at the 1961 population census in the agricultural socio-economic groups (for rural districts/districts of county only);

percentage population change 1961–1964;

occasionally, the 'shopping town' index (the proportion of food shops in total 1961 turnover).

Within each stratum, areas were selected systematically in order of the characteristic indicated, with a random start.

In broad outline the scheme followed that of the 1957 sample census with modifications intended to reduce the sampling errors in the kinds of business where they had been largest in 1957 and in the smaller regions.

*Estimates from the sample*

Population values were estimated from the sample by the ratio method, using data from the full census of 1961 as supplementary information in order to reduce sampling errors. Further details are given below in the section on processing.

**The census forms**

The questions to be asked in the census were decided in the light of the discussions in the Advisory Committee. In designing the census forms, the aim was to ensure that traders would understand correctly the questions and what answers were required, that the task of completing the forms was as easy for them as possible, that the forms were suitable as punching documents for automatic data processing (described later in this article) and that modern office equipment could be used for their despatch.

Different types of questionnaire were designed to cover different sectors of the inquiry. The standard form sent to the majority of independent traders asked for information on legal status, description of the business (both in words and by indicating, in order of importance, which of a list of commodities and services accounted for more than a fifth of turnover, also whether operating by self-service or as a credit trader), turnover, number of persons working in the business, wages and salaries, trading purchases, stocks, capital expenditure, credit sales, book debts, analysis of turnover by main classes of goods sold, goods vehicles operated and, for establishments in central shopping areas covered by the sample, floor-space. Traders with a turnover of less than £5,000 in the year were asked for only the first four of these items. Transport costs were asked for in a supplementary inquiry after the main returns had been received; for larger traders this question was included in the main form. A multiple trader or co-operative society was asked to give for each of its branches: kind of business, turnover, employment, and whether it was a self-service or mobile shop. In addition information was requested for the organisation as a whole similar to that required for independent traders. In the case of co-operative societies and multiples, the floor-space questions were limited to certain branches and therefore asked in a supplementary inquiry after the main forms listing the branches had been received. Hairdressers, shoe repairers and traders in the laundry group received shorter forms omitting such questions as those on purchases, stocks and credit trade. Automatic vending machine operators were sent a form designed to cover the special nature of their methods of trading.

In November 1965 advance warning and specimen copies of the forms were sent to the large organisations which had been listed from information in the 1961 census; it was not possible to issue advance copies of the questionnaire to those traders whose names and addresses were not available until they were listed by the field staff in the spring and summer of 1966, but a press notice outlining the requirements of the census was published in November 1965 and specimen copies of the questionnaire were available on application to the Board of Trade.

## Data collection

**Despatch and return of forms**

Traders were allowed to complete the questionnaire for any twelve-month period ending between 6 April 1966 and 5 April 1967. The business year of most co-operative societies ends in September and the questionnaires to co-operative societies were despatched in October 1966 so that they could make an early start on completing them. Addressing the remaining forms began in December and they were posted in the first week of January 1967. Approximately 86,000 forms in all were issued.

The response patterns set by earlier censuses were used as a guide to planning the flow of work, and these

earlier patterns were repeated almost exactly, so that by the end of March 1967 about a quarter of all the questionnaires sent out had been returned, by May about half, and three-quarters by July 1967. Reminders to those traders from whom completed questionnaires had not yet been received were sent out in April, June and July.

### Non-response

Thus the questionnaires took a long time to gather in, as is always the case with a census. Unfortunately, returns from many large firms, which have the formidable task of completing a questionnaire to cover, in some cases, well over 1,000 branches, tend to arrive very late. Not all businesses to whom the questionnaire was sent completed it, of course; non-response was particularly great among the small traders (about 20%).

It is important in a sample inquiry to obtain information from all in the sample, and in September and October 1967 investigators visited each trader in the areas selected for the sample who, despite three postal reminders, had not returned the questionnaire, and completed a brief questionnaire for the firm on the spot. Over a period of about six weeks, just over 12,300 forms were completed by a team of about 30 investigators, helped by staff from Board of Trade Offices in the regions. 3,000 similar forms were received from traders by post. Large traders all over the country (and not only in the sample areas) were included in the inquiry, and about 2,100 of these large traders had failed to return the questionnaire after three reminders had been sent. Information from these firms was obtained by telephone. These follow-up campaigns provided sufficient information from all firms selected for the inquiry to start compiling provisional results by the end of 1967. Full returns took much longer to obtain, and the last returns included in the results were not received until June 1968.

### Supplementary inquiries

The supplementary inquiry on transport costs was addressed to traders with a turnover of £5,000 or more who had completed the main sample form; this form asked for information on goods vehicles but not on costs as did the forms for larger traders. A total of 30,000 forms was despatched in April 1968; after one reminder 79% has been returned by the time the inquiry was closed in October 1968.

The inquiry on floor-space and self-service served a similar purpose. The census gathered floor-space information mainly for establishments in those shopping centres or parts of centres which were selected for the sample. One or the main reasons for this restriction was to limit the burden which these questions imposed on multiples and co-operative societies. The branches in question were selected for the supplementary inquiry from the main returns. Secondly, floor-space information was collected for establishments with a turnover of £100,000 or more (whether multiple or independent, irrespective of location). Finally, information was collected on self-service establishments, mainly on the number of check-outs but also on floor-space if not already obtained.

About 1,650 forms covering 25,000 branches were sent out to co-operative societies and multiples and 3,100 forms to independents in June and July 1968, with a response, after one postal reminder and a telephone follow-up of the largest traders, of 91% (covering 89% of branches) and 93% respectively.

## Processing the results

### Scrutiny

The results of the census were compiled on a LEO III computer. When a return was received, the first step was to record the fact on a magnetic tape receipt file which controlled the issue of subsequent reminders and provided lists of non-respondents. The form was then examined to ensure that all relevant questions had been answered and that the information on it was in a form which could be transferred to punched paper tape. No attempt was made at this stage to test the consistency and validity of the data. This was done on the computer. The first stage was to test the consistency of the answers on the questionnaire, for example, by comparing totals of detailed figures with totals given elsewhere on the form. About one eighth of the questionnaires failed to meet these tests and in these cases the computer printed out the reference number of the form which was then investigated and amended as necessary, sometimes after a scrutiny of the form, sometimes only after a doubtful point had been raised with the firm concerned.

### Classification

The second stage was for the computer to classify the return to one of 73 kinds of business; these 73 were subsequently aggregated into 28 intermediate groups and 10 broad groups. Classification of an independent trader depended on the sales headings indicated by the trader as the most significant in share of turnover; this was checked against the broader commodity analysis of turnover supplied by all but the smallest traders. Multiples and co-operative societies were classified as organisations at the desk, using their turnover analysis and the classification of their individual branches which had been made by the traders themselves.

**Credibility checks**

After returns had been classified to a kind of business in this way, for each return the computer compared ratios calculated from the returns with limiting values of such ratios for all the returns allocated to the same kind of business. The main ratios examined were:

turnover per head;
wages per head;
gross margin to turnover;
wages to gross margin;
capital expenditure to turnover;
book debts to turnover;
credit sales to turnover.

In calculating the ratios, regard was had to such factors as the proportion of workers who were part-timers or women, working proprietors' probable drawings in wages and of special features such as tobacco sales or turnover from catering. The computer rejected about one-tenth of all the returns as a result of these tests, and again these returns were scrutinized. Most of the points queried by the computer proved to have a reasonable explanation or to be easy to put right. Often, for example, scrutiny of the return revealed special circumstances or showed an obvious error which could be put right without reference to the trader. About 2,300 returns needed further investigation and in these cases the trader was asked to clarify the information he had provided; in about half of these cases, traders confirmed the original figures submitted. Similar credibility checks were applied to the transport and floor-space data.

**Imputation of missing data**

A number of returns still lacked some of the information needed for compiling report tables. Mainly these were the returns of very small traders who had only been asked the basic questions on description of business, turnover and employment and non-responders from whom also these items only had been obtained in the follow-up.

The missing values were imputed to each deficient return by the computer on the following lines. Both good and deficient returns were sorted to kind of business, turnover size group and broad sample stratum group, average ratios (e.g. of purchases to turnover or wages to employment) calculated for the good returns and applied to the basic data of the deficient returns in the same group. A similar method is being used for imputing floor-space and partly for transport costs, but where no information about goods vehicles is available 'good' returns from each group are being selected by random sampling and their vehicle and cost data replicated for use with the deficient returns.

**Compilation of results: sample estimates**

In compiling the census results on the computer, the largest task has been the making of estimates for the sample field. First, simple estimates are made within each stratum, grossing up the sample totals by the inverse chance of selection, and aggregated to five large zones. They are then usually(1) adjusted by the ratio of the relevant full 1961 census total to the corresponding simple estimate compiled by the computer from 1961 data for the same area. 'Relevant' here means the same as the 1966 variable for number of establishments and total turnover, total persons engaged (full-time equivalent) for all employment figures, total persons engaged (full-time male equivalent) for wages and salaries and total turnover for all other variables such as purchases, stocks, capital expenditure and individual turnover groups.

These ratio estimates are then aggregated to Great Britain level (regional figures are adjusted by the ratios for the zones in which they are included) and combined with the totals compiled for the 1-in-1 sectors (those covered in full).

**Estimation of sampling errors**

An indication of the likely effects of chance variations on a figure estimated wholly or partly from the sample is given by the standard error of the estimate. There is a chance of about 1 in 20 that the estimate differs from the true figure by as much as twice the standard error in either direction. The estimated standard errors are also being calculated by the computer for a selection of the more important census results. (Standard errors for the provisional census results are available on request.)

**Effect of computer processing**

Among the advantages found in integrating the computer completely into the work of processing census returns (a technique which had been developed over several years on other inquiries by the Board of Trade Census Office) were the big savings of resources in the preparation of registers, the addressing of forms, the despatch of reminders, and the listing of non-responders for investigation. The use of the computer to test the data on returns, to classify them to a kind of business and to impute missing data, not only saved clerical resources but ensured a uniform approach to these processes and a consequent improvement in the reliability of the data. The sampling scheme described earlier in this note and the estimation procedures

(1)The exceptions are size distributions, data for the laundry group and all floor-space and self-service tables since most of these are classified by size.

associated with it, of course depended heavily on the computer.

While the computer made possible very considerable savings in desk work, it required a considerable capital investment by way, for example of 267 main computer programmes to set up registers, to address forms and reminders, to file the data from the forms on to magnetic tape, to process the data and to prepare the tables in the report on the census. The 1966 sample census was a once-for-all inquiry and the programmes were specific to the tasks in hand and cannot generally be used to handle other inquiries in the Business Statistics Office. The Business Statistics Office, in consultation with the Computer and Data Systems Unit of the Central Statistical Office, is planning to develop a series of general systems and programmes which will handle as wide a range of inquiries as possible.

## Preparation of reports

### Skeleton tables

One of the early tasks in the work of the census was the drawing up of skeleton tables as a basis for publishing the results and compiling information which, though unpublished, could be made available to enquirers. These skeleton tables took account not only of the problems of publication of results of previous censuses but also of discussions, in the Advisory Committee and elsewhere, of the needs of the users of the figures. They were the starting point for the systems work for computer compilation.

### Tables of results

The computer then printed out the statistics required for the tables of results. From the print-outs, the final tables were prepared in manuscript. Before these were published, however, two further stages intervened. First the statistics were carefully checked by comparing them with earlier inquiries and by examining them in relation to trends suggested by short-term indicators of retail sales and so on.

### Guarding against disclosure

Secondly, a comprehensive check was made to ensure that information relating to an individual undertaking would not be disclosed by publishing the statistics, either directly or by deduction. This is a duty imposed by the Statistics of Trade Act 1947 and the checks are both rigorous and time-consuming. Where necessary, disclosure has been avoided by aggregating the sensitive figures with other figures, but this, of course, inevitably entails a loss of information to the public. To keep this loss of information to a minimum, several very large firms in certain kinds of business were asked for permission to publish figures which involved disclosure of information about their businesses. The Business Statistics Office was gratified by the generally favourable response to these requests which will permit much information to be published which would otherwise have had to be suppressed.

### Publication of results

The provisional results published in February 1968 were limited to data about establishments, and included no information about the items which for multiples, etc. are collected for the organisation as a whole. The provisional tables included information about number of establishments, and turnover and employment for each kind of business analysed by form of organisation. Comparisons were made with previous censuses.

The final report will be published in two volumes. Volume 1 will give the main establishment and organisation tables for both retail and service trades; Volume 2 will deal with data dependent on the post-census inquiries and with special forms of trading.

The establishment tables in Volume 1 will give final figures of establishments, turnover and persons engaged (detailed) by kind of business and form of organisation, by turnover size and by region. The organisation tables will give information on organisations, establishments, turnover, purchases, gross margin, stocks, capital expenditure, commodities sold, credit trade, book debts; on persons engaged and on wages and salaries; on large enterprises and on membership of voluntary buying groups.

Volume 2 will deal with transport costs; floor-space and self-service; mail order trading, credit traders calling on customers, mobile shops of co-operative societies and multiple retailers and automatic vending machine trading; and with sampling errors of the published estimates.

In addition to the published volumes, the Business Statistics Office will, where possible, supply special analyses of the data on request. Many requests for additional data are made before processing begins and the work is organised to take account of them. Others can be expected since there is still a steady and continuing demand for additional data from the 1961 Census of Distribution; over 800 requests for special analyses of these data have so far been met. The Business Statistics Office charges the costs of providing these special extractions of figures; work costing about £15,000 has so far been done on the 1961 census for planning authorities and market research organisations.

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Enquiries about censuses of distribution should be addressed to Special Enquiries Section, Census of Distribution, Business Statistics Office, Chartist Tower, Dock Street, Newport NPT 1XQ. Tel 0633-52277.

# Great Britain population projections by marital condition

**J. R. Watts,** *Actuary, Government Actuary's Department*

Projections of the population are made annually by the Government Actuary's Department after consultation with the Registrars General. The latest projections were based on the mid-1968 estimates of population and have been published separately for England and Wales[1] and for Scotland[2]. An article[3] which appeared in 1965 describes the methods employed; up-to-date bases are given, however, in a note published with the latest projection for England and Wales[1]. In making these annual projections no regard is had to marital condition beyond that required for estimating future births; it has been necessary to consider in detail only marriages of women below age 30, since as many as 97 per cent of legitimate births arise from these marriages.

For many purposes, however, much fuller analyses by marital condition are required. These analyses are needed particularly for the periodic reviews of the National Insurance scheme carried out by the Government Actuary, for projections of the working population made by the Department of Employment and Productivity and for estimates of housing needs made by the Ministry of Housing and Local Government. The principal requirements of these analyses are:

Projections of men analysed between married men and others and of women between spinsters, married women, widows and divorced women.

Tabulations by age of husbands and wives in combination.

Analyses of widows by age and duration since widowhood.

Projections of the population of Great Britain by marital condition have accordingly been carried out to give these analyses at quinquennial intervals. This article deals with the first two of these requirements.

## Procedure

The starting point was an estimate in quinary age-groups of the mid-1968 female total population of Great Britain, subdivided by marital condition, given by the latest estimates of the Registrars General.

The procedure then was, taking one quinquennium at a time, to estimate the transfers between one marital condition and another, and deaths among each condition, which would occur during the quinquennium and so to arrive at estimates of the female population, by age and marital condition, at five-yearly intervals.

The movements come under six heads:

first marriage,
widowhood,
divorce,
remarriage of widows,
remarriage of divorced,
death.

It is, of course, possible for a woman to experience more than one of these movements in any quinquennium, and appropriate allowance was made in the calculations. At this stage movements due to migration into or out of Great Britain were ignored.

## The basis of the calculations

As a preliminary to each set of quinquennial calculations it was necessary to derive suitable rates of transfer between marital conditions, under the headings given in the previous paragraph. In general, they were based on the published statistics of the Registrars General. Although it is not proposed to show in detail how the rates were derived, one or two features may be of interest. All the rates relate to quinary age-groups and five-year intervals.

### First marriage

For several years past there has been a pronounced trend towards earlier marriage and in accordance with this trend it was assumed that women's marriage rates, at ages under 25, would continue to rise for a few years. Such rising rates, however, are accompanied by slowly falling rates at higher ages. (These assumptions imply a halving or even greater reduction over the next thirty years of the proportions remaining single among women aged 50 and over).

Five-year marriage rates, i.e. the probability of marriage within the following five years, were required. Specimen figures are given in Table 1.

TABLE 1

*Women's first-marriage and divorce rates*

| *Age last birthday at beginning of quinquennium* | *Probability of a spinster marrying during the quinquenium commencing in* | | | | *Probability of a married woman becoming divorced during the quinquennium* |
|---|---|---|---|---|---|
| | 1968 | 1978 | 1988 | 1998 | |
| 10–14 | ·082 | ·087 | ·088 | ·088 | — |
| 15–19 | ·590 | ·607 | ·608 | ·608 | ·011 |
| 20–24 | ·664 | ·666 | ·666 | ·666 | ·029 |
| 25–29 | ·435 | ·427 | ·425 | ·425 | ·034 |
| 30–34 | ·265 | ·260 | ·210 | ·203 | ·026 |
| 35–39 | ·140 | ·125 | ·085 | ·073 | ·020 |
| 40–44 | ·098 | ·065 | ·035 | ·020 | ·015 |
| 45–49 | ·056 | ·045 | ·020 | ·010 | ·011 |
| 50–54 | ·045 | ·036 | ·015 | ·005 | ·007 |
| 55–59 | ·020 | ·012 | ·005 | ·003 | ·004 |
| 60–64 | ·010 | ·006 | ·002 | ·001 | ·003 |
| 65–69 | ·006 | ·004 | ·002 | — | ·002 |
| 70–74 | — | — | — | — | ·001 |

**Widowhood**

Widowhood rates as such were not employed, but the numbers of new widows were derived by applying married men's mortality rates to find the number of husbands dying (see later paragraph on differential mortality by marital status), and then having regard to the age distribution of husbands and wives in combination.

**Divorce**

Divorce rates have been increasing in recent years. In determining the rates to be adopted regard was had to the most recent experience available in order to avoid understating the rates. It should be emphasized here that while considerable increases in divorce rates may be expected in future, especially after the Divorce Reform Act comes into effect, no increase over current rates has been assumed in the calculations on the grounds that it was quite impracticable to forecast the extent of such changes. As will be seen later, however, it was considered that compensating errors in the estimates of remarriages of divorced women would prevent too serious an underestimate in the resulting numbers of divorced women at a particular time.

The rates which were employed are given in Table 1. Suitable allowance was also made for the small number of divorces expected to occur among women newly married earlier in the quinquennium.

**Remarriage of widows**

The analyses of widows by age and duration since widowhood, one of the requirements referred to in the opening paragraphs of this note, were needed in connection with the current review of the National Insurance scheme. In seeking a basis for projection it was natural, therefore, to look at the experience of this scheme as well as the data from the Registrars General.

In the first five years or so following widowhood remarriage is highly dependent on the duration since widowhood as well as on the age of the widow. It was therefore considered necessary to employ separate remarriage rates for widows of over five years' duration, where the age classification alone was important, and for those of less than five years' duration, where regard was had both to age and duration. The foregoing related to women already widowed at the beginning of the quinquennium under consideration; in addition, account had to be taken of remarriage of new widows arising during a quinquennium.

Each of the two sources of data referred to above was inadequate in a vital respect. The National Insurance statistics include no data relating to childless widows under the age of 50 because such widows are not in receipt of benefit under the scheme; the statistics of the Registrars General cannot, by the nature of the marriage registration form, classify remarriages of widows by duration. By means of approximate methods, however, it was found possible to compile remarriage rates in suitable durational form, having regard to the pattern of the National Insurance statistics while reflecting the complete coverage of those of the Registrars General. Reasonable stability over a number of past years was evident and the rates adopted for all future years are given in Table 2.

TABLE 2

*Remarriage rates of widows and divorced women*

| *Age last birthday at beginning of quinquennium* | *Widows* | | | *Divorced* | |
|---|---|---|---|---|---|
| | *Probability of remarriage within five years, or within the outstanding period if widowed in the quinquennium* | | | *Probability of remarriage within five years, or within the outstanding period if divorced in the quinquennium* | |
| | *Duration of widowhood at beginning of quinquennium* | | *Widowed during quinquennium* | *Divorced at beginning of quinquennium* | *Divorced during quinquennium* |
| | over 5 years | less than 5 years | | | |
| Under 20 | — | ·560 | ·400 | 1·000 | ·750 |
| 20–24 | ·600 | ·610 | ·300 | ·935 | ·600 |
| 25–29 | ·450 | ·570 | ·260 | ·795 | ·450 |
| 30–34 | ·300 | ·520 | ·220 | ·640 | ·350 |
| 35–39 | ·200 | ·310 | ·125 | ·500 | ·270 |
| 40–44 | ·150 | ·190 | ·090 | ·385 | ·195 |
| 45–49 | ·100 | ·140 | ·055 | ·260 | ·125 |
| 50–54 | ·050 | ·080 | ·025 | ·160 | ·070 |
| 55–59 | ·020 | ·025 | ·015 | ·090 | ·040 |
| 60–64 | ·010 | ·015 | ·010 | ·055 | ·025 |
| 65–69 | ·005 | ·009 | ·005 | ·035 | ·015 |
| 70–74 | ·002 | ·004 | ·003 | ·020 | ·007 |
| 75 and over | — | — | — | ·007 | ·003 |

**Remarriage of divorced women**

As in the case of widows, remarriage rates of divorced persons are highly dependent on duration since divorce, particularly at the shorter durations. Owing to the absence of statistics in suitable form, however, it was necessary to work throughout on rates related to age alone, except that some allowance was made for the markedly higher rates that may be expected immediately following divorce at the younger ages.

Like divorce rates, remarriage rates have been increasing in recent years although far more slowly and some further slight increase may be expected when the Divorce Reform Act comes into effect. For the purpose of the calculations, however, current rates were adopted for the future. While both divorce and remarriage rates were understated, the understatement is likely to be far less for the latter than for the former. Thus, although the errors are to some extent compensating, it is probable that the number of divorced women at any time has been slightly underestimated.

The rates adopted are shown in Table 2.

**Differential mortality by marital condition**

As a final stage in the preliminary work it was necessary to determine the variation in mortality according to marital condition. For women this was required for all marital conditions as allowance for deaths as well as changes in marital condition featured in the projection; for men mortality of the married only was required to estimate the number of new widows. As there has been little change in the relative mortality in recent years, apart from some worsening for young spinsters as their numbers have decreased, constant ratios were adopted for all future years. Specimen figures of the ratios are given in Table 3.

TABLE 3

*Ratio of mortality rates for each marital condition to those of all men and all women*

| *Age* | *Married men/ All men* | *Spinsters/ All women* | *Married women/ All women* | *Widows and divorced women/ All women* |
|---|---|---|---|---|
| 20 | ·72 | 1·14 | ·73 | — |
| 30 | ·80 | 1·92 | ·86 | 1·54 |
| 40 | ·88 | 1·64 | ·92 | 1·66 |
| 50 | ·93 | 1·30 | ·94 | 1·34 |
| 60 | ·94 | 1·16 | ·93 | 1·14 |
| 70 | ·94 | 1·00 | ·92 | 1·08 |
| 80 | ·94 | 1·00 | ·92 | 1·04 |

Constant ratios imply mortality improvement at the rates adopted for all men and for all women. Details of these improvement factors, which are the same for Great Britain as for England and Wales, are given with the published projection for England and Wales[1].

## The calculations

**Projection of numbers of women**

Taking one quinquennium at a time the movements derived from the application of the rates described in the previous paragraphs were brought together to give the estimated numbers in each condition at the end of the quinquennium. Where appropriate, the operation of more than one movement in the quinquennium was taken into account. This work was first related to a projection on a natural increase basis, i.e., assuming no migration, and the proportions of women single, married, widowed and divorced at quinquennial intervals were obtained. These proportions were then applied to the projections previously made on a with-migration basis[1] [2] to give the projected numbers. This process was to some extent arbitrary, but any attempt to analyse future immigrants and emigrants by marital condition was quite impracticable. It should, however, be emphasized that appropriate allowance for the sex and age distributions and the differential fertility of migrants was made in the projections.

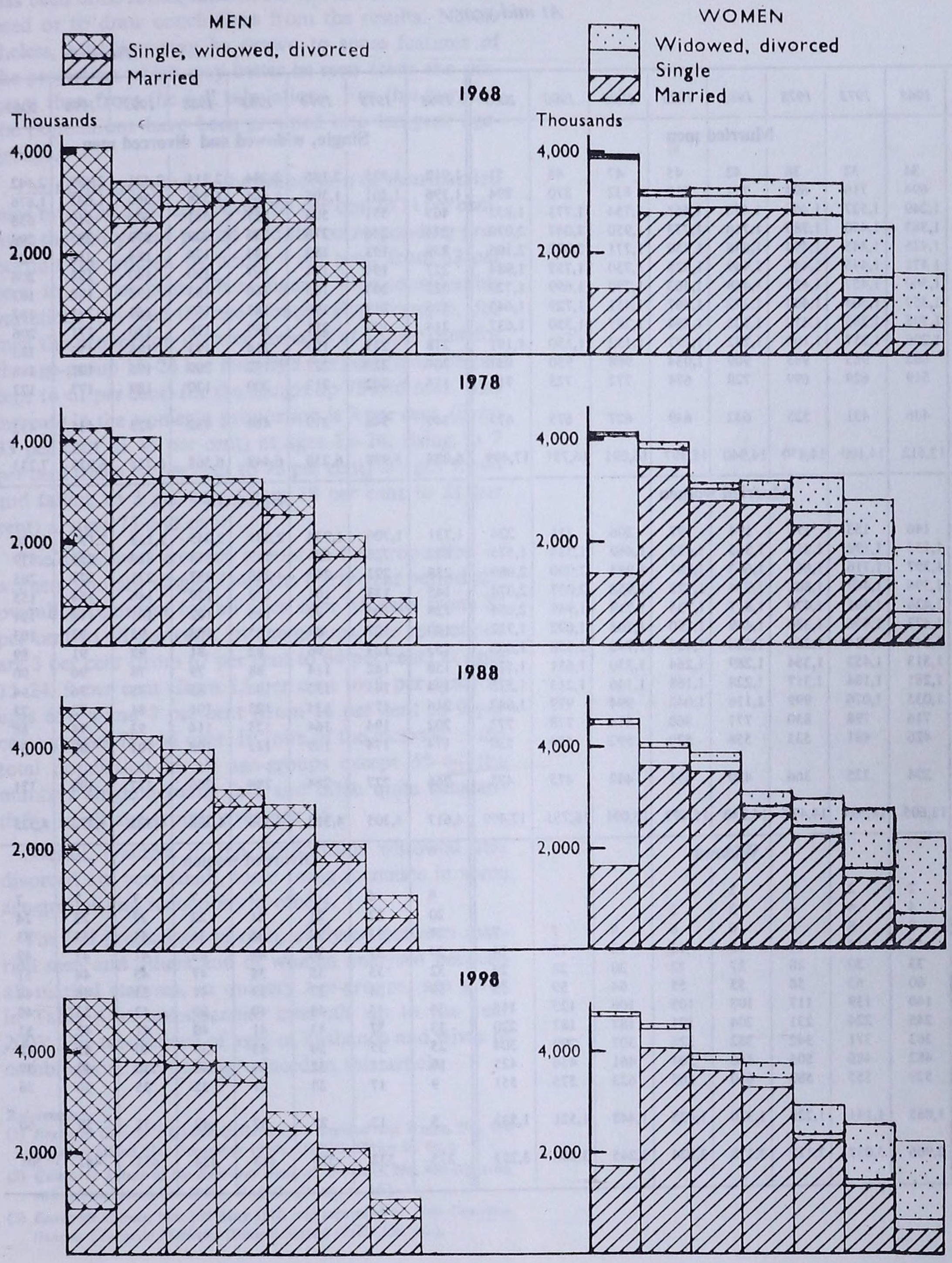
**Projections of numbers of men**

For men, a subdivision only between married and others was required. In addition, however, distributions by age of husbands and wives in combination were needed and the method of calculation was necessarily quite different from that adopted for women.

The 1968 estimates of population by marital condition provided by the Registrars General and the distribution of husbands and wives in combination available from the 1966 Census of Population enabled a similar distribution for 1968 to be estimated. Thereafter the method outlined below was employed to make similar estimates at quinquennial intervals.

From the distributions of married couples obtained at the 1966 and earlier censuses a cohort analysis was possible. For example, from successive census tabulations it was possible to derive for each age-group, having regard also to the trends, a combined measure of the effect of new marriages and losses by widowhood, divorce and death. Suitable factors were chosen for the period 1968 to 1973 and the 1968 distribution was projected accordingly. Small adjustments were then made to ensure that the proportions of married men were reasonable in relation to the proportions of married women; in particular, regard was had to any imbalance between the numbers of young men and young women reaching marriageable age.

*Great Britain population in 1968 and projections to 1998*



## TABLE 4

*Estimated future total population of Great Britain*
*At mid-year*

*Thousands*

| *Age last birthday* | *1968* | *1973* | *1978* | *1983* | *1988* | *1993* | *1998* | *2003* | *1968* | *1973* | *1978* | *1983* | *1988* | *1993* | *1998* | *2003* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Married men** | | | | | | | | **Single, widowed and divorced men** | | | | | | | |
| 15–19 | 34 | 32 | 38 | 42 | 45 | 47 | 48 | 51 | 1,912 | 1,935 | 2,185 | 2,294 | 2,314 | 2,421 | 2,489 | 2,642 |
| 20–24 | 694 | 716 | 694 | 771 | 812 | 832 | 870 | 894 | 1,396 | 1,261 | 1,305 | 1,484 | 1,556 | 1,560 | 1,631 | 1,676 |
| 25–29 | 1,249 | 1,527 | 1,463 | 1,470 | 1,663 | 1,754 | 1,773 | 1,853 | 465 | 551 | 503 | 517 | 581 | 603 | 610 | 638 |
| 30–34 | 1,383 | 1,450 | 1,785 | 1,716 | 1,733 | 1,950 | 2,047 | 2,070 | 274 | 246 | 276 | 234 | 239 | 279 | 295 | 298 |
| 35–39 | 1,426 | 1,445 | 1,494 | 1,848 | 1,758 | 1,771 | 2,002 | 2,106 | 239 | 193 | 183 | 194 | 174 | 184 | 210 | 221 |
| 40–44 | 1 471 | 1,446 | 1,441 | 1,489 | 1,828 | 1,730 | 1,753 | 1,984 | 227 | 194 | 174 | 167 | 190 | 180 | 182 | 206 |
| 45–49 | 1,560 | 1,457 | 1,421 | 1,418 | 1,463 | 1,790 | 1,699 | 1,723 | 225 | 203 | 185 | 166 | 163 | 195 | 182 | 183 |
| 50–54 | 1,357 | 1,504 | 1,404 | 1,372 | 1,367 | 1,411 | 1,729 | 1,645 | 195 | 219 | 199 | 183 | 169 | 169 | 203 | 187 |
| 55–59 | 1,395 | 1,263 | 1,412 | 1,323 | 1,294 | 1,287 | 1,330 | 1,637 | 214 | 192 | 211 | 189 | 178 | 170 | 171 | 206 |
| 60–64 | 1,206 | 1,217 | 1,109 | 1,252 | 1,177 | 1,152 | 1,150 | 1,191 | 218 | 225 | 199 | 214 | 193 | 186 | 179 | 183 |
| 65–69 | 882 | 963 | 985 | 909 | 1,034 | 968 | 950 | 951 | 209 | 229 | 227 | 192 | 209 | 196 | 191 | 188 |
| 70–74 | 519 | 629 | 699 | 728 | 674 | 772 | 725 | 715 | 174 | 202 | 212 | 200 | 170 | 189 | 177 | 173 |
| 75 and over | 436 | 451 | 525 | 602 | 649 | 627 | 675 | 679 | 340 | 348 | 379 | 414 | 432 | 423 | 435 | 432 |
| All ages over 15 | 13,612 | 14,100 | 14,470 | 14,940 | 15,497 | 16,091 | 16,751 | 17,499 | 6,088 | 5,998 | 6,238 | 6,448 | 6,568 | 6,755 | 6,955 | 7,233 |
| | **Married women** | | | | | | | | **Spinsters** | | | | | | | |
| 15–19 | 146 | 153 | 175 | 194 | 197 | 206 | 211 | 224 | 1,731 | 1,706 | 1,934 | 2,031 | 2,045 | 2,138 | 2,197 | 2,330 |
| 20–24 | 1,155 | 1,198 | 1,211 | 1,363 | 1,453 | 1,469 | 1,534 | 1,575 | 872 | 726 | 694 | 789 | 818 | 819 | 855 | 879 |
| 25–29 | 1,397 | 1,716 | 1,664 | 1,663 | 1,881 | 1,984 | 2,000 | 2,089 | 238 | 293 | 244 | 228 | 257 | 271 | 273 | 285 |
| 30–34 | 1,396 | 1,469 | 1,808 | 1,734 | 1,725 | 1,952 | 2,057 | 2,074 | 145 | 133 | 161 | 138 | 129 | 146 | 154 | 155 |
| 35–39 | 1,426 | 1,401 | 1,470 | 1,817 | 1,734 | 1,719 | 1,949 | 2,055 | 128 | 106 | 97 | 115 | 102 | 101 | 114 | 121 |
| 40–44 | 1,477 | 1,406 | 1,380 | 1,449 | 1,790 | 1,703 | 1,692 | 1,922 | 140 | 107 | 89 | 85 | 103 | 95 | 93 | 103 |
| 45–49 | 1,543 | 1,434 | 1,363 | 1,338 | 1,404 | 1,740 | 1,658 | 1,650 | 153 | 123 | 96 | 82 | 81 | 98 | 91 | 89 |
| 50–54 | 1,313 | 1,453 | 1,354 | 1,289 | 1,264 | 1,330 | 1,651 | 1,576 | 158 | 142 | 114 | 88 | 79 | 78 | 96 | 90 |
| 55–59 | 1,281 | 1,184 | 1,317 | 1,228 | 1,168 | 1,146 | 1,213 | 1,515 | 194 | 145 | 133 | 106 | 85 | 75 | 76 | 94 |
| 60–64 | 1,035 | 1,076 | 999 | 1,116 | 1,042 | 994 | 979 | 1,042 | 216 | 179 | 134 | 123 | 101 | 81 | 72 | 73 |
| 65–69 | 716 | 798 | 830 | 771 | 868 | 814 | 778 | 772 | 202 | 194 | 164 | 123 | 114 | 93 | 74 | 68 |
| 70–74 | 426 | 481 | 533 | 558 | 520 | 592 | 554 | 530 | 174 | 174 | 169 | 142 | 108 | 101 | 82 | 67 |
| 75 and over | 294 | 325 | 366 | 420 | 451 | 442 | 475 | 475 | 266 | 277 | 284 | 288 | 266 | 227 | 199 | 171 |
| All ages over 15 | 13,605 | 14,094 | 14,470 | 14,940 | 15,497 | 16,091 | 16,751 | 17,499 | 4,617 | 4,305 | 4,313 | 4,338 | 4,288 | 4,323 | 4,376 | 4,525 |
| | **Widows** | | | | | | | | **Divorced women** | | | | | | | |
| 15–19 | | | | | | | | | | | | | | | | |
| 20–24 | 2 | 2 | 2 | 2 | | | | | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 |
| 25–29 | 4 | 4 | 4 | 2 | 2 | | | | 20 | 22 | 21 | 21 | 22 | 23 | 23 | 24 |
| 30–34 | 8 | 8 | 8 | 6 | 6 | 6 | 7 | 7 | 27 | 31 | 38 | 36 | 36 | 41 | 43 | 43 |
| 35–39 | 15 | 14 | 14 | 16 | 13 | 13 | 13 | 14 | 29 | 31 | 36 | 44 | 42 | 41 | 47 | 49 |
| 40–44 | 33 | 30 | 28 | 27 | 32 | 30 | 28 | 29 | 32 | 33 | 35 | 38 | 47 | 45 | 44 | 51 |
| 45–49 | 80 | 63 | 58 | 55 | 55 | 64 | 59 | 55 | 39 | 38 | 37 | 39 | 41 | 51 | 48 | 48 |
| 50–54 | 140 | 139 | 117 | 108 | 105 | 106 | 125 | 115 | 34 | 43 | 40 | 40 | 39 | 42 | 52 | 49 |
| 55–59 | 245 | 224 | 231 | 204 | 191 | 187 | 187 | 220 | 33 | 37 | 43 | 41 | 40 | 41 | 42 | 53 |
| 60–64 | 363 | 371 | 342 | 362 | 326 | 307 | 299 | 304 | 25 | 35 | 36 | 43 | 39 | 40 | 41 | 42 |
| 65–69 | 482 | 486 | 505 | 466 | 504 | 461 | 436 | 425 | 16 | 27 | 32 | 36 | 40 | 36 | 40 | 39 |
| 70–74 | 529 | 555 | 580 | 610 | 565 | 623 | 575 | 551 | 9 | 17 | 28 | 31 | 32 | 35 | 36 | 36 |
| 75 and over | 1,065 | 1,141 | 1,228 | 1,320 | 1,425 | 1,448 | 1,521 | 1,533 | 5 | 12 | 27 | 37 | 49 | 51 | 58 | 60 |
| All ages over 15 | 2,966 | 3,037 | 3,117 | 3,178 | 3,224 | 3,245 | 3,250 | 3,253 | 275 | 332 | 379 | 413 | 434 | 453 | 481 | 501 |

## Results of the projection

The purpose of this article is to describe the work that has been done rather than to set out in detail the bases used or to draw conclusions from the results. Nevertheless, attention may be drawn to some features of the projection which may better be seen from the diagram than from the full tabulations. For this purpose the populations have been grouped into ten-year age-groups.

Taking all ages over 15, the proportion of men married rises by about 2 per cent, from 69 per cent to 71 per cent, over the thirty-year period and the corresponding proportion for women by about 4 per cent, from 63 per cent to 67 per cent. These figures hide considerable variations between the age-groups. For example, for men the proportion married remains at 18 per cent for the age-group 15–24 but rises by 5 per cent (from 56 per cent to 61 per cent) for the age group 75 and over. The increase in the women's proportion is 3 per cent (from 33 per cent to 36 per cent) at ages 15–24, rising to 7 per cent (from 68 per cent to 75 per cent) at ages 55–64 and falling to 3 per cent (from 18 per cent to 21 per cent) at ages 75 and over.

The differences are even greater in the proportion of women who are single. Over the thirty-year period the overall proportion for all ages over 15 falls from 22 per cent to 18 per cent. In age-groups, the reductions are 3 per cent (from 67 per cent to 64 per cent) at ages 15–24, 9 per cent (from 15 per cent to 6 per cent) at ages 65–74 and 7 per cent (from 16 per cent to 9 per cent) at ages 75 and over. In spite of the increase in the total population in all age-groups except 55–64 the numbers single actually fall, and often quite substantially, in all age-groups over age 35.

Overall, changes in the proportions widowed and divorced are very small, there being increases in some age-groups and reductions in others.

The full projections of men, analysed between married men and others and of women analysed between all marital statuses, in quinary age-groups, are given in Table 4 at quinquennial intervals up to the year 2003. The tabulations of ages of husbands and wives in combination, are not reproduced in this article.


**References**

(1) *Registrar General's Quarterly Return for England and Wales*, No. 480 (Quarter ended 31st December 1968), HMSO, (Price 3s. 6d.).

(2) *Quarterly Return of the Registrar General, Scotland*, No. 456 (Quarter ended 31st December 1968), HMSO, (Price 4s. 0d.).

(3) *Economic Trends*, No. 139 May 1965 and reprinted in *New Contributions to Economic Statistics* (Fourth Series) (Price 15s. 0d.).

# The needs for statistics of the plastics industry

**A. A. Sorrell,** *Chief Statistician, Board of Trade*

The Government Statistical Service is now engaged on a programme of recasting and improving industrial statistics. The purpose of this reorganization is as far as possible to meet all the needs of users of these statistics – those of the Government, industry and others – by a series of comprehensive and related inquiries. Figures of the output of individual products will generally be collected quarterly and other information – about the total value of sales and of purchases of materials and fuel (to enable the derivation of net output), fixed investment, stocks, remuneration of employees, etc. – will be collected annually. Finally, certain other information, for example, purchases of materials and fuel in detail, will be collected less frequently, perhaps every three or four years. By the use of a Central Register of Businesses, and the same reporting unit (the establishment) in conducting each of these inquiries the results will provide relatable information about the various aspects of industrial activity. One result of this system of industrial statistics will be to review the need for the detailed quinquennial censuses of production.

A very important aim of this reorganization is to provide a first-rate statistical service to industry and as part of this programme the Board of Trade has started discussions with the plastics industry about the range of statistics that is required about the industry and its products. It is clear already that the needs are varied, extensive and complex – and sometimes conflicting – and that one is faced with the familiar problem of balancing what it would be useful to have against the effort and resources, particularly of those who have to provide the figures, needed to collect it. The industry presents a number of special and interesting problems in these respects. The purpose of this article is to review these problems as they appear at this stage.

## Definition of the industry

It would be as well, first of all, to say a little about the definition of the industry. Broadly defined, the 'plastics industry' covers two fairly distinct activities which do not overlap with each other to any great extent but which nevertheless present some tricky problems of classification; first, the production of the plastic itself in the form of synthetic resins and plastics materials, and secondly, the fabricating from these of intermediate or final products. The first is essentially a part of the basic chemicals industry in respect of its processes, products and marketing problems. The industry is largely producing basic materials in the form of resins, solutions, dispersions, emulsions, compounds, sheet, etc. used by a very wide range of other industries. Some of its products such as polyethylene and transparent regenerated cellulose film can be used directly for packaging, whilst sheet, rod, tube and profile shapes border on the plastics products industry. There is also a tricky problem in drawing the line between certain plastic materials and synthetic rubber. But the industry is, on the whole, very well-defined and homogeneous and the definition in Minimum List Heading 276(1) of the Standard Industrial Classification does not raise important difficulties or disagreements.

The moulding and fabricating side of the industry, however, presents a range of alternatives from a statistical classification point of view and the interests of different users of the statistics often conflict. For some purposes, particularly for market analysis by the resin and materials producers, as wide a definition as possible, bringing together all manufacturers mainly engaged in producing goods made from plastics, has clear attractions. Against this, in many fields manufacturers using plastics as a material do not think of themselves as part of a large, heterogeneous 'plastics' industry. Manufacturers of plastic toys, for example, are competing with manufacturers of toys of other materials and regard themselves as part of the toys industry. The outlook of manufacturers of plastic foam mattresses, plastic floor coverings, plastic hose and belting, and so on, is similar. To classify each of these activities to a general 'plastics goods' trade would substantially reduce the meaningfulness and value of the statistics relating to the rest of the activities of these trades and would cause serious inconvenience to the users of the figures.

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*Notes:* This article will be published in the December issue of *Plastics and Polymers.*

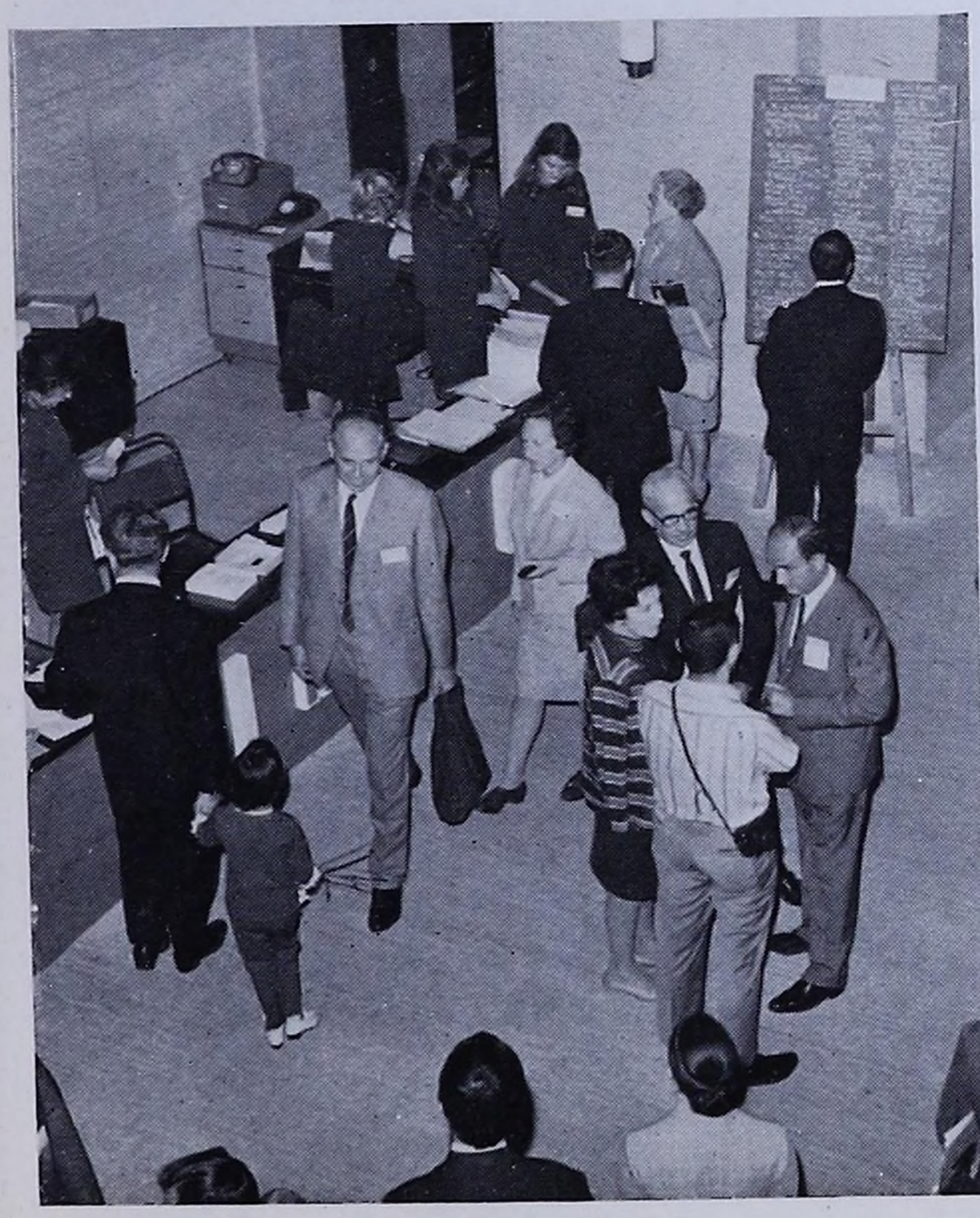
Since this article was written, Mr Sorrell has been transferred to the Ministry of Technology which has assumed responsibility for the plastics industry.


*Photograph: P. Boyce*

The Prime Minister, the Rt. Hon. Harold Wilson, opens the 37th Session of the International Statistical Institute in London. *Below:* Part of the audience in the Queen Elizabeth Hall for the opening ceremony.

Statisticians from overseas governments are entertained at the Banqueting House, Whitehall. *Above left:* the Chancellor of the Exchequer, the Rt. Hon. Roy Jenkins, chats to Professor P. C. Mahalanobis, Honorary President of the ISI. Sir Harry Campion, former Director of the CSO, looks up from his conversation with Mr. P. Schmidt, President of the Statistisches Bundesamt, Federal Republic of Germany. And *below:* Professor Claus Moser, present Director of the CSO, introduces Mr. A. I. Yezhov, a deputy chief of the Central Statistical Board of the U.S.S.R. to the Chancellor, while Mr. E. N. Omaboe, Commissioner of Economic Affairs, Ghana, looks on.

The Prime Minister has a word with fellow statisticians Professor W. G. Cochran (*centre*), President of the 37th Session and Professor Sir Roy Allen, President of the Royal Statistical Society.



Delegates at the registration desk and in one of the meetings in the Beveridge Hall, Senate House.

Mr. J. Ripert, Director-General of the National Institute for Statistical and Economic Studies, Paris, makes a point.

Three delegates pause for an informal discussion between meetings.

*(Photographs: Jalmar)*

The Prime Minister speaks at the Grosvenor House banquet.

In compiling – and, recently, in revising – the Standard Industrial Classification the balance of advantage thus seemed heavily on the side of classifying many products made of plastics to the industry with which they are closely associated, and, indeed, of which they are an integral part. For some plastics products, however, the advantages at present of classifying them in this way to other industries are less clear. In addition there is a large number of moulders and extruders specializing in the production of plastics components and 'bits and pieces' for a wide range of industries. Taken together these products are a mixed collection and they form a rather diverse 'industry'. There seems to be advantage, however, in classifying them in one place, which, in the SIC is MLH 496, Plastics Products n.e.s.

## Statistics of plastics materials

Regular quarterly statistics of the output of synthetic resins and plastics materials have been published for many years. Figures of production, stocks and deliveries (all in terms of weight) are collected separately for 46 different products. There is mostly a number of producers involved and the danger of revealing the activity of individual producers prevents the publication of only a small amount of the information collected. In setting up the inquiry and in keeping the classification of the product headings up to date the Board of Trade has worked very closely with, and had the full support and help of, the British Plastics Federation. The figures are used by the Government primarily for the construction of the index of industrial production and by the industry for marketing and management purposes.

Figures of production (often described as 'total make') as well as of deliveries are collected because for some products, particularly resins, substantial amounts are further processed in the establishments in which they are produced and information about the total amounts produced is of very real interest. The figures of production and sales can differ significantly. For example, although production of alkyd resins amounted to 64,000 tons in 1968, and stocks hardly changed during the year, sales were only 37,000 tons, and for all thermosetting resins the figures were 355,000 tons and 237,000 tons respectively. One of the major difficulties is to ensure that the figures of production are comprehensive. Some resins are widely produced by firms outside the industry wholly or mainly for subsequent processing – e.g. by paint manufacturers – who sell, if at all, only a small proportion of their output. Keeping track of firms starting up their own production is a formidable problem.

While the needs for short-term figures of the output of resins and plastics materials are substantially met by the present quarterly statistics, the Board of Trade will be reviewing the existing inquiry with the industry and considering what changes are necessary in order to provide figures that will fit into the integrated system of industrial statistics outlined at the beginning of this article. This will involve three main changes in the quarterly statistics of resins and plastics materials.

First, in addition to whatever figures of the quantities of output will still be wanted – and it is certainly intended to continue to meet the needs for these – some figures of the value of deliveries will need to be collected. Secondly, it will be necessary to collect from each unit returning figures the whole of its sales and not, as at present, just its output of a defined range of resins and plastics materials, as the quarterly inquiry will be one of a comprehensive series of related inquiries to different industries covering the whole of manufacturing industry. Comprehensive figures of output collected in this way over the whole range of industry will enable figures to be derived both of the total sales of products – whether produced by firms in the industry or, as a subsidiary activity by firms outside it – and figures of the output of each industry. This latter is, for an industry, the total of the sales of firms mainly engaged in producing products characteristic of the industry. It will thus include the output of products which are characteristic of other industries. Thirdly, the unit in respect of which figures are separately collected (the 'reporting unit') will need as far as possible to be the establishment. This is generally each geographically separate production unit but it may exceptionally have to be more widely defined in the light of the firm's accounting arrangements[1].

To the extent that figures can be obtained for each production unit, a better definition of an industry will be achieved and more satisfactory figures for geographical areas will be obtained.

The units for which figures are reported in the present quarterly inquiry are known to be a mixture, but with substantial amounts relating to firms as a whole rather than the individual production units. As in other parts of the chemicals industry, the reporting of figures, particularly deliveries, for each production unit poses particular difficulties owing to the complex nature of the flows of products between units and the differing ways in which these are recorded. The Board of Trade will be discussing with firms the best ways in which the needs of the new integrated system of statistics can be met in respect of reporting units.

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[1] For further discussion of the definition of the establishment, see the introduction to the *Standard Industrial Classification: Revised, 1968.*

## Statistics of plastics products

Statistics of the output of plastics products are much less adequate than those of resins and materials. For products classified to particular industries – e.g. toys, footwear, belting and hose, etc. – goods made of plastics are often shown separately in the present statistics from those made of other materials but there is no regular short-period information at all about the output of products classified to M.L.H. 496 – Plastics Products not elsewhere specified. The value of the output of firms mainly engaged in producing these goods was about £175 million in 1963 – it had increased by about 150 per cent since 1958 – and they employed more than 70,000 people. The absence of up to date figures about this output is a major gap in industry statistics. It is a gap that the Board of Trade is anxious to fill as soon as possible and discussions are at present taking place with the British Plastics Federation.

### The needs of Government and fabricators

There are three main needs to be met – those of the plastics goods producers, those of the resins and materials producers, and the Government's. The last-named may be examined first as, although the need is urgent and important, the requirements are modest. The primary need is to be able to measure adequately the short-term movements in the industry's output in the index of industrial production. For this purpose no great amount of product detail is necessary and the essential needs could be met by a fairly summary analysis of output. At present changes in the industry's output are measured in the index – not very well – by figures of home production and imports of a range of resins and materials that are judged to be used by the industry. The basically unsatisfactory nature of input data as indicators of output, differences in timing between the output and importation of materials and the difficulty of selecting materials that are appropriate, all mean that the present measure is pretty unsatisfactory and the need for a better indicator for this important and fast-growing industry is a pressing one.

In looking at fabricators' requirements it is perhaps useful to look separately at the needs in respect of finished goods, specific components and general components.

The needs of firms in the industry who are producing what may be described as finished goods – domestic hollow-ware, rainwater goods, plastic containers, etc. – are probably very similar to those of firms in other industries. They want, for marketing and management purposes, figures in a fair amount of product detail and, where it is meaningful, in quantity terms as well as in value terms. For these products figures of sales – the point of measurement generally convenient to most firms, and that adopted for the new system of industrial statistics – are likely to meet firms' needs and it does not seem necessary to collect, in addition, figures of production. There are not likely to be any special difficulties in this area in meeting what is required. The problems seem likely to be the familiar ones of balancing the needs of the users for detailed information that might be useful against the costs to the providers of obtaining separate figures from their accounting records. Another, and again familiar, constraint is the number of firms producing particular items; there is little point in collecting very detailed figures if publication is not possible because it might reveal the business of individual firms.

Outside this field of 'finished goods' the statistical needs of producing firms are less well-defined and the problems of meeting them somewhat more complex. It has been represented that figures of sales of certain components – for example, linings for household appliances – are of limited value to firms as to a substantial extent these are also produced and used captively at establishments making the equipment in which they are incorporated. The total 'market' for these products could only be obtained by supplementing the figures of sales by establishments in the plastics fabricating trade by the collection of figures of the 'in plant' production of these items. This presents the problem of identifying, and keeping up to date a register of, the 'in plant' producers. Another aspect of the requirements of components manufacturers is the usefulness of a breakdown of 'sales' from the establishments of plastics fabricators between those which are, in fact, transfers to other establishments of the same organization and those which are genuine sales to other firms. In this, and a number of other industries, it has been suggested that the separation of the latter – described as the 'free market' sales – would add a valuable dimension to the statistics. It is by no means certain that all firms could readily provide separate figures and it is not easy unambiguously to define this distinction.

Finally, a large part of the output of this industry consists of less well-defined components than those dealt with in the previous paragraph – a myriad of bits and pieces of various shapes and sizes used by a very wide range of industries. How much, and what sort of information, about this sort of output the industry needs, and how far its record keeping permits analysis of it is not clear. Analysis by individual products seems likely to have very little significance and to be largely impracticable. The classification of this miscellaneous output which is most likely to be of some value to firms in the industry is by the industries to

which it is sold. Regular figures on this basis would indicate the separate trends in the markets for these products and may be of some interest and use to producers. It may, however, be difficult and burdensome for firms to classify their sales even by broad industry groups in which their customers operate. The extent to which some breakdown would be useful and practicable will be discussed with the industry. It is essential, however, that this sizable output (it amounts to perhaps a fifth of total sales) should somehow be covered, whether aggregatively or with some detail, in the quarterly inquiry, so that trends in the output of the industry as a whole can be measured. It is very doubtful, whatever the conclusion on usefulness, whether it will be possible to collect more than just the value of the sales of these products. Figures in quantity terms, or any analysis by materials, would be likely to be impracticable.

To a growing extent, these general plastics components, like the more specific ones dealt with earlier, are being produced for captive use at the establishments where they are needed for incorporation in other equipment. One authority has, in fact, speculated informally that in ten years or so almost all production will be in-plant and that specialist component moulders will disappear. Whether or not this extreme position is reached it seems likely that the figures of sales by establishments classified to the miscellaneous plastics products trade will represent a declining proportion of the total output of these components. While it might be possible, if there were a real need, to collect figures of the in-plant production of a limited range of specific components, the problems of collecting figures of a heterogeneous assortment of bits and pieces of plastics from a large number of firms in many industries would be very formidable. There would, first of all, be the problem, already mentioned, of keeping track of these producers, but, equally important, the provision of figures would be likely to prove difficult to them. As the products are not sold nor, generally, their transfer from one part of the establishment to another recorded as an accounting transaction, many firms would not be likely to be able to provide figures of the value of this production; equally, as has already been mentioned it is doubtful whether meaningful figures in quantity terms could be provided.

The difficulties of collecting figures of the 'market' for miscellaneous plastics components are thus considerable. How far, however, there is in fact a need for the producers and sellers of these products to assess this and regularly monitor the trends in their output is not clear. The need would seem to be greater for the finished goods and the specific components of the industry.

The trend towards in-plant production of plastics components and the attendant difficulties in measuring this output presents problems in other directions. In constructing the index of production, changes in output are mostly measured by changes in the gross output or production of the products of each industry, the individual series being weighted together by estimates of net output in the base, or reference period, of the index. Regular short-period figures of net output, or the value added, are seldom available. To the extent that plastics components are increasingly made at the establishments where they are used, and not purchased from the plastics industry, the gross output of the final products of these industries progressively understates their contribution to national production. The problem is not serious if the change is not sharp in the short term and if the periods between the rebasing of the index with up to date net output weights are not too infrequent. Annual figures of net output will be available as part of the new system of industrial statistics.

**The needs of the resins and materials producers**

The producers of synthetic resins and plastics materials want to know, for their home marketing and planning purposes, what are the trends in the output of products made of plastics. Their needs are, in some respects, more extensive than those of the fabricators and in many ways more difficult to meet, partly because they would involve the collection from fabricators of figures they find difficult to provide and from which they themselves are likely to derive little benefit. They want, ideally, figures in a good deal of using-industry and product detail and, rather more than the fabricators want for their own marketing purposes, they want figures in quantity – usually weight – terms and with, as far as possible, an analysis by the different kinds of plastics material.

The producers of plastic rainwater goods and plastic domestic hollow-ware, for example, may feel the need themselves for some analysis of their sales by the type of plastics material used but whether their needs in this respect are as extensive as those of the materials producers is less certain. Even more doubtful is the ability, and willingness, of the producers of plastics goods classified outside the miscellaneous plastics products trade to provide this sort of information. Producers of plastic toys, plastic hose and belting, and plastic brushes, for example, are frequently not particularly interested in this sort of analysis of their output. Moreover, in some cases, for example toys, figures are only collected of the value of sales – this is sufficient for the industries' needs – and in other cases a variety of different quantity measures of output are used, each designed to meet the

requirements of the industry concerned. The additional, and even more considerable, problem of obtaining from the in-plant producers the sort of information needed has already been described.

The difficulties of meeting what seem to be the main requirements of the materials producers from an analysis of the sales or production of the fabricators are thus very considerable. An alternative way would be to tackle the problem from the input side of the fabricators. That is, to collect systematically over the whole of industry the purchases of resins and plastics materials by each reporting establishment. This is being done in the 1968 census of production, the forms for which contain questions about the purchases of plastics materials in those trades where they are likely to be sizable. The provision of detailed figures of purchases is, however, extremely troublesome to firms and experience has shown that these statistics are among the most difficult to collect and the part of the burden of form-filling that industry most resents. It would be out of the question to collect this information quarterly, and it is very doubtful, anyway, whether the need is for figures so frequently. The question of how frequently, in the new system of industrial statistics, it is necessary and practicable to collect figures of materials purchases in detail is under consideration, but as mentioned at the beginning of this article the Government has been thinking in terms of every three or four years.

There is, here, a sharp conflict between the needs of some users for statistics and the burden of providing them and the Board of Trade will be looking carefully with the industry at this problem to see if there is any way of resolving it.

# Notes on current developments

## POPULATION AND VITAL STATISTICS

### 1966 Sample Census of Population

The *Economic Activity Tables* Part III contains further information on the economically active and retired populations of Great Britain. This volume includes tables analysing industry by socio-economic group and salary/wage earner group and also gives details of the hours worked by persons in part-time employment. The occupation, industry, status, socio-economic group and social class of persons resident in but born outside Great Britain are shown in Table 25 for Great Britain down to conurbation level.

The *Economic Activity Tables* Part IV contains in one volume the socio-economic group distribution of economically active males for all local authority areas already published in the county leaflets.

The summated totals for Great Britain, England and Wales, Scotland, Standard Regions, Conurbations and Counties are also included.

The *Migration Summary Tables* Part II continues the analysis of one and five year migrants given in Part I. Part II is mainly concerned with the movement of families and households, and includes tables relating solely to immigrants from outside Great Britain.

The *United Kingdom General and Parliamentary Constituency Tables*, combined into one volume, give summary statistics on age, sex marital condition, migration, economic activity, dwellings, households, tenure, amenities, cars and transport for the constituent countries of the United Kingdom and parliamentary constituencies in the United Kingdom. The tables are in some instances limited by the difference in scope between the Great Britain and Northern Ireland Censuses.

**References**

*Sample Census 1966, England and Wales; Migration Summary Tables* Part II, (HMSO), November 1969 (Price £5 7s. 6d.).

*Sample Census, 1966, Great Britain, Economic Activity Tables Part III and Part IV*, (HMSO), September 1969 (Price Part III £2 0s. 0d., Part IV 18s. 0d.).

*UK General and Parliamentary Constituency Tables*, (HMSO), November 1969 (Price £3 5s. 0d.).

### Projections

Appendix K of *Quarterly Return No. 481* shows 1968-based population projections by sex and broad age groups, for the standard regions of England and Wales at 1971, 1981 and 1991. These projections supersede the previous set for the year 1981, based on mid-1966 population estimates, which were published in the *Registrar General's Quarterly Return* for the 4th Quarter of 1967. The current projections are consistent with, and constrained to, the independently-derived projections for England and Wales as a whole which were prepared by the Government Actuary's Department in consultation with the General Register Office. The base populations for the regional projections are the mid-1968 home population estimates, the first to have been revised in the light of the results of the 1966 Sample Census of Population.

5 year age-specific fertility rates and sex-specific 5-year cohort survival factors have been used to obtain future natural change, the rates varying among regions according to their average differential fertility and mortality observed in the period, 1965–1967.

The 1968-based assumptions on future migration embody the latest evidence on current trends, including that from the 1966 Sample Census, and the latest appraisal of the effects which existing regional and Development Area measures, and overseas migration, may have in modifying regional migration patterns over the projection period. The assumptions on net migration are included in the Appendix.

### Migration

Appendix J of *Quarterly Return No. 481* contains for the first time a table showing the gross migrant movement into and out from the total population of the United Kingdom. These estimated gross flows are partly based on the International Passenger Survey but also include estimates of movement between the Republic of Ireland and the United Kingdom derived from National Insurance data.

### Illegitimate births

Appendix H of *Quarterly Return No. 481* contains a new series on seasonally adjusted quarterly illegitimate live birth occurrences giving the numbers and annual rates per 1,000 seasonally adjusted total live birth occurrences from 1958 to 1968 for England and Wales. The original figures for occurrences have been adjusted by removing the estimated regular seasonal fluctuations, in order to give a better appreciation of the underlying trend.

This series is to be kept up to date in future *Quarterly Returns*.

**Reference**

*The Registrar General's Quarterly Return for England and Wales No. 481.* Quarter ended 31st March 1969, (HMSO), September 1969 (Price 3s. 6d.).

### Psychiatric patients

The care of psychiatric patients is of national interest from many points of view. Nearly half of the hospital beds in England and Wales are occupied by psychiatric patients. Within the scope of psychiatry there has, however, been a continuing reduction in beds occupied for mental illness, as distinct from mental subnormality; for example, numbers have declined from 132,000 in 1964 to 124,000 in 1967 and, further, to 120,000 in 1968. This decline has been associated with a gradual reduction in patients' length of stay in hospital. Already by 1964, 44 per cent of patients discharged from mental illness hospitals had stayed less than a month; by 1967 the proportion had risen to 47 per cent. Care of psychiatric patients was meantime being developed outside hospital wards, that is, in the out-patient departments of hospitals, in day hospitals and in the residential, training and other services of local authorities.

The Department of Health and Social Security has been devoting considerable effort to speeding up its publication of psychiatric statistics. In-patient statistics for psychiatric hospitals and units in England and Wales for the years 1964–66 were published last year in the *Statistical Report Series No. 4*; figures for 1967 were published this year (*Statistical Report Series No. 5*). These publications analyse, separately for mental illness and for mental sub-normality hospitals, the admissions and discharges of patients by sex, age, diagnostic group, duration of stay and other characteristics.

These statistics are derived from the Mental Health Enquiry which began in 1949 under the auspices of the General Register Office, with whom responsibility remained until 1960. Over that period the scheme was based on an individual patient's return for each admission to, departure from and death in the main hospitals designated for mental disorder. Following the Mental Health Act 1959 the Ministry of Health collected statistics on an individual patient basis for general planning and administrative purposes. The enquiry conducted by the General Register Office, of a largely clinical nature, continued in a modified form until 1964 when the two schemes were combined under the responsibility of the Ministry of Health and extended to include all national health service psychiatric hospitals and units in England and Wales.

The Department also collects comprehensive data relating to the staffing and services of psychiatric hospitals and units – the framework contributing in part to the quality of care. In 1968 a report 'The Activities of Psychiatric Hospitals: A Regional Comparison: Mental Illness Hospitals and Units 1964' (*Statistical Report Series No. 3*) was published. This gave a series of regional indices of hospital facilities and services. A further report published this year 'The Facilities and Services of Psychiatric Hospitals in England and Wales 1966' (*Statistical Report Series No. 6*) is a continuation and extension of the 1964 material and includes particulars for mental subnormality as well as for mental illness hospitals. In addition to giving regional indices it includes indices for the larger individual hospitals. The indices show a wide variation in facilities and services available, for example, in admission rates, in the number of resident hospital patients, in out-patients and day patients and in the level of medical nursing and other staffing.

The Department has also published 'A Pilot Survey of Patients Attending Day Hospitals, (*Statistical Report Series No. 7*). Considerable attention has been given in the past few years to the value of day hospitals as part of a comprehensive system of psychiatric care. A day hospital is a special unit set apart for the use of patients who attend the hospital other than as out-patients, but who return home at night. Day hospitals serve as an intermediate or linking stage between the hospital and the home. The report includes a series of tables on such matters as the number of patients attending classified by sex and age, the source of referral to day hospital, previous psychiatric care, marital state, occupation and clinical diagnoses. There seems little doubt from the survey that in some cases attendances at a day hospital obviated the need for in-patient care.

**References**

*The Activities of Psychiatric Hospitals: A Regional Comparison: Mental Illness Hospitals and Units 1964* (*Statistical Report Series No. 3*), (HMSO), February 1968 (Price 5s. 3d.).

*Psychiatric Hospitals and Units in England and Wales: In-patient Statistics from the Mental Health Enquiry for the years 1964, 1965 and 1966* (*Statistical Report Series No. 4*), (HMSO), January 1969 (Price £1 7s. 0d.).

*Psychiatric Hospitals and Units in England and Wales: In-patient Statistics from the Mental Health Enquiry for the year 1967* (*Statistical Report Series No. 5*), (HMSO), June 1969 (Price 13s. 6d.).

*The Facilities and Services of Psychiatric Hospitals in England and Wales 1966* (*Statistical Report Series No. 6*), (HMSO), September 1969 (Price 14s. 0d.).

*A Pilot Survey of Patients Attending Day Hospitals,* (*Statistical Report Series No. 7*), (HMSO), September 1969 (Price 7s. 3d.).

**Are family allowance orders cashed promptly?**

Family allowances are paid in respect of families where there are two or more children for whom the conditions are satisfied. The allowance is 18/- a week for the second child plus £1 a week for the third and for each subsequent child. The allowance is normally paid by means of an order book containing weekly orders (usually 52) which are cashed at a Post Office. An order book is generally held and cashed by the mother, but her husband can be an alternative payee.

A family allowance order can be cashed on the date on which it becomes due for payment, or at any time within six months afterwards. The majority of orders are cashed promptly although there is some tendency to save orders.

The Department of Health and Social Security in accounting for expenditure on family allowances has to take account of changes in the propensity to cash orders promptly from one year to another.

An enquiry carried out by the Department of Health and Social Security in March 1969 showed that in a random sample of 1,500 orders cashed in a week 80% were cashed on the due date or within the following week.

*Percentage cashed on due date and subsequent dates*

| | *Number cashed* | *Percentage of total number in sample* | *Percentage of total cash value of sample* |
|---|---|---|---|
| Cashed on due date | 774 | 52 | 58 |
| ,, within a week of due date | 416 | 28 | 25 |
| ,, 1–2 weeks after | 131 | 9 | 8 |
| ,, 2–3 ,, | 66 | 4 | 4 |
| ,, 3–4 ,, | 41 | 3 | 2 |
| ,, 4–5 ,, | 21 | 1 | 1 |
| ,, 5–6 ,, | 13 | 1 | 1 |
| ,, 7 or more weeks after | 38 | 2 | 2 |
| Total | 1,500 | 100 | 100 |

The orders were also analysed by value (which directly indicates the size of family) and this showed that the proportion cashed in the first week was 75% for two-child families, 81% for three-child families and 88% for four-child families. These differences are significant and confirm the common sense hypothesis that the higher the value of the order, the greater the incentive to the payee to cash it quickly.

Family allowance orders become payable on Tuesdays and can be cashed then or on any day thereafter. The table below shows, for each day of the week of the enquiry, the number of orders in the sample cashed together with percentages for these numbers and for the amount of money drawn.

*Day of encashment*

| *Day* | *Number cashed* | *Percentage of total number in sample* | *Percentage of total cash value in sample* |
|---|---|---|---|
| Tuesday | 928 | 62 | 66 |
| Wednesday | 239 | 16 | 15 |
| Thursday | 150 | 10 | 9 |
| Friday | 117 | 8 | 6 |
| Saturday | 42 | 3 | 3 |
| Monday | 24 | 2 | 1 |

Some figures were also obtained about the extent to which orders were cashed singly, or two or more orders cashed together. The percentage distribution was as shown in the table below.

| *Numbers of orders in encashment* | *Percentage of total encashments* |
|---|---|
| Single | 81 |
| Two | 11 |
| Three | 4 |
| Four | 2 |
| Five or more | 2 |
| Mean number of orders cashed per visit | 1·4 |

A similar enquiry was carried out in March 1966. At that time the family allowance payable was 8/- for the second child and 10/- for the third and each subsequent child. That showed that about 53% of family allowance orders were cashed on the due date or within a week. But since then the rate of family allowances has been more than doubled.

On the basis of the enquiry carried out in March 1969 it was estimated that, out of a total family allowance bill of about £300 million in 1968/69, the value of orders held uncashed at 31 March 1969 was at most £6 million.

## HOUSING

### Housing condition surveys

The first two in a series of *Housing Survey Reports* prepared by the Ministry of Housing and Local Government were published in September. These deal with the 1967 House Condition Surveys in the West Midlands and South East Lancashire Conurbations (announced in *Statistical News* 1.17). Each Report describes the survey method and presents analyses of the conurbation dwelling stock by condition, estimated cost of repairs, availability of basic amenities, tenure, age, number of rooms and gross (rateable) value. A few of the results have already appeared in *Housing Statistics* No. 10. Ten per cent of the 764,000 dwellings in the West Midlands conurbation are estimated to have been unfit for habitation in 1967, and 15 per cent of the 844,000 dwellings in the South East Lancashire conurbation, compared with almost 12 per cent of dwellings in England and Wales as a whole. The lack of basic amenities was seen to be particularly prevalent in Lancashire, which contains a high proportion of pre-1919 housing.

The next two reports will be on the similar surveys carried out in 1968 in the Merseyside and Tyneside conurbations; some of the main results of these two surveys have been published in *Housing Statistics* No. 14. A house condition survey of the West Yorkshire conurbation was carried out this spring.

*Housing Statistics* No. 14 also contains some hitherto unpublished tables from the 1967 House Condition Survey in England and Wales. These show the gross value distribution of the stock analysed by age, amenities and tenure; the number of rooms by age, tenure and condition; and amenities by age. (Other tables have appeared in *Housing Statistics* Nos. 9 and 10 and in *Economic Trends* May 1968.)


**References**

*Housing Survey Reports*; No. 1 West Midlands House Condition Survey, No. 2 South East Lancashire House Condition Survey (HMSO), September 1969 (Price 5s. 0d. each).

*Housing Statistics, Great Britain* (Quarterly), (HMSO), No. 9, July 1968 (Price 8s. 6d.), No. 10, October 1968 (Price 8s. 6d.), No. 14, September 1969 (Price 12s. 0d.)


### Household projections

Issue 14 of *Housing Statistics, Great Britain* contains projections of the number of potential households, classified into household types, in Great Britain and its countries and regions, for 1971 and 1981. These projections, which are derived from the Registrar General's 1966 based population projections, were calculated by the Ministry of Housing and Local Government using the 'headship rate' technique which has recently been further developed and refined.

Potential households are defined as families and other groups likely to want separate dwellings. They comprise actual households, *plus* married couples not heading households, *less* three-quarters of those one-person households who share a dwelling. The deduction is made to allow for the preference of a proportion of those living alone for sharing a dwelling with another household.

Basically, the number of potential households is calculated by multiplying a projected population, divided into age, sex and marital condition categories, by headship rates which represent the proportions of persons in each category who head households. The techniques employed and the problems involved are described in more detail in a paper read to the recent Urban Studies Conference in Manchester[1].

The results obtained show a decline in the net rate of potential household formation in England and Wales from some 150,000 a year in the mid-1960's to 100,000 in the late 1970's. This partly reflects an assumed reduction in the rate of increase of headship rates. The estimated number of potential households rises from 15·9 million in 1966 to 17·8 million in 1981. Among household types the most rapid increase over this period is in one-person potential households, from 2·1 million to 2·6 million. Among the regions, East Anglia and the Midlands are expected to show fastest increases.

It is intended to publish further projections from time to time to take account, for instance, of revised population projections. A computer program is now being developed to compute these projections, in particular for local authority areas. It is hoped that the program will be of use to planning bodies in estimating future housing requirements as it will then be possible to compare the results of alternative assumptions, for instance about trends in headship rates or about population growth and the factors, particularly migration, which affect it.

## EDUCATION

### Scottish education

*Universities*

*Scottish Educational Statistics* 1968, which was published in June 1969, includes for the first time a set of tables for the Scottish universities based on information provided by the University Grants Committee. The figures show a provisional total of 33,499 students (30,146 under-graduates and 3,353 post graduates) in Autumn 1968. This compares with 17,176 in 1958/59,

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(1)D. E. Allnutt: Projecting Future Numbers of Households, copies available on application to Statistics Branch, Ministry of Housing and Local Government.

an increase of 95 per cent. Over the period 1956/57 to 1966/67 first degrees awarded rose from 2,387 to 5,332, an increase of 123 per cent. This is accounted for in part by a more than proportionate increase in the number of Honours degrees awarded, 767 or about 30 per cent of all first degrees in 1956/57 compared with 2,244, about 40 per cent in 1966/67.

*Survey of school leavers*

Another innovation is the section devoted to the results of a 10 per cent sample survey of qualified school leavers who left school during session 1966/67. The survey showed that of all the pupils sampled (three Scottish Certificate of Education 'O' grades was the minimum considered) just under 50 per cent continued in full-time education when they left school. The vast majority of the highly qualified leavers continued in full-time education – some 90 per cent of those with five 'H' grades and more. There was a marked difference between boys and girls in the types of full-time education pursued, 70 per cent of the boys entered university, but only 33 per cent of the girls.

On the other hand 30 per cent of the girls entered colleges of education compared with 3 per cent of the boys. Of the girls who went to the colleges of education almost 30 per cent possessed the level of qualifications, 4 'H' grades or more, generally considered suitable for entry.

The survey also provided information on the pattern of SCE subjects held by those who entered various fields of study at university. They illustrate the comparative breadth of subject coverage of the Scottish school leavers. Two-thirds of the boys had qualifications involving at least two science and two non-science subjects, although for girls the balance was emphatically towards non-science. It is notable that nearly 86 per cent of the boys and 65 per cent of the girls who went on to university were shown by the survey to have a Higher grade pass in mathematics.

The upward trend for pupils to stay on at school above the statutory leaving age and to study to the level of 'O' grade continues unabated. The latter is reflected in the proportionate rise in the numbers of pupils leaving school with SCE qualifications. 35 per cent in 1968 compared with 22 per cent in 1963. The trend to stay on is one factor which gave rise to the highest pupil population ever recorded (almost 950,000).

*Further education*

On the further education front the numbers of students in non-advanced courses are shown to have increased by 6 per cent over the period from October 1965 to October 1968, a trend which disguises the fact that evening-only attendances over the same period diminished by 15 per cent, having given way to full-time or other forms of part-time attendance. The trend in advanced level study is largely similar, with an increase between 1965 and 1968 of over 19 per cent in the total number of students for all modes of attendance.

*Teachers*

Comparability with teacher statistics of previous years is made a little difficult by the introduction of Registration as the means of describing the eligibility of persons to teach. However the numbers of formerly certificated teachers, full-time and attached to one school, increased between December 1967 and December 1968 by 6 per cent in nursery and primary and by 3 per cent in secondary. The numbers in further education increased by almost 9 per cent. Married women are shown to comprise a large proportion of the nursery and primary school teaching force – nearly 43 per cent of the Registered teachers at December 1968 were married women – though in secondary schools the proportion, 18 per cent, was much smaller. On the teacher training side, the numbers of students entering training continued to increase both for graduates, over the previous year, and non-graduates, 12 per cent. The numbers of non-graduates completing training in 1967/68 also showed a large increase over the previous year, 20 per cent, a direct consequence of the high 'bulge' school leaver intake to the Primary Diploma Course in 1965/66.

**Reference**

*Scottish Educational Statistics 1968*, (HMSO), June 1969 (Price 28s. 6d.).

## MANPOWER AND EARNINGS

### Manpower planning

A personnel management course has recently been introduced at the Civil Service Centre for Administrative Studies on an experimental basis. It included a day devoted to manpower planning techniques, organised by the Statistics Division of the Civil Service Department. Professor D. J. Bartholomew (University of Kent) and Mr. R. W. Morgan (University of Cambridge), both consultants to the CSD Statistics Division, gave two of the four lectures. The other lectures were given by CSD Statistics Division full-time staff: Mr. J. A. Rowntree and Mr. P. Ashdown. Mr. Ashdown also regularly lectures in statistics for CAS. The one day session was chaired by Mr. A. R. Smith.

On the preceding day 'The case for manpower planning' was presented under the chairmanship of Mr. B. R. Morris, also of the CSD Statistics Division. The speakers included Mr. D. B. Hughes and Mr. C. W. Walmsley (ICI), Mr. D. T. Bryant (Tavistock

Institute), Mr. D. J. Bell (ICL) and Mr. J. Wheeler (BP). This team was brought together by the Manpower Planning Study Group (see *Statistical News* 5.23). They gave a similar presentation at the Institute of Personnel Management Annual Conference at Harrogate on 9 October under the chairmanship of Mr. A. R. Smith. Most of the people involved are members of the MPSG Executive Committee. An additional speaker at the CAS presentation was Mr. Charles Watkinson who is responsible amongst other things (as head of the CSD Division MP3) for the personnel management of the Statistician Class of the Civil Service. Mr. B. R. Morris has also given talks on manpower planning techniques recently for the Industrial Society and an Industry Training Board.

Early in November the British Institute of Management held a one-day seminar on the Economics of Manpower Planning, under the chairmanship of Mr. Ray Gunter. The seminar discussed amongst other things the newly-established Institute of Manpower Studies. The Director of this new research institute, Mr. Michael Hall, was amongst the speakers, as was Mr. A. R. Smith of the CSD Statistics Division.

The Manpower Planning Study Group has sponsored the preparation of a bibliography of manpower planning. This will be published shortly by English Universities Press. The editor is Mr. C. G. Lewis of the Ministry of Defence Statistics Division. Amongst the contributors are Mr. W. R. Hawes of the DEP Manpower Research Unit, Miss Rosemary J. Medlar of the Central Statistical Office, and Mr. A. L. Oliver of the MOD Statistics Division. Others are Messrs. D. J. Bell, D. T. Bryant, A. F. Forbes, C. S. Leicester, C. J. Purkiss and G. A. Yewdall.

Now that he has become Secretary to the Institute of Manpower Studies Mr. K. H. Boehm has been obliged to relinquish the post of membership secretary of the Manpower Planning Study Group (see *Statistical News* 5.23). This task has now been taken over by Mr. J. K. Gealy of the Statistics Division, Civil Service Department, Whitehall SW1.

It seems likely that the 1970 International Conference of the Institute of Management Sciences (see *Statistical News* 6.28) will include a substantial number of papers on manpower planning. The session chairman for manpower, Mr. A. R. Smith, has received offers of 30 papers in this area so far.

The Northern Manpower Study Group (see *Statistical News* 5.23) has now published its programme for 1969/70. It comprises six monthly meetings in Manchester University, dealing with manpower planning in hospitals, the textile industry, the hotel industry, local Government, the Civil Service and ITB's, respectively, under the general title 'Manpower Planning: Techniques and Practice'. Details may be obtained from Mrs. E. Mumford, Manchester Business School.

**Regional earnings**

The regional statistics of earnings produced by the Department of Health and Social Security from information contained in the Department's records of graduated insurance contributions were described in *Statistical News* 1.22. Figures are now available for the 1967–68 tax year. Copies of the basic tables have been sent to interested departments and some derived figures have been published in the *Abstract of Regional Statistics* this year.

The analyses are in the same general form as those produced for previous years but a new table has been introduced to give some information about the earnings of persons who were not full-year workers i.e. who had at least one but fewer than 48 Class 1 flat-rate contributions paid or credited in the year. Versions of the new tables are available for Great Britain and each statistical region for men, spinsters, married women paying full flat-rate contributions, other married women, and widows and divorced women. Separate tables cover those who paid up to 12, 13 to 25, 26 to 38, and 39 to 47 Class 1 contributions – an indication of the weeks for which pay was received.

It must be remembered that the size of the sample of insured persons from which the Department's statistics of earnings are obtained is only 0·5 per cent and the numbers of persons covered by the new table are relatively small (6,575 men and 12,248 women, a substantial proportion being under age 25). Moreover, the earnings of more than 10 per cent of the men and 20 per cent of the women were not known (these are mainly in the 0–12 category) because they did not attract a tax deduction document. It is likely, therefore, that really meaningful conclusions cannot be drawn for many of the categories. Nevertheless, the new analyses have been produced in considerable detail to provide the individual user with the opportunity to summarise the data in whatever way he wishes.

The Department's statistics of earnings for Great Britain as a whole include separate analyses by age and earnings for participants and non-participants in the graduated pension scheme; average annual earnings derived from the tables are published regularly in the Department's Annual Reports. Versions of the tables are available for men, spinsters, married women and widows and divorced women and, in the case of married women who paid at least 48 Class 1 contributions in the year, for optants out of the flat rate scheme and non-optants.

### MRU publications

The Manpower Research Unit (MRU) is part of the Department of Employment and Productivity. The following is a list of MRU publications to date.

#### MANPOWER STUDY SERIES

No. 1 *The pattern of the Future*

A survey undertaken in 1964 of future manpower resources, describing the changes expected at that time in the size and structure of the working population.

No. 2 *The Metal Industries*

An exploratory study of the trends in occupational requirements for the period 1963–68 based on forecasts and opinions provided by over 300 establishments in the metal manufacturing and metal using industries.

No. 3 *The Construction Industry*

An examination of the size and structure of the labour force of the construction industry, based mainly on official statistical information.

No. 4 *Computers in Offices*

A study of the effect of computers on office employment, based on a survey by questionnaire and discussion, covering establishments with computers in use or on order in January 1964 (see *Statistical News* 1.23 and 6.22).

No. 5 *Electronics*

A survey of occupational requirements, problem areas and the effects of new techniques in the electronics industry with forecasts of changes in occupational structure.

No. 6 *Occupational Changes* 1951–61

A study of the changes in the occupational structure of industry, based on the population censuses of 1951–61 (see *Statistical News* 1.21).

No. 7 *Growth of Office Employment*

An analysis by industry of the growth of office employment in Great Britain between 1921 and 1961, based on censuses of population (see *Statistical News* 1.23).

No. 8 *Food Retailing*

A study of employment in retail grocery and provision shops, comparing the composition and use of the labour force in counter service and self-service establishments, based on a survey of 1,798 shops (see *Statistical News* 5.24).

#### MANPOWER PAPERS SERIES

No. 1 *Company Manpower Planning*

A general introduction to the practical application of manpower forecasting and planning techniques at company level (see *Statistical News* 4.29).

## PRODUCTION

### Northern Ireland Census of Production

The final report on the Census of Production of Northern Ireland for 1967 has now been published (preliminary estimates were issued in December 1968).

An article describing the purposes of the Census of Production and the nature of the operations involved was contributed by Mr. H. E. Browning in *Statistical News* 5.1. The article referred mainly to the Censuses for the whole United Kingdom for 1963 and 1968. The returns for establishments in Northern Ireland are collected by the Ministry of Commerce and passed to the Census Office for inclusion in these United Kingdom reports as well as being used as the basis for separate Northern Ireland reports.

In the years when a full census has not been taken by the Board of Trade the Ministry of Commerce has taken a less detailed one for Northern Ireland and the report now published is the latest in a series of annual reports which go back to 1949. The reports on the sample censuses contain much of the basic information – output, employment, wages and salaries, capital expenditure, etc. – similar to a detailed census report but the commodity analysis of purchases and sales is omitted.

Sales are analysed to show the value of sales to customers in Northern Ireland, in Great Britain and outside the United Kingdom. Similarly separate figures are shown for work done for customers inside and outside Northern Ireland. Exports outside the United Kingdom are further broken down giving an analysis by geographical area and industrial grouping and also an analysis by country of destination. Although these analyses are a valuable addition to other information available about Northern Ireland's external trade, they do not give a complete statement of exports because the figures do not include all of the sales through shipping houses and other intermediaries, and firms employing fewer than 25 persons are excluded.

The report for 1967 summarises the returns received in respect of 1,153 establishments which had a gross output of some £928 million and employed 206,000 persons.

**Reference**

*Report on the Census of Production of Northern Ireland 1967* (HMSO), September 1969 (Price 11s. 0d.).

## FOOD AND AGRICULTURE

### Food consumption levels

Revised estimates of food consumption in the United Kingdom, together with detailed nutritional analyses for the period 1965 to 1968, were published on 30 July 1969 in the *Board of Trade Journal*.

The estimates relate to total supplies of food moving into consumption (after deductions for exports, waste and non-food uses), divided by the estimated population to give average consumption per head. They are the only available figures for the total food consumption of the population as a whole, and enable the overall food position to be compared over different periods of time.

In recent years the national diet has shown marked stability in terms of energy value and nutrient content, though there is a long-term tendency for the contributions from protein and fat to increase, and for that from carbohydrate to decline.

### Workers leaving Scottish farms

The number of workers on Scottish farms has been falling for many years, and this is of interest not only in relation to the future adequacy of the agricultural labour force but also in that it releases workers for other industries. Twice-yearly agricultural censuses furnish statistics about workers employed, but little is known about those moving from one farm to another or out of agriculture altogether.

Between July 1967 and June 1968 the Department of Agriculture and Fisheries for Scotland carried out a survey of a random sample of 3,000 farms throughout Scotland (1 in 11 of full-time and 1 in 50 of part-time and other farms) to obtain some information about the circumstances in which workers leave – whether they are redundant or leave of their own accord to go to other occupations; what occupations they go to; and whether they are mainly in the older or younger age groups. Each farmer in the sample was interviewed by a Field Officer of the Department about workers who had left during the previous 12 months, and while it would have been desirable to confirm some of the information from the workers concerned, such as why they left and where they went, this was not practicable. An article in *Scottish Agricultural Economics*, Volume XIX, 1969 gives results relating to hired male full-time workers, the most important category.

Figures are given for Scotland as a whole and for five regions. It was found that 15·5 per cent of the adult workers, and 40 per cent of the youths, left the surveyed farms during the year, of whom 60 per cent were replaced. The net loss to agriculture of hired male full-time workers was 7·2 per cent for Scotland and ranged regionally from 5·1 per cent in the South East to 7·9 per cent in the Highlands. There were greater regional variations in the rate of gross loss and of replacement than in the net loss. Other topics covered included age, length of service, subsequent occupation, and reason for leaving. Compared with the average worker employed, those who left were younger and their length of service was less. Two-thirds left of their own accord and the most important single reason for doing so was inadequate pay.

## TRANSPORT

### Civil aviation

The *Report of the Committee of Inquiry into Civil Air Transport* (the Edwards Committee Report) recommended the publication of more statistical information about airline operations. As a first step the Board of Trade are now publishing an additional *Business Monitor* (C.A.6) in the Civil Aviation series. This contains statistics of passengers using United Kingdom airports on domestic routes. The first publication in this series gives figures for the first quarter of 1969. Subsequent publication will be as soon as possible after each quarter's data becomes available. An annual summary of passenger traffic on all domestic routes in 1968. Discussions with the airlines are proceeding about the publication of more detail on international services operating to, from and through United Kingdom airports and on financial statistics.

The new Monitor is available on annual subscription of 10s. 0d.: reduced rates are offered for bulk orders. Orders should be sent to HMSO, P.O. Box 569, London, S.E.1.

Two articles on air transport have recently been published by the Board of Trade. These articles supplement the civil aviation statistics published regularly in the *Business Monitor* (Civil Aviation) series. A short article published in the *Board of Trade Journal* of 9 July deals with the traffic of British airlines in 1968 and includes tables showing separately for BOAC and BEA and in total for the independent companies statistics relating to passengers, freight and mail carried and the distances flown during the year. Monthly figures of passengers carried during the past two years on scheduled services show the highly seasonal nature of this traffic.

The second article, published in the August 1969 issue of *Economic Trends* reviews the growth of air transport over the last decade and the changes in the traffic and capacity of the British operators and the scale of their international operations which makes the United Kingdom the second largest provider of international air transport services. The article shows the dramatic growth of airborne holidays by inclusive tour; from

minor operations 15 years ago this kind of business has grown to represent nearly half of all non-scheduled operations.

There is a section with illustrative tables about activity at United Kingdom airports and the rapid growth in passengers and freight passing through them in the past 15 years.

**Reference**
*British Air Transport in the Seventies.* (*Report of the Committee of Inquiry into Civil Air Transport*, Cmnd 4018, (HMSO), June 1969 (Price £1 15s. 0d.).

### Car ownership growth in Britain

In 1961, only 30 per cent of Great Britain's households owned a car and only two per cent had more than one car. By mid-1968, just under half Britain's households had a car and six per cent had two cars or more.

This information is given in a new table in *Highway Statistics* 1968 published by the Ministry of Transport in August 1969. This annual publication gives figures for 1968 and earlier years of the numbers of motor vehicles currently licensed and newly registered, estimates of road traffic and statistics on road mileage and road expenditure. Although most of the information relates to Great Britain, there are a number of tables which give figures for the United Kingdom as a whole.

Results of the 1968 vehicle census in this issue contain an interesting new analysis (table 13) of cars and private vans by body type as well as engine size. Of the 10,816,100 vehicles in Great Britain registered in 1968 in the private taxation class, 9,555,700 (88 per cent) were saloons, coupés, sports cars and convertibles; 679,800 (6 per cent) were estate cars and station wagons; 496,500 (5 per cent) were vans; 42,000 were minibuses; and 42,000 were of other types.

Total traffic has more than doubled from 58,000 million vehicle-miles in 1958 to 118,000 million vehicle-miles in 1968; while, over the ten years, not only has the number of cars increased from 4·5 million to 10·8 million, but the average annual mileage of each car has increased from 7,400 in 1958 to 8,200 in 1968.

**Reference**
*Highway Statistics 1968*, (HMSO), August 1969 (Price 12s. 6d.).

## OVERSEAS FINANCE

### Balance of payments

The 1969 issue of the balance of payments Pink Book contains several new tables. Table 23 gives details of the financing of private overseas investment, showing in particular how control over private investment by the United Kingdom in non-sterling areas has been reflected in changes in the reserves. The reserves are shown not to have been directly affected by the growth of United Kingdom private investment in non-sterling areas, since the investment was largely financed by reinvested profits or borrowing from overseas. In Annex 1 (Tables 35 to 40) the analysis of capital transactions has been considerably extended. Table 35 provides separate figures for:

Outflows (acquisition of assets) and inflows (assumption of liabilities)

Public and private sector participants in the United Kingdom

The principal types of assets or liabilities in which transactions occur

Table 37 gives the corresponding United Kingdom external assets and liabilities outstanding at the end of each recent year.

New information about invisibles includes Annex 6 on United Kingdom shipping where, for certain years, additional data are given which distinguish between the operations of ships owned by the United Kingdom and those time-chartered from abroad and between dry-cargo ships and tankers. The significance of receipts from international services which do not enter the balance of payments accounts is also explained in this annex; these figures for both shipping and airlines are now given in Tables 12 and 13. Annex 5, on overseas earnings of financial institutions, has been expanded to cover investment trusts, unit trusts and pension funds.

**Reference**
*United Kingdom Balance of Payments, 1969*, (HMSO), September 1969 (Price 15s. 0d.).

### Under-recording of exports

An article published in the *Board of Trade Journal* of the 10 September 1969 describes the investigation into the under-recording of exports. It explains how the investigation came to be instituted, and describes the problems involved and the results that emerged. The net under-recording of exports (under-recording net of some over-valuation) was estimated at 2 per cent for 1968 and the first half of 1969. Although no firmly based historical series can be constructed, a table is given showing estimates of the net under-recording of exports for the period 1963 to 1968, and the first half of 1969.

### Invisibles

An article on 'Trends in invisible transactions' was published in the *Board of Trade Journal* on 17th September, 1969. This was the first of a series of articles which will appear either at quarterly or half-yearly intervals, and will discuss recent trends in the credits and debits to the balance of payments resulting from 'invisible' transactions such as shipping, travel, civil aviation, financial services, etc.

## NATIONAL INCOME ACCOUNTS

### National income and expenditure, 1969

The 1969 Blue Book, which was published on 15 September contains the same tables as the 1968 edition, apart from the omission of the three tables on input-output, on which much more detailed tables will be published in a separate booklet early next year. The estimates have been revised to include the latest information, the main changes being various revisions to the items of consumers' expenditure, the inclusion of the allowance for under-recording of exports since 1963, and the incorporation in the income estimates of more up-to-date information from tax assessments. The treatment of the cost to the government and local authorities of providing school meals, milk and welfare foods has been changed and it is now regarded as direct expenditure on goods and services by the authorities and not a grant in kind to persons; this has the effect of lowering the figures of consumers' expenditure and increasing those of public authorities' current expenditure on goods and services. There has also been a change in the timing of the series for expenditure on electricity; consumers' expenditure and the electricity corporations' trading surplus now relate to consumption in the period instead of to amounts billed and meter collections. The classification of the Treasury analysis of public expenditure has been changed to agree with that recommended in the Green Paper (*Public Expenditure: A New Presentation*, Cmnd. 4017) for use in future White Papers on public expenditure.

### Quarterly accounts

The October issue of *Economic Trends* as usual contains the long run of quarterly figures consistent with the 1969 Blue Book. On this occasion, the accounts have been expanded to show separately the accounts for companies and public corporations and from 1963 all of the current accounts are given on a seasonally adjusted as well as an unadjusted basis. Seasonally adjusted series for the personal income and expenditure account and the company appropriation account have been published for some time, but the complete seasonally adjusted series for the public corporations' appropriation account, the current account of central government and the current account of local authorities are being published for the first time.

Most of the seasonally adjusted series for the public sector accounts have been calculated by a ratio to moving average method, with constant or variable factors according to whether or not the seasonal pattern appears to be changing. Some of the series are affected by irregularities in payments which are reflected in seasonally adjusted series. As far as possible the seasonally adjusted series reflect changes in rates of tax and benefits when they occur and the series are consistent with the corresponding series included in the constant price estimates.

**References**

*National Income and Expenditure, 1969* (HMSO)., September 1969 (Price 9s. 0d.).

*Economic Trends*, (HMSO), October 1969. (Price 8s. 0d.).

## NATIONAL BOARD FOR PRICES AND INCOMES

### Pay of top executives in private and nationalised industry

A report on *Top Salaries in the Private Sector and Nationalised Industries* by the NBPI was published in March. For this report the Board conducted a survey of pay and other remuneration of top executives in the 12 main nationalised industries and a stratified sample of the 300 largest industrial, commercial and financial companies in the private sector. The response rate was 88 per cent and covered 99 organisations.

The survey asked for information about the company or corporation and for selected top executives details of their composition of pay, fringe benefits, conditions of service and various measures of responsibility. Top executives were defined as full-time main Board Members and other senior managers reporting direct to a member of the main Board – excluding those with a controlling interest, foreign nationals and non-residents. The analyses of pay, conditions and responsibility were based on individual returns for about 2,000 of these executives.

The analyses used various broad measures of responsibility for comparing the pay between the nationalised and private sectors. Other analyses were concerned with the extent of bonuses, pensions and other benefits, age, length of service, main function, qualifications and retirement age. The survey also analysed movements in pay over the past six years.

**Reference**

*Top Salaries in the Private Sector and Nationalised Industries*, National Board for Prices and Incomes, Report No. 107, Cmnd. 3970 (HMSO), March 1969 (Price 8s. 6d.).

### Pay of armed forces

The NBPI in June made its second Report on the *Pay of the Armed Forces* under its standing reference. The report gives the results of two attitude surveys among members of the Forces carried out by the Board in consultation with the Ministry of Defence. Summary results of these surveys are published in the report and fuller results have been passed to the Ministry.

The first enquiry was directed at all officers and other ranks leaving the Services during the four-week period ending 16th November 1968, and analysed the main reasons for their decision to leave the Service, their plans for employment and housing and their atti-

tude to the resettlement service. Questionnaires were issued to a total of 241 officers and 2,273 other ranks of all Services and the response rates were 77 per cent and 55 per cent respectively.

The second survey, which was made in February this year, covered serving personnel. Usable returns were received from 1,412 officers (2·9 per cent of all serving) and 3,309 other ranks (1·0 per cent of all serving) and the response in both cases amounted to 80 per cent of the sample. Apart from various characteristics such as rank, branch, age, length of engagement, marital status, etc., the survey provides details of family and educational background, views both on present pay and on the concept of a military salary, on job satisfaction, service life generally and details of the amounts of annual leave taken and for other ranks, their hours of duty.

**Reference**
*Standing Reference on the Pay of the Armed Forces: Second Report*, National Board for Prices and Incomes, Report No. 116, Cmnd. 4079 (HMSO), June 1969 (Price 10s. 6d.).

### Pay in electrical contracting industry

A report by the NBPI on *Pay and Conditions in the Electrical Contracting Industry* was published in June 1969. The report contains various analyses of conditions of service, hours of work and composition of earnings by occupation, region and size of firm extracted from the survey on pay and conditions in the construction industry other than building and civil engineering (referred to in *Statistical News* 4.35).

**Reference**
*Pay and Conditions in the Electrical Contracting Industry*, National Board for Prices and Incomes, Report No. 120, Cmnd. 4097 (HMSO), June 1969 (Price 7s. 0d.).

### Operatives in clothing manufacture

A Statistical Supplement to the NBPI's Report on *Pay and Conditions in the Clothing Manufacturing Industries* was published in July 1969. The Supplement gives the results of the sample survey of pay and conditions of employment for a week in November 1968 of operatives in different parts of the clothing manufacturing industry covered by ten Wages Councils. The NBPI was supported by DEP officers in sampling, collecting questionnaires and assisting with their completion where required.

The sample of firms varied according to the number covered by each Wages Council and details of pay and hours were obtained for sub-samples of operatives. Valid returns were received from 1400 establishments, a response of 72 per cent of the sample and representing 13 per cent of all establishments engaged in clothing manufacture. Data on pay and hours were collected for 9,400 operatives, or 2 per cent of the labour force. The analysis shows the structure of the industry and its labour force, the timing and nature of wage revisions, seasonal variations in pay and various tables on conditions of service, hours of work and pay, classified by Wages Council size, region and type of establishment and by sex, occupation and method of payment of operatives.

**Reference**
*Pay and Conditions in the Clothing Manufacturing Industries* (*Statistical Supplement*), National Board for Prices and Incomes, Report No. 110 (Supplement), Cmnd. 4002–1 (HMSO), July 1969 (Price 7s. 6d.).

## INTERNATIONAL

### Manpower models

A Conference on 'Mathematical Models for the Management of Manpower Systems' was held during 1–5 September 1969 in Oporto under the auspices of NATO (see *Statistical News* 5.23). There were about 150 participants from sixteen countries and from the international staffs of NATO and OECD Industry and commerce (especially air lines), government departments, universities, research institutes, and management consultancies were all represented.

The papers considered by the Conference were grouped into the following Sessions: Econometric models, Models of Educational systems, Computer systems, Mathematical programming, Assignment models and Some Mathematical considerations. The papers and the discussions which followed their presentation are to be published in full by English Universities Press. The target date is May 1970.

The UK Government Statistical Service made a substantial contribution to the Conference. Papers were contributed by Professor Vajda who is a consultant with the Defence Statistics Division, by Professor Bartholomew and Mr. A. D. Butler, and by Mr. R. W. Morgan. Professor Bartholomew and Mr. Morgan are consultants to the Civil Service Department Statistics Division, which Mr. Butler joined on 1st October 1969. Mr. A. R. Smith, also of the CSD Statistics Division, was overall Conference Director, and both he and Professor Vajda were also Session Chairmen. Mr. A. L. Oliver of the Defence Statistics Division was consultant to the Conference staff. Miss Rosemary J. Medlar of the Central Statistical Office, Mr. E. Jones, Mr. C. G. Lewis and Mr. J. N. Lithgow of the Ministry of Defence, Mr. J. A. Rowntree and Mr. P. L. Ashdown of the Civil Service Department and Mr. I. G. Heslop of the Post Office also attended the Conference.

The Administrative Director of the Conference was Professor Rogerio de Sousa Nunes (Computer Laboratory, University of Porto), and the social programme was arranged by Professor Francisco Guerra (Portu-

guese representative on the NATO Science Committee). The Conference participants were deeply impressed by the efficiency of the Conference administration and the overwhelming hospitality which they received from everyone they met in Portugal.

In view of the very considerable interest aroused by the Conference further Conferences on the same theme are likely to be held.

## PUBLICATIONS

### *National Institute Economic Review

The August issue of the *National Institute Economic Review* includes articles on monetary policy and on the office machinery industry. (Copies of the issue can be obtained from the National Institute Economic Review, 2 Dean Trench Street, Smith Square, London, S.W.1).

The monetary article, 'Two aspects of the monetary debate' by M. J. Artis, falls into two parts. The first reviews the arguments put forward by the so-called 'Chicago School' in the United States for believing in particular that changes in the money supply are a primary cause of fluctuations in income but that, as the causal process takes a long and varying time, the authorities should aim at a steady rate of growth in the supply of money in preference to a policy of 'fine-tuning'. It also describes the results of applying to United Kingdom data tests of a kind recently employed in the United States. These suggest that, while the monetarist school had demonstrated a 'gross' association between money and certain macro-economic variables, in the United Kingdom at any rate fiscal measures may be more powerful as well as quicker-acting than monetary measures. But the equations do not provide a good explanation of changes in gross domestic product and neither methods nor data are considered to be entirely satisfactory. The second part of the article discusses the new concept of domestic credit expansion (DCE), its presentation in *Financial Statistics*, and its relationship with the former official concept of changes in the money supply and with studies carried out at the International Monetary Fund. It concludes that, since monetary statistics become available quickly, DCE could be a useful indicator of trends in the economy, but that the case for regarding it as a dominating influence has not been publicly made.

The other article, 'The office machinery industry in the United Kingdom' by S. Hays, Mrs. M. F. W. Hemming and G. F. Ray, is part of a wider investigation into the competitiveness of British industry which the National Institute has been undertaking with the financial support of the Department of Economic Affairs. The article describes the growth of the office machinery industry in this country and discusses the reasons why this has fallen far below the rates achieved elsewhere (despite the important contributions made by foreign-owned firms, which appear to be more advanced, particularly from the technological point of view, than their purely British counterparts). Drawing upon the results of three special inquiries conducted in 1967, it suggests that, despite a relatively good export record, the industry suffers from considerable competitive weakness, with productivity rising only slowly and growth lagging behind demand. It attributes this weakness principally to an undemanding public, lack of incentives for mechanisation, inadequate market research, lack of entrepreneurship, under-capitalisation and the handicap of the newcomer (in relation to the United States, where most types of equipment originated).

*Indicates that the contribution refers to work outside the Government service but is included because of its relevance to Government statistical work.

### Health and Social Security Annual Report

The annual report of the Department of Health and Social Security for the year 1968 was published in July 1969. For ten months of the year the report covers the work done by the Ministry of Health and the Ministry of Social Security before their amalgamation in November. Part I covers the Health and Welfare services and continues the series of statistics contained in the reports of the former Ministry of Health about finance, executive council services, local authority services, hospital and specialist services, etc. Part 2 deals with Social Security services and includes statistical tables following the pattern of earlier years about national insurance contributions and benefits and supplementary benefits (see *Statistical News* 2.16).

**Reference**

*Annual Report of the Department of Health and Social Security for the year 1968*, Cmnd. 4100, (HMSO), July 1968 (Price £2 0s. 0d.).

### Abstract of Regional Statistics

The 1969 issue of the *Abstract of Regional Statistics* has been expanded to include a detailed list of the areas covered by sub-divisions of the Standard Regions of England and Wales. Series are analysed by sub-division where possible. Several new tables have been added, in particular population tables containing information based on the results of the 1966 Census of Population.

**Reference**

*Abstract of Regional Statistics*, No. 5, 1969 (HMSO), November 1969, (Price £1 0s. 0d.).

### Insurance Business: Statistics

*Insurance Business: Statistics*, published in August 1969, contains a double set of figures relating to the accounts and statements deposited with the Board of Trade covering business transacted by insurance

companies for accounting years ended between 1 September 1964 and 31 August 1965 and accounting years ended between 1 September 1965 and 31 August 1966.

The publication contains tables giving various items of basic information about insurers carrying on business in Great Britain.

*Insurance Business: Statistics* takes the place of the annual summary of insurance business called *Insurance Business: Summary of Accounts and Statements* which was last published in 1967 and set out accounts and statements deposited with the Board of Trade for accounting years ended on or after 31 December 1963 and on or before 31 August 1964.

**Reference**
*Insurance Business: Statistics*, (HMSO), August 1969, (Price £7 0s. 0d.).

## GOVERNMENT STATISTICAL SERVICE

### Appointments

CENTRAL STATISTICAL OFFICE

*Mr. R. E. Fry* has been appointed to a new Chief Statistician post dealing with social statistics. Mr. Fry was formerly Assistant Director of the Research and Intelligence Unit, Greater London Council.

MINISTRY OF TECHNOLOGY

*Mr. K. G. H. Binning*, Assistant Secretary, has taken charge of the Industrial Statistics Branch following Mr. K. V. Henderson's move to the Ministry of Overseas Development.

BOARD OF TRADE

*Mr. M. J. G. M. Lockyer* has been promoted to Chief Statistician.

GENERAL REGISTER OFFICE FOR SCOTLAND

*Mr. A. L. Rennie*, an Assistant Secretary in the Scottish Home and Health Department, has been appointed Registrar General in succession to Mr. J. A. Ford. Mr. Ford has been promoted to an Under-Secretary post in the Scottish Office.

SCOTTISH OFFICE

*Mr. W. J. Fearnley*, Statistician, Scottish Education Department, has been promoted to a new Chief Statistician post.

## LATE ITEM

### Reorganisation of industrial statistics

The following industries have now been added to the list, given in previous issues of *Statistical News* 4.29, 5.34 and 6.24, of those industries where a new quarterly sales enquiry is now being considered:

Bread and Flour Confectionery – MLH 212

Biscuits – MLH 213

Manufactured Stationery – MLH 483

Manufactures of Paper and Board not elsewhere specified – MLH 484

Musical Instruments – MLH 499/1

# Alphabetical Index

The index to *Statistical News* is cumulative. Page numbers are prefixed by the issue number e.g. 1.23 signifies issue number 1, page 23.

Generally speaking articles relating to United Kingdom, Great Britain, England and Wales or covering several geographical groups will not be indexed under these groups, but topics with a significant regional interest will be indicated e.g. regional earnings. Articles and notes dealing particularly with Scottish statistics will be indexed under 'Scotland' as well as the topic, e.g. 'Scotland, population projections', and similarly for Wales and Northern Ireland.

The following conventions have been observed in printing this index: articles appearing in *Statistical News* are indicated by capital letters when shown under the author's name, and by (A) elsewhere; italics are used for the titles of published books or papers.

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# CENTRAL STATISTICAL OFFICE

## Regular Publications

**Published by Her Majesty's Stationery Office and obtainable from the addresses on the back of the cover or through any bookseller.**
Prices in brackets include postage

## MONTHLY

**Monthly Digest of Statistics**
**8s 6d** (9s 8d)
*Published in the second week of the month following*

A digest of the main economic and social statistics collected by all government departments, providing monthly or quarterly series over the last two or three years and annual series for up to six or seven years past. A supplement giving detailed definitions of items and units employed is published with the January issue. Price 3s 9d (4s 3d).

**Financial Statistics**
**12s 6d** (13s 4d)
*Published in the third week of the month*

A similar statistical digest but devoted to key financial and monetary statistics. A supplement giving detailed definitions of items and units employed is published from time to time.

**Economic Trends**
**8s 0d** (8s 10d)
*Published at the end of the month*

A selection of charts and tables designed to provide a broad background to trends in the economy. Also articles commenting on economic statistics, new series and methods of compilation.

## QUARTERLY

**Statistical News**
**6s 0d** (6s 6d)
*Published on the penultimate Thursday of February, May, August and November*

Articles and notes designed to keep users of statistics in touch with developments in official statistics.

## ANNUAL

**Annual Abstract of Statistics**
*Published about the end of November*

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