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STATISTICAL NEWS

Developments in British Official Statistics

A publication of the Government Statistical Service

Note by the Editor

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 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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Statistics Users' Conference 1978*: Dissemination of statistics

Hamish Lumsden, *Principal Information Officer, Central Statistical Office*

The eighth Statistics Users' Conference, held on 21 November, as usual at the Royal Society, was opened by probably our best known statistician, Sir Harold Wilson, Past President and Fellow of the Royal Statistical Society, with fascinating and lively reminiscences of a career as a producer and user of statistics.

The conference was arranged in three main sessions. The first session, under the chairmanship of Leslie Huckfield, Parliamentary Under Secretary of State for Industry, discussed Availability and Accessibility. The two afternoon sessions, Overseas Comparisons and Meeting Users' Needs were chaired by Professor Bernard Benjamin, Chairman Standing Committee of Statistics Users.

These notes are a brief summary of the papers.

First session – Availability and accessibility

John Boreham, Director of the Central Statistical Office and Head of the Government Statistical Service, gave the first paper, on *Recent and likely future developments* in the dissemination of statistics. Mr. Boreham's paper dealt with the criteria for what should be published. These criteria, he said, are rigid and include quality, relevance, interest, comprehensibility and the strictest regard for confidentiality. The GSS is constantly seeking improvements in the presentation and marketing of its publications, which now have an annual turnover of £400,000. Mr. Boreham foresees that priced publications and press notices are likely to be the dominant media for some time. However, the GSS is looking at dissemination based on computer technology and looks forward to the use of microfiche and magnetic tapes. Another most promising outlet is the Post Office's Prestel system to which GSS is already contributing.

In the second paper, *Dissemination of statistics, availability and accessibility*, Professor A. R. Ilersic of Bedford College made two main points. First, following the enormous increase in demand for and output of official statistics, it would be sensible to consider whether the data are all equally worth disseminating. Second, provided data is available, how dissemination is achieved is not of the greatest importance to specialist statisticians. However, the needs of generalists users might be better met by fewer more self-contained publications.

Dr. Frank Pearce of Intelligence Science and System Associates spoke on *The ecology of statistics – A review of conference proceedings since 1970*. He traced the changing emphasis of the conference from general principles and ways of publicising output and improving input in the earlier conferences, through matters of definition, interpretation and structure of the system towards adequacy of existing statistics. Dr. Pearce concluded with a call for a thorough discussion on the rights of access to information.

The session's fourth paper *Availability of statistical publications in public libraries* was presented by A. L. Smyth, Commercial Librarian, City of Manchester. Mr. Smyth said that to help librarians select the most appropriate material a list of recommended basic statistical sources for community use was published in 1968. Findings of subsequent surveys of library holdings of statistics did not show an encouraging trend of better provision of statistics in public libraries. Mr. Smyth said that public interest in statistics is increasing. However, this caused librarians some problems in helping the public to understand figures and to interpret terminology. He welcomed the increasing use of diagrams and the provision of guides to sources of publications and of contacts for expert advice.

The session's final paper was *The STIR project: The past and future of centralised indexing of statistical sources* by Martin Fessey, recently retired Director of the Business Statistics Office, and Geoffrey Hamilton, Senior Librarian at the Department of Energy. They explained the proposed STIR (Statistical Tables Indexing and Retrieval) project and evaluated it in comparison to the CSO's *Guide to Official Statistics*[1] and the American *Statistics Index*. The paper rested on the assumption that statistics users would value a service through which they could have access, via computer terminal linkage, to the full range of the Government Statistical Service's unrestricted data. The authors proposed that the Organisation of Professional Users of Statistics and the Committee of Librarians and Statisticians should consider how best to obtain supporting evidence upon which discussions of this idea could be based.

*Bound copies of the papers, including discussion, are available, price £10, from Ian Maclean, Lancaster House, More Lane, Esher, Surrey.

Second session – Overseas comparisons

Policies and recent developments in Eurostat methods of disseminating statistics was presented by Aage le Cour, Director General, Statistical Office of the European Communities.

There are peculiar difficulties in establishing a dissemination programme at the level of a multilingual community. Eurostat provide for free distribution of disseminated general information and documents to a wide but selected public. Computer services are potentially very important and there has been a rapid growth in their use by official users. M. La Cour conjectured that direct access to data bases may lead to a more intensive and sophisticated use by some restricted categories of statistical users rather than to a widening number of users.

There are plans to improve the presentation of Eurostat publications, to make use of other techniques like microfiche and microfilm and to speed up the issue of principal publications. The *Monthly Bulletin of General Statistics* is being replaced by a new publication *Eurostatistics, Data for Short-term Economic Analysis* from January 1979.

M. la Cour's paper was accompanied by an annexe on the *Dissemination of statistics using computer facilities*, by Marcel Mesnage.

M. Jean Salmona, Director of France's National Centre for Statistics and Experiments in Information Systems, spoke on *The dissemination of economic and social data in France: The experience of regional economic observatories*. He discussed the classical methods for dissemination; the reformation of data dissemination in 1967 and the present organisation of data dissemination in the French Statistical Service.

The last speaker in the overseas session was Christer Arvas of the National Bureau of Statistics (SCB), Stockholm, whose subject was, *The Swedish regional statistical data base*. To meet the specific demands of individual end-users, selective retrievals may be ordered from SCB against payment. Sections of such statistical production have been standardised. This has an adverse effect on flexibility and lead time required for orders. SCB is devoting considerable effort towards improving flexibility. A resulting development project is the Regional Statistical Data Base (RSBD). RSBD is a data oriented, interactive system for the storage, processing, retrieval and presentation of statistical information. Its purpose is to increase the utility and facilitate the retrieval of statistical information on regional areas. It offers users flexibility, direct access, simple dialogue, tables in clear, and regional levels. Time series will be built up.

Third session – Meeting users' needs

New developments in instant information by P. W. Williams of UMIST was the final session's first paper. Recent developments in computer technology, he said, have radically altered the prospects for easy access to information but it will be some time before the correct technical solution is matched to each information requirement. The most useful future development could well be the familiarisation of undergraduate scientists, technologists and managers with possible means of access to information.

Communication costs are an important factor in the use of centralised computers and in the United Kingdom impose a severe penalty on users outside London. It would be invaluable if government statistical data were accessible quickly and simply through a computerised system available through a public network.

The paper *Data dissemination for the population census* was presented by Dr. Hakim, recently of the Census Division of the Office of Population, Censuses and Surveys. OPCS does not have a 'monopoly' on the dissemination of census statistics, which has become diversified. Census confidentiality has always placed important constraints on dissemination, particularly micro data. OPCS is considering the release of sample micro data in censored format. A question which will feature in any discussions on improvement to publications is whether statistical offices should publish analyses and interpretation of the data they collect.

A survey of attitudes of users to GSS publications by the Organisation of Professional Users of Statistics (OPUS) was the subject of a paper by Kenneth Avery of Beecham Products. The survey showed a reasonable level of satisfaction – greatest among users of macro data in economic or population fields, least among those concerned with investigations into particular industrial markets. Mr. Avery suggested that the main contribution to improving user satisfaction would be in closer liaison between Department and user, on product classification; and between Department and source, to improve timeliness and accuracy of returns.

The conference's last paper was on *The role of a National Statistics Council* by Ian Maclean, industrial marketing and research consultant. The paper dealt with the justification for such a council and outlines the type of programme which could be followed. The paper also sets out in general terms a proposed form for the Council and presents in tabular form two alternatives based on european experience.

Reference

Guide to Official Statistics No. 2 1978 (HMSO) (Price £8·25 net)

The use of company reports for national statistics

M. J. Erritt, *Chief Statistician, Departments of Industry, Trade, and Prices and Consumer Protection*

Company reports have been used for some 25 years now as a source of statistics. The 1948 Companies Act brought about improvements in the standard of accounts published by public companies and effectively provided a new source of statistical data. This improved source of information was first put to regular use by *The Economist* and *The Financial Times* but it was the detailed analysis of the accounts of 3,000 public companies quoted on UK stock exchanges undertaken by the National Institute of Economic and Social Research (NIESR) in the early 1950s that laid the foundations of the regular analysis of company accounts. This work was continued by the Board of Trade and has been maintained by its successor departments.

The results of the current analysis are published annually in detail in *Business Monitor MA3 – Company Finance*[1]. The analysis currently covers some 1,600 large listed and unlisted private sector companies – company groups or independent companies. The form of the analysis essentially consists of a balance sheet summary, an income and appropriation account and a sources and uses of funds table. Various accounting ratios are available from 1960 onwards and supplementary information, when it is available in the accounts, on turnover, exports, average number of UK employees and their remuneration; charitable contributions have been published from 1969 onwards. Political contributions have been shown since 1973. The results are analysed by 25 industry groups, the company or group being assigned to that industry which constitutes its main activity. Only companies whose activities are mainly in the United Kingdom and who are in manufacturing or certain non-manufacturing industries within the industrial and commercial company sector are included. Not included are companies whose main activities are in agriculture, mining, shipping, banking and finance and those UK registered companies operating mainly overseas.

The analysis has, hitherto, been based on a fixed panel of companies, a panel which since 1960 has been re-selected every four or five years on the basis of certain size criteria for gross income or net assets in particular years – 1960, 1964, 1968 and 1973.

It might be thought that such an analysis, as well as being of interest in its own right, could form an input to the national accounts. The industrial and commercial company sector is, after all, only the total of a large number of individual companies. In fact, the analysis plays little part in the national accounts estimates; though not because those estimates are already perfect. The national accounts statistics for the industrial and commercial sector are compiled and estimated by a great variety of methods, using a host of different sources, within which company reports at present play a comparatively minor role. For example, profits are derived from corporation tax statistics, projected forwards by means of a direct quarterly inquiry to a sample of companies, capital expenditure and stocks estimates for the private sector come from the censuses of production, the annual retail inquiry and other annual inquiries supplemented by voluntary and comparatively small-scale quarterly inquiries. The financial accounts of the industrial and commercial sector are also compiled from a variety of sources many of which are inadequate for this purpose. The figures for transactions in British Government securities have to be taken from the Department of Industry's survey of company liquidity even though the survey relates only to about 230 of the larger companies. Some transactions, notably trade credit extended to the personal sector, are not covered at all. A fuller account of the sources and methods used in compiling the accounts for the industrial and commercial company sector appears in *Statistical News No. 37*[2] and in *Financial Statistics: Explanatory handbook*[3].

Why then have published company accounts and in particular the analysis of company accounts published in *Business Monitor MA3* not been found suitable for compiling the national aggregates used in macro-economic analysis and decision making? The main reasons are:

(a) The present analysis of accounts relates only to companies above certain size limits.

(b) In general, only annual data for accounting periods which may differ from company to company are available and then not very quickly.

(c) The accounts cover the whole of companies' activities and do not distinguish sufficiently the

results of activities in the United Kingdom from those of activities overseas – a distinction which is essential for the national accounts. Nor are activities in different industry groups always separated.

(d) There is insufficient standardisation of definitions and presentations.

(e) For some purposes not enough detail is given, particularly of financial transactions.

The resolution of some of these difficulties are the subject of current work in the Department of Industry.

Articles by S. J. Penneck in the previous issue of *Statistical News* (November, No. 43, pages 15 to 18) and by Clive Lewis in the current issue (pages 44.6 to 44.11) describe the methods being used to extend the present analysis to a representative sample of all industrial and commercial companies[4]. When this work is complete, the problem of unrepresentativeness will have been overcome.

The second drawback is difficult to overcome. To match the need for quarterly national accounts data would require companies to publish reasonably detailed quarterly reports very shortly after the period to which the accounts relate. Moves towards shorter reporting periods have already occurred – the interim (six monthly) reports by companies listed on the Stock Exchange. Quarterly reports are more common in the USA, and though any increase in the frequency of reports would be welcome it must be recognised that the burden on companies would be greatly increased. An attempt to go some way towards greater timeliness in the Department of Industry's extended analysis is being considered, *viz.* publication of aggregate data each quarter for each group of companies whose accounts end in a particular quarter. The data would still relate to twelve month periods and speed of publication would still depend to a great extent on the lag between the company's year end and the publication of its annual accounts. Nevertheless, it would provide an overlapping series of annual figures which would help to throw light on short-term movements.

The difficulties caused by the content of the accounts and by lack of standardisation and detail are less amenable to solution by the statistician at the desk, though a great deal of work in putting existing accounts onto a common base is already done in the course of producing the present company account analysis.

One of the most – if not the most – important changes in company accounts which would make them more suitable as an input to the national accounts would be for companies to show their UK and overseas activities separately. The national accounts make a clear distinction between resident and non-resident activity. National income is the income of residents of the United Kingdom, investment in fixed assets and stocks is limited to domestic investment, i.e. investment in physical assets located in the United Kingdom, and so on. Transactions across UK boundaries need to be accounted for in the accounts as in many cases they involve income accruing to United Kingdom residents. Thus, for the industrial and commercial company sector – as for other sectors in the economy – there is a need to distinguish and identify separately activities in the United Kingdom and elsewhere.

The extended Department of Industry analysis will divide companies or groups between whether their activities are wholly in the United Kingdom, mainly in the United Kingdom, or mainly or wholly overseas. This will be an improvement to the present analysis, which is confined to companies who operate wholly or mainly in the United Kingdom, but these broad divisions can only be used as an approximation to dividing the companies' activities between United Kingdom and overseas. A full UK/overseas split would fit the present basis of the national accounts which draws a boundary around UK activities, based on where the activity takes place. There would naturally be argument about which items should be separately shown. A full split of the complete profit and loss account and the balance sheet between UK and overseas activities would be ideal and be of enormous benefit in compiling the accounts for the sector. There is, however, particular interest in turnover, profits, capital employed and new investment, employment and value added. There is at present no information about aggregate employment in the company sector though figures are available for different industries (including unincorporated businesses). Data on profits and capital employed would enable estimates of profitability in the United Kingdom and overseas for companies who have activities outside the United Kingdom to be made.

Although there is also a demand for a variety of possible geographical detail, the most vital distinction is between activity in the United Kingdom and overseas. This basic division would be most useful if shown by all companies; in fact for most smaller companies this would not be a burden as they have no overseas based activities. It would, however, be of greater value if broad geographical zones outside the United Kingdom could be laid down, to make comparisons and aggregation easier, but with companies left to provide a more detailed analysis within this framework if they judged it suitable.

A breakdown of activities between the countries and regions of the United Kingdom could also be useful but more difficult for companies to provide. Some companies might wish to show a breakdown at least of

employment in the constituent countries of the United Kingdom where it is significant to the operation of their business.

A breakdown by industrial activity would be helpful. The present company account analysis classifies *all* the activities of a company to the industry of its main activity. This necessarily introduces a degree of fuzziness into the figures for each industry. It also means that the industry groups cannot be too fine. But if such an analysis were possible, and if the grouping were based on the Standard Industrial Classification, the accounts could provide sound annual figures for (say) profits or capital expenditure and perhaps replace some of the existing sources of such data. If the data are to mean much, the analysis should relate to UK activities only, or to UK and overseas activities separately.

The value of much of the information in company accounts and the changes suggested here would be greatly enhanced for national accounting statisticians and economists and, indeed, many others by the introduction of current cost accounting. The philosophy underlying current cost accounting is basically the same as that underlying the national accounts. Calculating changes in the nation's real wealth means allowing for the using up of the nation's assets at replacement costs. The Department of Industry's analysis of rates of return on capital employed[5] allows for capital consumption at replacement cost and for stock appreciation due solely to price rises and revalues capital employed at replacement cost before striking the ratio of profits to capital stock to obtain the 'real' rate of return. But the figures for stock appreciation, depreciation and capital stock are only estimates arrived at in broad terms. Direct information in company accounts could replace much of the estimation process thus leading to a more accurate picture of the sector's profitability and progress.

The remaining difficulties mentioned earlier were lack of standardisation and detail. There is a need for standardisation in accounting definitions, methods and presentations so as to make an individual company's accounts more easily comprehensible, to make comparisons between companies more valid and to provide a sounder basis for computing aggregates and averages from company accounts for industrial groupings and the company sector as a whole. The system of accounting standards which has been developed by the accountancy profession in recent years probably offers the best route towards a clarification of concepts and a greater uniformity in accounts.

Statements of Standard Accounting Practice as issued by the accountancy profession do contain examples of the presentation of accounts but only in appendices; the examples do not form part of the standards themselves. More emphasis on standard presentations and models would be helpful to the national accounting statisticians. The absence of a clear model is likely to lead to a variety of presentations for no very good reasons, and this makes the understanding, comparison and aggregation of accounts more difficult. Many other users of company accounts such as investment analysts and advisers would also undoubtedly welcome more standardisation.

The lack of detail, for example, of expenditure on different types of fixed assets or categories of stocks, or kinds of securities, is also an area which makes published accounts less useful for national accounting purposes and any improvement here would be welcome. The publication of more detail would of course increase the need for standardisation.

This article has been concerned with changes in company reporting which would have an important and a direct effect on the availability and quality of company statistics within the national accounts framework and the Department's analysis of company accounts. They would, we believe, also be of considerable benefit to many other users of accounts.

Some of these changes in company reporting were also discussed in the Green Paper on *Company Reports* (Cmnd. 6888), for example, geographical and industrial disaggregation and more detailed and standardised information on financial transactions. The Green Paper also covered other changes which would be helpful to national statistics – for example, statements of value added, of employment and more information about research and development. But these are outside the scope of this article.

Acknowledgements

The author is grateful to colleagues in the Government Statistical Service for helpful comments during the preparation of this article.

References

(1) The tenth issue is due to be published in early 1979. (HMSO) (Price £2·00 net)

(2) Nicholas Rudoe, 'Statistics on industrial and commercial companies' *Statistical News*, No. 37, May 1977. (HMSO) (Price 80p net)

(3) *Financial Statistics, Explanatory handbook*, October 1977, Sections 1 and 9. (HMSO) (Price £1·35 net)

(4) See also a paper '*Industrial and commercial companies' financial statistics*' presented by the author to the Statistics Users' Conference, November 1977. Copies of the report of the conference are available from the Bank of England, (Price £4·00 net)

(5) Last published under the title 'Companies' rate of return on capital employed 1960 to 1977' in *Trade and Industry*, 22 September 1978. (HMSO) (Price 40p net)

Constructing a sampling frame of industrial and commercial companies.

Clive Lewis, *Statistician, Departments of Industry, Trade and Prices and Consumer Protection.*

Introduction

This article describes the construction of a sampling frame of medium-sized and smaller companies undertaken as part of the first stage of the work of extending the coverage of the Department of Industry's analysis of company accounts to a representative sample of all sizes of industrial and commercial companies registered in Great Britain. The other part of the work has involved compiling a list of the largest 1,500 industrial and commercial companies registered in Great Britain. An article by S. J. Penneck in the November 1978 issue (No. 43) of *Statistical News* 'The top 1,500 industrial and commercial companies' (pages 15 to 18) described the work of compiling this list. This article should be read in conjunction with the one in the November issue to obtain a full account of the construction of the complementary sampling frames which, together, will provide a valuable indication of the size distribution, broad industry classification and certain other details of British industrial and commercial companies. There is a certain amount of repetition and overlapping with the earlier article but only to the extent that some points need to be re-emphasised and others require a different emphasis.

Background

Before describing in detail the construction of the sampling frame of medium-sized and smaller companies it might be useful to explain briefly the history of the company accounts analysis; why it was thought that the coverage of the analysis of company accounts now needed to be extended and why a considerable effort was required to establish lists of the larger and, separately, the medium-sized and smaller companies which could be used as sampling frames.

The need for statistics on company finance and profitability has long been recognised both within Government and outside. Most macro-economic statistical series are prepared and presented as part of the system of national accounts; many series are adapted for this purpose though based on sources which involve, sometimes, inappropriate definitions and units. Companies' published annual accounts are just such a source but given the paucity of financial data for companies, particularly industrial and commercial companies, they are recognised as a fruitful source of statistical information. A regular statistical analysis of companies' annual accounts has been published for more than twenty years. The requirements of the 1948 Companies Act brought about improvements in the standard of accounts published by public companies and, effectively, provided a new source of statistical data. This improved source of information was first put to regular use by *The Economist* and *The Financial Times*, but is was the detailed analysis of the accounts of 3,000 public companies quoted on UK stock exchanges undertaken by NIESR in the early 1950s that laid the foundations of the regular analysis of company accounts. The analysis work was continued by the Board of Trade and its successor departments. The results of the NIESR analysis 'Company Income and Finance 1949–53' were published in November 1956. Results for subsequent years, up to 1961, were published in various editions of *Economic Trends* and for the period 1960–66 in various editions of *Statistics on Incomes, Prices, Employment and Production* (SIPEP). Results are currently published annually in detail in *Business Monitor MA3 – Company Finance*[1] and summary, cumulative results are published in *Financial Statistics*[2].

Scope of the current analysis

The current analysis covers a panel of some 1,600 large, listed and unlisted, private sector, UK registered companies – independent companies or company groups – whose main activities are in the United Kingdom in manufacturing, distribution, construction, transport (other than shipping), property and certain other services. Excluded are those companies whose main activities are in agriculture, mining, shipping, banking and finance, and those UK registered companies operating mainly overseas. The selection of the (large) companies to be included in the analysis has, since 1960, been made every four or five years based on certain size criteria (in terms of net assets or gross income) common to both listed and unlisted companies. Further details of the current analysis can be found in the introduction to *Business Monitor MA3 – Company Finance*[1] and in

the *Explanatory handbook*[3] to *Financial Statistics*. Two important series derived from the current analysis of company accounts are the subject of annual articles in *Trade and Industry*[4]. The articles, which also contain series based on quite separate national accounts sources, are 'Companies' rate of return on capital employed' (latest published on 22 September 1978) and 'Structure of company financing' (published on 16 February).

Though the analysis of large companies' accounts has proved of considerable value in analysing the financial structure, transactions and profitability of industrial and commercial companies, the scope of the analysis and its results have been restricted by the fact that the panel of companies covered has not been statistically representative of all sizes of UK registered industrial and commercial companies (I and CC) and has not extended to cover all activities within the I and CC sector. In consequence it has not been possible to produce reliable and comprehensive aggregate figures for the industrial and commercial sector as a whole, from this source. Before 1960 only listed companies whose main activity was in manufacturing, distribution or building in the United Kingdom were included in the panel. Since 1960 size limits have been set, broadly speaking, to maintain an equal coverage in terms of net assets from one period to the next, crudely estimated to have been between three-fifths and two-thirds of the total net assets of all I and CC companies.

Data for small companies

Three commissions of inquiry – the Bolton inquiry on small firms (1968); the (Diamond) Royal Commission on the Distribution of Income and Wealth (set up in 1974) and, now, the (Wilson) Committee to Review the Functioning of Financial Institutions – have all, in different ways, highlighted the comparative lack of aggregate, quantitative information about small firms and companies, particularly as to their financial structure and well-being.

It was recognised that there should be little difficulty in *analysing* the accounts of the smaller companies (other than the problems of actually obtaining them without too much delay) but it was difficult to decide how many such companies should be covered by the analysis, since reliable population estimates were not readily available, and which companies should be included in any sample. The fundamental problem was the lack of a suitable sampling frame.

Sampling requirements

The essential requirements of a suitable sampling frame were considered to be that:

(*a*) it was comprehensive and up-to-date;
(*b*) it identified independent companies separately from subsidiaries, and linked subsidiaries to give company groups;
(*c*) it indicated the size of each company or group at a common date;
(*d*) it provided an industry classification;
(*e*) it indicated whether the company was listed or not; and
(*f*) it indicated the geographical balance of its activities i.e. whether wholly/mainly in the United Kingdom or overseas.

Requirements *c*, *d*, *e* and *f* were regarded as the key characteristics in choosing a representative sample of companies for analysis and for grossing-up the results to give aggregate figures which could be analysed according to those characteristics.

Clearly this was asking a great deal of any one register; indeed it was quickly apparent that any one register was unlikely to meet more than three of the six requirements. The registers considered were:

i Companies House (Companies Registration Office) list of all companies registered in Great Britain (but not the register of business names);

ii The Business Statistics Office register based on VAT information.

iii The Inland Revenue's Statistics Division's register of companies for assessing tax and deriving national accounts and other estimates of company sector profits.

It was decided to use the Companies House register largely because it was comprehensive, up-to-date and easy to access, though it did not contain any indication of size, industrial or geographical activity, whether a company was listed on a UK Stock Exchange or not nor whether it was a subsidiary of another GB company or an independent company (including any which were direct subsidiaries of overseas companies). Because this information was not given, a two-stage sampling procedure was adopted. The first stage involved taking a sample of 1 in 20 of the register, or some 35,000 companies arranged in alphabetical sequence. Originally a 1 in 10 sample had been envisaged but a small scale, pilot exercise soon established that such a large sample in terms of numbers of companies would be quite unmanageable within the available resources and timetable set. With hindsight it is possible to see that because of the highly skewed distribution of companies by size (in terms of capital employed) and the considerable concentration of companies at the lower end of the scale, halving the sample size will probably have little effect on the reliability of the eventual representative sample – in

terms of the size of companies. This may not be true to the same extent for the representativeness of the sample in terms of industrial activity.

The basic information mentioned above as well as some other potentially useful information was extracted from the companies' 1975 accounts as deposited at Companies House. (The 1975 accounts were taken to be accounts ending on or between 1 April 1975 and 31 March 1976.) The choice of year was governed largely by weighing the need for up-to-date information against the likelihood of a substantial majority of accounts for the base year being available (or a substantial minority not being available) at the time work on the first stage began, which was the middle of 1977. (None of the years 1974, 1975 or 1976 was ideal in terms of companies' financial position.) Even so, having picked 1975, rather than 1976, as the base year a considerable proportion of companies were found not to have deposited their 1975 accounts at Companies House when the companies in our 1 in 20 sample were first looked at. The overall proportion was 22 per cent. In addition some 12 per cent of the 35,000 companies were identified as being in default, through not having submitted an up-to-date annual return, or in course of liquidation at the time the original sample was selected in March 1977. Both categories of companies (without 1975 accounts) had to be looked at again at the end of the first stage exercise to see if 1975 accounts had subsequently been provided or, if not, whether earlier or later accounts could be used instead. Companies still in the course of liquidation were deemed to have ceased trading and excluded.

Microfiche records

It is worth pointing out here that the work of examining the accounts of the 35,000 companies and extracting information from them was done almost wholly from the microfiche records now held, instead of the files, at the London end of Companies House. Microfiche records have the considerable advantages of ease and speed of handling and reference, and reducing storage space but they do, of course, require special viewers and can be a strain on the eyes if used for long continuous periods. Nearly 1,600 of the companies in the 1 in 20 sample were Scottish registered companies whose files are kept in the Exchequer Office, Edinburgh. Special arrangements had to be made to enable the files and 1975 accounts of these companies to be examined. (Microfiche records are now being produced for Scottish registered companies.)

In-scope companies

Given that the main purpose of the exercise was to construct a sampling frame of industrial and commercial companies only and that the sample drawn from the Companies House list covered all types of registered companies, the in-scope companies had to be identified and key data would then be extracted for those companies only. Companies were ruled out-of-scope mainly because they had ceased trading or were consolidated subsidiaries of other GB registered companies or were financial i.e. non-industrial and commercial, companies. Unlimited companies were also excluded because they are exempted from filing accounts. Subsidiaries of other GB companies were excluded because it was decided that the accounts of independent companies or the consolidated accounts of company groups only should be analysed. Consolidated accounts give the best overall view of a company's financial performance and position, and increase the coverage in terms of activity.

Extracting key data

Some of the problems and difficulties encountered in extracting the key characteristics and other data from the accounts have already been referred to in the article on the top 1,500 industrial and commercial companies. These are worth repeating here if only because their effect was sometimes different for the medium-sized and small companies. The unavailability of some 1975 accounts has already been mentioned and though this was by no means confined to the small companies it was certainly more widespread among that category of companies though one has to bear in mind of course that most new companies and those in default or liquidation are concentrated among the smaller companies.

Size: capital employed

In terms of the key characteristics size was determined by capital employed, defined as the sum of:

Issued share capital
Reserves
Minority shareholders' interests
Deferred tax
Long-term loans (including debentures and mortgages)
Net amount owed to other group members
Short-term loans
Bank loans and overdrafts.

The latter two items were specifically included as they were expected to form a major part of financing for the smaller companies. This was indeed found to be the case in many instances but another item, not included in the definition, which also appeared quite frequently was 'directors' current account', which would include any undrawn salary. Because this item was not included in the definition, many companies, mostly very small, were deemed to have negative

capital employed i.e. their accumulated trading losses exceeded the sum of the other forms of capital finance. This problem will be overcome in the sample selection process by grouping the companies with negative capital employed with those in the lowest size band of positive capital employed. In future capital employed will be redefined to include directors' account(s). Four other measures of size were considered – turnover, number of employees, profits and value added. A fuller description of the pros and cons of each measure was given in the earlier article but, briefly, they were rejected because not all companies are required to give data on turnover and number of employees, profits are very variable (and not infrequently negative) and value added, though probably the best choice in principle, has hitherto only been provided by some of the larger companies in their published accounts.

Industry, area and listing

The classification of a single company or a company group to a single industrial activity, even when the industries are broadly defined, presents problems of two main kinds. The industrial classification employed in this exercise was based on the Standard Industrial Classification, at the Order level. The same method of classification was used as in the top 1,500 exercise previously described i.e. according to the breakdown of activity by industry given by the company in its accounts – in terms of either capital employed or assets, or turnover, or profits in that order of preference. The first kind of problem concerned the larger conglomerate companies – usually big groups – whose range of activities was diverse often covering more than one industry and sometimes spanning both manufacturing and non-manufacturing activities. The rule adopted was to classify a company or group to an industry which represented at least 40 per cent of its activities, or a lower proportion if the remaining activities were widely spread over other activities. Even so, some companies had to be allocated to a 'mixed activities' category with separate categories within manufacturing and non-manufacturing. The second kind of problem related more to the smaller companies and arose because of the imprecise way companies described their principal activity or activities. Some descriptions were vague or technical, or related to the end use of the product rather than to the product itself.

The classification of companies according to their main geographical area of operation was fairly straightforward for the smaller companies because most had no overseas-based activities (as opposed to no exports to overseas, which is a UK *based* activity). Similarly it was not difficult, by reference to the *Stock Exchange Official Yearbook*, to establish whether or not a company had any shares listed on a UK Stock Exchange.

Other data extracted

The other information extracted was collected either to supplement the data on the key characteristics in establishing a suitable sampling frame or because it was felt there would be some general interest in the items concerned and the data could be readily extracted without prejudicing the main aim of the exercise and the timetable set. A list of the items is given below in the Appendix. Much of the information is required to be disclosed under the Companies Acts of 1948 and 1967. There are some useful points to be made about most of these items.

Whether a company was a subsidiary of another GB registered company was a key question as already described. Subsidiaries of other GB companies were kept separate and it was intended that quite different information should be extracted for them. At the time of writing this work had not been done. The main difficulty in this part of the exercise would be tracing the precise lineage between a subsidiary and its ultimate parent. The name of the ultimate parent, which can often be an overseas company, is given in the Directors' Report accompanying the accounts; the name of the immediate parent is obtainable from the list of a shareholders though nominee holdings would present further problems; *Who Owns Whom* is a standard reference book for tracing ownership of companies but is not comprehensive – usually where small companies are concerned. Parent companies are, of course, only required to list the names of their main subsidiaries in their annual reports. There were a number of difficulties therefore in obtaining full and reliable information for the $5\frac{1}{2}$ thousand subsidiaries identified in the sample of 35,000. It is important to note that *direct* subsidiaries of overseas registered companies and *unconsolidated* subsidiaries of GB registered companies were treated as independent companies.

Type of company

The information about whether a company is a private (or public) company, a guarantee company or has share capital and whether it has limited liability was largely collected for outside i.e. non-statistical interest. Much of this information had to be obtained from documents other than the financial accounts, in particular the Memorandum, Articles of Association and the annual (statutory adminstrative) return to Companies House. The classification of a company as to whether it was a private or a public company proved onerous and time-consuming and was discontinued early in the exercise. It was felt that it could not be

done reliably without disproportionate time and effort being spent on what was a non-essential item. Briefly, where there are more than 50 shareholders the company is a public company; if there are less than seven and none of them is a company, then it is a private company. In between it can either be a private or a public company and it was often difficult to establish which from the documents.

Accounting year end

The grouping of companies according to the calendar quarter in which their accounting years end was considered as a potential key characteristic in drawing the final representative sample. However, so as not to overburden the sample selection it was decided to restrict the key characteristics to four, namely, size, industry, whether or not listed and area of operation. The information on accounting year ends will, however, still be useful in planning the work of analysing the accounts of the sample of companies selected and will provide a reliable indication of the spread of accounting years, as they stood in 1975/76. Since then, the 1976 Companies Act has required companies to notify Companies House of their accounting reference date and period, which are then recorded for the purpose of determining when accounts are due, or overdue.

Turnover

Finally, the figure of turnover was recorded where given, though it had been rejected as the measure of size, because it is often quoted and because of the lack of reliable estimates of companies by size of turnover. However, turnover need not be disclosed by an independent non-holding company if it is below £250,000 in the year, nor do shipping companies have to disclose their turnover.

Choosing the representative sample

At the completion of the first stage exercise we expect to have, besides a list of the top 1,500 GB industrial and commercial companies, a further list of 12½ thousand small and medium-sized in-scope companies – independents or groups – which together will form a sampling frame for selecting the second stage representative sample. Each of the fourteen thousand companies has attached to it data on the four key characteristics – size, industry whether or not listed and main area of activity. At the time of writing the second stage representative sample has not been selected but the intention is to draw a sample of some 3,000 companies which would be balanced, as far as practicable, for each of the four key characteristics mentioned above.

Because of the expected skewness of the distribution of companies by size (which will probably turn out to be greater than originally envisaged) it was decided at an early stage to sample the larger companies separately and more intensively than statistical theory might now suggest was necessary. Hence the separate exercise to establish a list of the top 1,500 companies who, in the event, are estimated to account for 85 per cent of the total capital employed of GB companies in the industrial and commercial sector (nationalised companies being excluded completely). One reason for weighting the sample in favour of the larger companies i.e. covering a disproportionate number of them, is historical in that the company accounts analysis has always covered a substantial number of large companies. Another reason, which has underlined the choice of sampling scheme, arises from the competing claims to be made on the results of the analysis based on the new, representative sample. On the one hand, reliable and timely grossed-up figures for the I and CC sector will be sought; a relatively small sample of the larger companies with a good record of publishing their accounts soon after the end of their accounting year would serve this overall purpose. But it would not enable much in the way of disaggregated data e.g. by size or industry, to be produced which is necessary as one of the purposes of the extension is to cover the gap in financial information about small and medium-sized companies. The choice of the final sample will necessarily therefore be in the nature of a compromise between the various competing claims.

It is possible to draw a sample which will give the best overall results by using two results from sampling theory. First, the size bands are chosen so as to minimise the variance of the capital employed within each size band. This is done by forming strata so that the square roots of the frequencies in each strata are roughly the same. This is the cumulative square root method (see *Kish-Survey Sampling* page 105 or *Cochrane-Sampling Techniques* page 131). Second, a scheme for optimal allocation is adopted whereby different sampling fractions are chosen for each stratum in proportion to the variability of companies' capital employed within that stratum. The method is optimal in the sense that it minimises the overall variance of the second stage sample estimates though it suffers from the practical disadvantage that the sampling fractions may differ for each and every stratum. However, while giving a sample which is efficient for the overall estimates, these methods may not ensure an adequate sample of companies for each industry or size group to enable reliable comparisons to be made between each and every industry or size group. A much larger sample size would be needed to ensure adequate coverage in each and every cell. The most that can be

done is to balance the sample separately by size and by industry – independently *not* simultaneously – and then to adjust the resulting sample so as to ensure a reasonable number of companies in each cell. This does, of course, limit the range of results which can be produced from the analysis.

An exercise of this magnitude could scarcely have been contemplated without adequate computer facilities though even with such facilities a considerable amount of desk work was still required. Computer programs have been developed both to sort the basic information extracted from companies' accounts to establish the sampling frames and to provide the information required to enable the representative sample to be drawn. Further programs are being prepared for data take-on, grossing and producing the results of the analysis of the annual accounts of the representative sample of companies.

Results

Readers will appreciate that the exercise to construct a sampling frame of companies as described should yield a great deal of information which will prove to be of general interest and value. The intention is to publish as fully as possible data on the main items described above. It is hoped that these data can be published soon and a further article will appear, in due course, in *Trade and Industry* (following the earlier article 'How many and how big' which gave figures for the top 1,500 companies and which appeared in the issue of 17 November 1978.) As soon as the first stage is complete, a representative sample of companies will be selected and work will begin on analysing those companies' accounts, starting with their 1977 accounts (accounts ending between 1 April 1977 and 31 March 1978). This means that there will be an overlap, for 1977 only, with the existing analysis which will be discontinued at the end of this year. First results of the new analysis are expected to be ready during the first half of 1980 and will follow, broadly, the same lines as those currently published annually in *Business Monitor MA3 – Company Finance*,[1]. It is intended in future, however, to publish a quarterly Business Monitor giving results for companies grouped according to the calendar quarter in which their accounting year falls. The figures will still be annual but will follow a quarterly publication cycle which should ensure that results are available more speedily than at present. There should also be greater scope to produce provisional and revised results in the new system.

Acknowledgements

The author wishes to acknowledge the work of all those connected with the exercise both in Economics and Statistics Division 6a and the computer unit of the Business Statistics Office; the assistance of the Companies Registration Office in London, Cardiff and Edinburgh and the contribution of colleagues in planning and carrying out the exercise and in preparing this article.

References

(1) *Business Monitor MA3 – Company Finance*, 10th issue due for publication in early 1979 (HMSO) Price £2·00 net). It also contains, at the back, a full list of sources of official statistics derived from companies' published accounts including the date of the various issues of *Economic Trends* and *SIPEP* containing the results of the company accounts analysis

(2) *Financial Statistics* – monthly (HMSO) (Price £3·40 net); see Tables 9.8, 9.9 and 9.10

(3) *Financial Statistics – Explanatory handbook* – first issued October 1977 (HMSO) (Price £1·35 net) – see pages 90 and 91; to be up-dated and reissued April 1979.

(4) *Trade and Industry* – weekly every Friday (HMSO) (Price 40p net)

(5) See *Guide to the Accounting Requirements of the Companies Acts* published for the Institute of Chartered Accountants in England and Wales by Gee & Co. (Publishers) Limited (Price £1·25 net). It provides a useful summary of the statutory requirements contained in the 1948, 1967 and 1976 Acts relating to the production of annual accounts (and directors' reports) of companies.

APPENDIX
Other information extracted

Is the company a subsidiary of another GB registered company and its accounts consolidated in the group accounts?

Is the company owned directly by an overseas (including Northern Ireland) company?

Is the company a private company? (discontinued – see text above).

Is the company a guarantee company?

Does the company have share capital?

Does the company have limited liability?

Does the company have subsidiaries?

In which calendar quarter does the company's accounting year end?

What is the company's turnover?

Scheduling a dockyard factory

D. Wallage, *Statistician and* **I. F. Boddy,** *Executive Officer, Ministry of Defence*

Introduction

1. This article describes a simple scheduling package which has been devised for the Dockyard Department by the Defence Statistics Organisation. The package forms part of a new production control system being installed in the mechanical factories of the four home yards.

2. The article begins with a brief explanation of the operation and structure of a typical factory. The nature of the information available to the scheduler is then discussed, and the principle features of the scheduling algorithm are summarised. The article concludes with an evaluation of package performance in a simulation model.

Background

3. The dockyard factories repair mechanical equipment which has been landed from ships in refit, or returned, defective, from the operational fleet. Each customer specifies the date by which his completed job is required (the 'Customer Required' date).

4. While early completion tends to be of small benefit to the customer, lateness is likely to disrupt a complex refitting or logistic programme. Consequent loss of operational availability means, in the long run, that a larger and more costly fleet is required to meet defence commitments than would otherwise be necessary.

5. A typical factory employs between 350 and 500 men. Around 10,000 items are processed annually by the larger factories, the technology ranging from ships' propellers and driving shafts to intricate hydraulic mechanisms. This diversity is managed by dividing the factory into several dozen sections, each having specialist skills and machinery.

6. The flow of jobs through factory sections is illustrated in Figure 1. There is a tendency for items to collect into queues as they arrive in the various sections, while they wait for resources (typically manpower) to become available. It has been shown that the order in which jobs are drawn from the queues by section operators has a marked effect on the average lateness of jobs leaving the factory. The scheduling package computes an order of item selection which reduces the mean lateness per job to as low a value as possible*.

*Taking account of the *importance* of the lateness of specific jobs as necessary

7. The production control system feeds information into the scheduling package about each job, describing its current state, a forecast of its future processing needs, and its Customer Required date. The package produces, for each section, a list which recommends the order in which jobs should be selected from that section's queue. It is planned to run the scheduling package daily in each of the dockyard factories.

Job flow statistics

8. The compilation of job flow statistics is complicated by the detailed nature of the activities to which a job may be subjected as it passes through a specialist section. The following description is paragraphed for later reference.

9. The job arrives in a section, and some time may elapse before it is recognised. More time may pass before requirements for spare parts or specifications are identified.

10. The spares and/or paperwork may be demanded, but may not arrive all at the same time.

11. When all parts and specifications have been provided, the job may wait for manpower or (less usually) for machinery to become available.

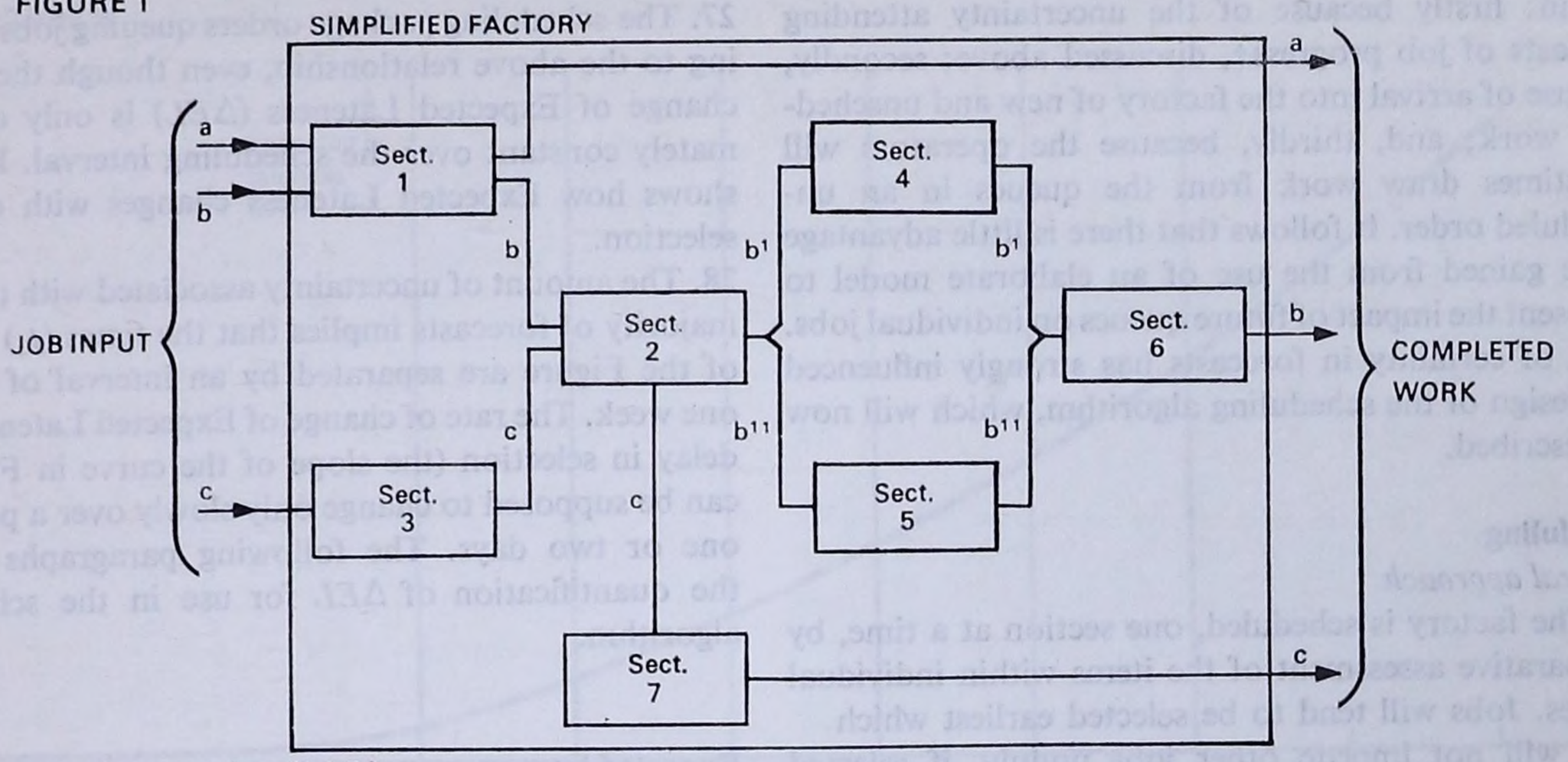
12. The job will then be issued to an operator, singly, or in a batch with other jobs. Either before or after work has started on the job the operator may fall ill or take leave. During the course of repair it may be found that further specifications or parts are needed, and additional delays may be incurred. When the work is finished the item may be subjected to test within the section, involving further delay; and possible reworking of some or all of the job may be necessary. Further time may elapse before job completion is recorded.

13. The job may then be delayed before transit either to another section for further work, or to the factory despatch bay. Time will pass while the job is moved.

14. The process can be further complicated by the arrival from (or despatch to) other sections of 'fragmented' components (Figure 1), the suspension of work for a job of higher priority, etc.

15. The mass of detail described above is beyond the scope of any practicable scheduling system. It has therefore been necessary to devise statistics which embrace and simplify the activities and delays described above, but which are, nonetheless, sufficiently

FIGURE 1



Note fragmentation of job 'b'

detailed for scheduling purposes. Figure 2, which is discussed below, shows the simplified flow of a job passing (without fragmentation) through three factory sections.

16. The times Q of Figure 2 describe the periods discussed at paragraph 11 above. Forecasts of queueing time are generated internally by the scheduling package.

17. The times W of Figure 2 encompass all of the activities described in paragraph 12. An estimator assesses the Expected Active Work Content ($EAWC$) of each job, section by section, and observations are made, in the factory, of the relationship between the estimated $EAWC$ and the measured elapsed time W. The historically observed relationship within each section is used to deduce a mean and variance of W, for current jobs, from the estimators. forecast of $EAWC$.

18. The times T include the periods described in paragraphs 9 and 13. Observations of the times associated with specific sending and receiving sections provide means and variances of the relevant T's for each job.

19. The times D are those described at paragraph 10. The parameters are again obtained by observation within each section. Records of mean and variance for W, T and D are updated continuously by exponential smoothing.

20. The times X represent the sum of W in one section; of T; and of D in the next section (where appropriate). On the not unreasonable assumption that W, T and D are mutually independent, estimates of the first two moments of each X in Figure 2 can be calculated by addition of the component moments, and fed to the scheduling package.

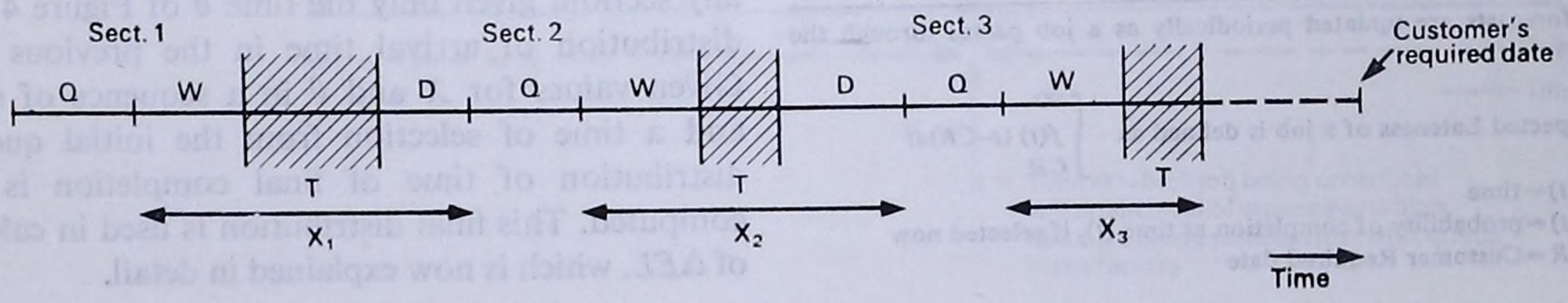
21. To summarise: For each job in the factory a forecast is made of its future path through the specialist sections, and of its expected active work content within each. By monitoring the passage of all jobs, through and between the sections, a data base is established from which it is possible to estimate the first two moments of the times shown as X in Figure 2.

Uncertainty

22. The problem of scheduling in the dockyard factories is dominated by the uncertainty attending forecasts of work content, etc. The extent of work required is often not fully apparent until repair has been started, and many of the jobs are non-standard, so that there is no previous history upon which to base estimates. The magnitude of the uncertainty associated with a forecast varies from job to job and from section to section, and is, in itself, an important component of the scheduling calculation.

23. The content of queues at future times is also un-

FIGURE 2



certain: firstly because of the uncertainty attending forecasts of job progress†, discussed above; secondly, because of arrival into the factory of new and unscheduled work; and, thirdly, because the operators will sometimes draw work from the queues in an unscheduled order. It follows that there is little advantage to be gained from the use of an elaborate model to represent the impact of future queues on individual jobs. Lack of certainty in forecasts has strongly influenced the design of the scheduling algorithm, which will now be described.

Scheduling

General approach

24. The factory is scheduled, one section at a time, by comparative assessment of the items within individual queues. Jobs will tend to be selected earliest which

(i) will not impede other jobs unduly, if selected before them, and

(ii) would suffer badly, in terms of increased lateness, if held back in the queue.

25. The Expected Active Work Content ($EAWC$) of each job is used as a measure of the extent to which selection of that job would absorb section resources and so delay selection of the remainder. The increase in lateness which would result from holding back a particular job is calculated from the rate of change of Expected Lateness‡ with delay in selection, as assessed at time of scheduling ('time-now'). This rate of change will be designated ΔEL.

Basic theorem

26. The scheduling package is based upon the following simple theorem: If $(\Delta EL)_i$ and $(EAWC)_i$ are determined constants for each job at position (i) in a queue, it can readily be shown that, if the jobs are ordered such that

$$\frac{(\Delta EL)_1}{(EAWC)_1} \geqslant \frac{(\Delta EL)_2}{(EAWC)_2} \geqslant$$

$$\ldots\ldots\ldots\ldots \geqslant \frac{(\Delta EL)_i}{(EAWC)_i} \geqslant \frac{(\Delta EL)_{i+1}}{(EAWC)_{i+1}} \ldots\ldots\ldots\ldots,$$

then the expectation of total lateness of all jobs is minimised.

(Since if any $\frac{(\Delta EL)_i}{(EAWC)_i} < \frac{(\Delta EL)_{i+1}}{(EAWC)_{i+1}}$, then exchanging the jobs in question reduces their combined contribution to Expected Total Lateness).

27. The scheduling package orders queuing jobs according to the above relationship, even though the rate of change of Expected Lateness (ΔEL) is only approximately constant over the scheduling interval. Figure 3 shows how Expected Lateness changes with delay in selection.

28. The amount of uncertainty associated with the large majority of forecasts implies that the times (t_1) and (t_2) of the Figure are separated by an interval of at least one week. The rate of change of Expected Lateness with delay in selection (the slope of the curve in Figure 3) can be supposed to change only slowly over a period of one or two days. The following paragraphs discuss the quantification of ΔEL for use in the scheduling algorithm.

Expected lateness

29. Expected Lateness and its derivative depend, by definition, on the distribution of completion time, which is the distribution of the sum of the Q and the X in current and succeeding sections (see Figure 2). Summation is simplified by the two key assumptions described below.

30. The first assumption is illustrated in Figure 4. The urgency of the jobs being selected from each queue is assessed by observation in the factory, and a simple procedure, discussed shortly, is used to derive the time θ shown in the Figure. If a job arrives during period a of Figure 4 it is assumed to be selected from the queue at time θ. If a job arrives during period b it is assumed to be selected without delay. This coarse model of queuing behaviour represents the negative correlation which exists between queuing time and the length of previous processes. Given a distribution of arrival time and a value of θ, it is possible to calculate the mean and variance of a job's time of selection.

31. The second assumption is supplementary to the first. The distributions of selection time and immediately subsequent processing time (assumed to be independent of each other) are combined by summation of moments, and represented by the Log Normal density function with origin at θ. This distribution goes some way towards simulating the skewness caused by spare part delays, test failures, etc.

32. Taken together the above assumptions make it possible to estimate the distribution of arrival time in any section, given only the time θ of Figure 4 and the distribution of arrival time in the previous section. Given values for X and θ in a sequence of sections, and a time of selection from the initial queue, the distribution of time of final completion is readily computed. This final distribution is used in calculation of ΔEL, which is now explained in detail.

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†These forecasts are updated periodically as a job passes through the factory.

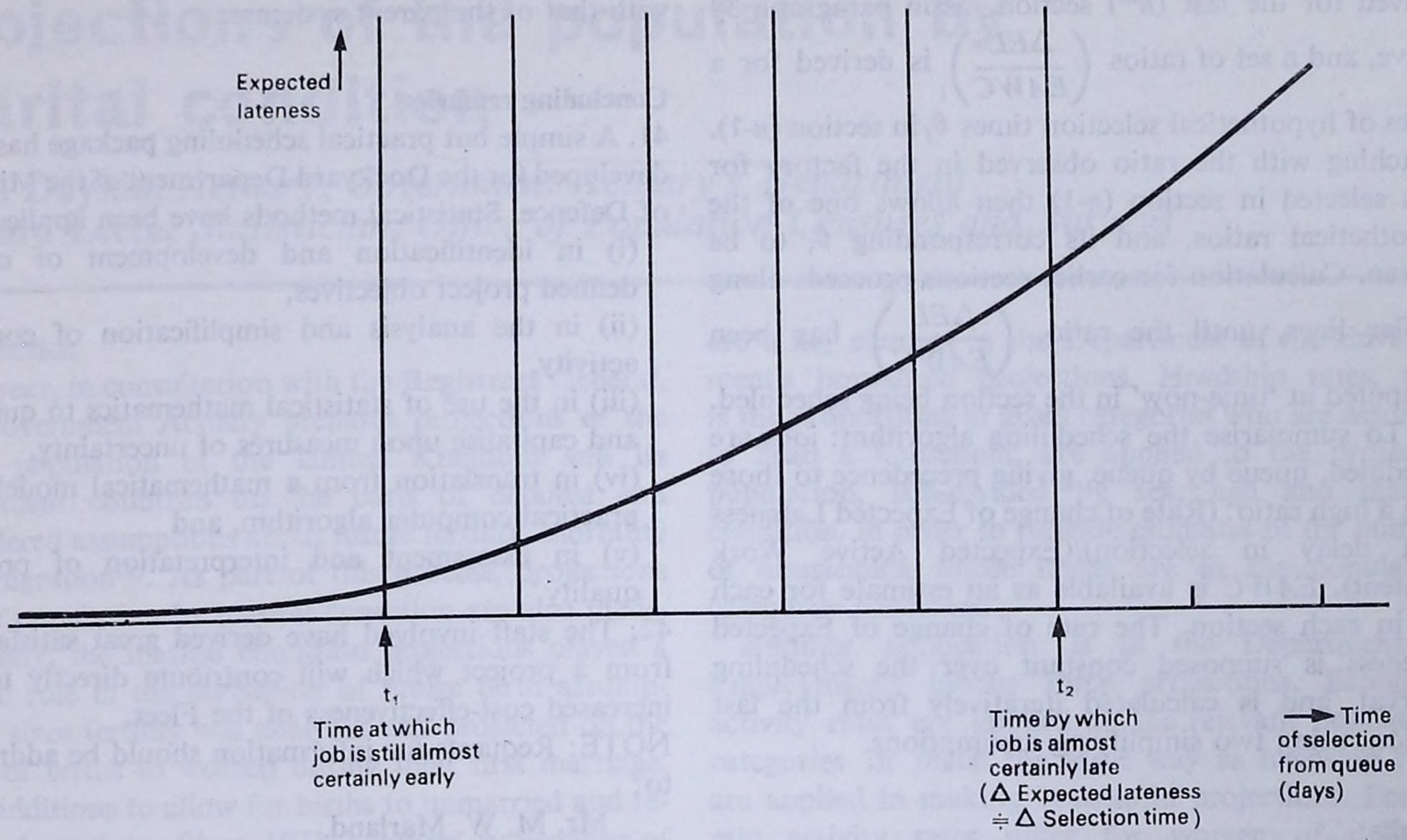
‡The Expected Lateness of a job is defined as $\int_{CR}^{\infty} f(t)\,(t-CR)dt$

where (t) = time

$f(t)$ = probability of completion at time (t), if selected now

CR = Customer Required date

FIGURE 3



Computation of ΔEL

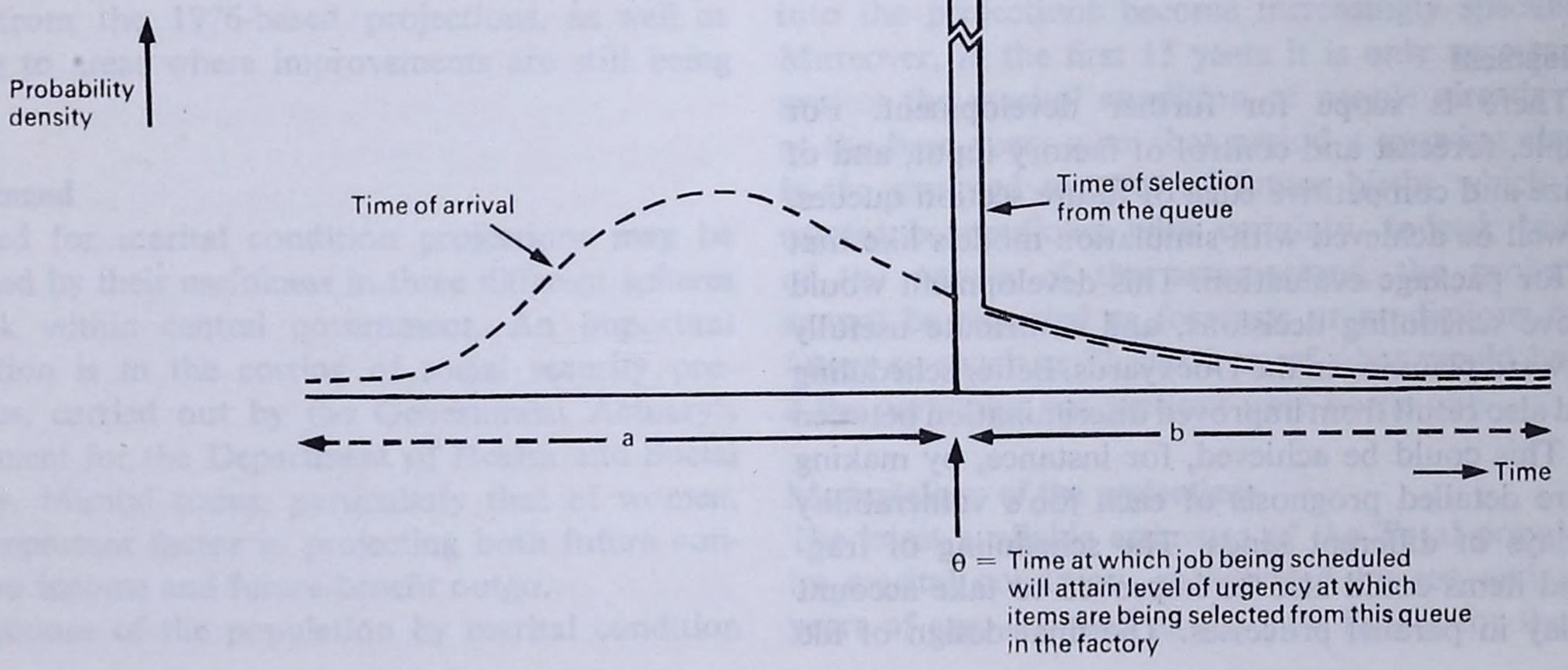
33. ΔEL for a single section job is obtained directly as the derivative of the Log Normal Loss Function (with origin at time-now). *N.B.* This is equal to the probability of lateness if the job is selected immediately.

34. If a job has to pass through two sections before completion, a set of ratios $\left(\frac{\Delta EL}{EAWC}\right)_i$ is first computed for this job in the final section, based on a corresponding set of hypothetical selection times θ_i. That ratio is chosen which matches the ratio observed in the factory, at time of selection, of the jobs being drawn from the second section's queue. The time θ of Figure 4 is the θ_i associated with the chosen $\left(\frac{\Delta EL}{EAWC}\right)_i$.

35. Having established θ in the second section, it is a straightforward matter to apply the distributional assumptions at paragraph 30 *et seq.* above, and to derive ΔEL at time now, using numerical methods.

36. A similar procedure is followed for jobs passing

FIGURE 4



through any number (n) of sections. the time θ is derived for the last (n^{th}) section, as in paragraph 34 above, and a set of ratios $\left(\frac{\Delta EL}{EAWC}\right)_i$ is derived for a series of hypothetical selection times θ_i in section (n-1). Matching with the ratio observed in the factory for jobs selected in section (n-1) then allows one of the hypothetical ratios, and its corresponding θ, to be chosen. Calculation for earlier sections proceeds along similar lines, until the ratio $\left(\frac{\Delta EL}{EAWC}\right)$ has been computed at 'time-now' in the section being scheduled.

37. To summarise the scheduling algorithm: jobs are scheduled, queue by queue, giving precedence to those with a high ratio: (Rate of change of Expected Lateness with delay in selection)/(Expected Active Work Content). *EAWC* is available as an estimate for each job in each section. The rate of change of Expected Lateness is supposed constant over the scheduling interval, and is calculated iteratively from the last section, using two simplifying assumptions.

Results

38. A detailed simulation model of the factory has been used to compare the effectiveness of the scheduling package with current performance. The model has been based on historical data, and on estimates provided by dockyard management. The information fed to the model scheduler is subject to the same uncertainties as is that which will be fed to its counterpart in the factory system.

39. It is current practice in the factory to draw from a queue that job which has waited longest in it (First In: First Out). In comparative runs with the simulation model it has been shown that the mean lateness of jobs leaving the factory is reduced by an order of 20 per cent when the current procedure is replaced by selection from queues in the order recommended by the package.

Development

40. There is scope for further development. For example, forecast and control of factory input, and of the size and competitive edge of future section queues, may well be achieved with simulation models like that used for package evaluation. This development would improve scheduling decisions, and contribute usefully to forward planning in the Dockyards. Better scheduling would also result from improved discrimination between jobs. This could be achieved, for instance, by making a more detailed prognosis of each job's vulnerability to delays of different kinds. The scheduling of fragmented items could also be improved to take account of delay in parallel processes. The final design of file configuration, etc. will be developed in conjunction with that of the parent systems.

Concluding remarks

41. A simple but practical scheduling package has been developed for the Dockyard Department of the Ministry of Defence. Statistical methods have been applied:

(i) in identification and development of clearly defined project objectives,

(ii) in the analysis and simplification of complex activity,

(iii) in the use of statistical mathematics to quantify and capitalise upon measures of uncertainty,

(iv) in translation from a mathematical model to a practical computer algorithm, and

(v) in assessment and interpretation of product quality.

42. The staff involved have derived great satisfaction from a project which will contribute directly to the increased cost-effectiveness of the Fleet.

NOTE: Requests for information should be addressed to:

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Projections of the population by marital condition

Chris Daykin, *Actuary, Government Actuary's Department*
Richard Leete, *Statistician, Office of Population Censuses and Surveys*

Introduction

Each year, in consultation with the Registrars General, the Government Actuary prepares projections of the Total population of the United Kingdom and its constituent countries on the basis of detailed and considered assumptions about future fertility, mortality and migration[1]. As part of this process, projections of the population by marital condition are also made. Formerly, the marital condition projections played a central role in the derivation of future birth assumptions, since fertility was analysed and projected on the basis of births to women during their first marriage, with additions to allow for births to unmarried and remarried mothers. Since 1973, however, projections of future births have been based on assumptions relating to the fertility of all women taken together, regardless of their marital condition. But in spite of the fact that marital condition projections no longer play a part in the formulation of the basic projections' assumptions, they have become more important in their own right and have been increasingly used in planning and in the formulation of policy, both inside and outside central government.

With their growing importance the model on which the marital condition projections are based has changed substantially from that described in *Statistical News* about a decade ago[2]. This article outlines some of the needs for marital condition projections, describes the current methodology and illustrates some of the results from the 1976-based projections, as well as pointing to areas where improvements are still being made.

User demand

The need for marital condition projections may be illustrated by their usefulness in three different spheres of work within central government. An important application is in the costing of social security programmes, carried out by the Government Actuary's Department for the Department of Health and Social Security. Marital status, particularly that of women, is an important factor in projecting both future contribution income and future benefit outgo.

Projections of the population by marital condition are a key element in the Department of the Environment's household projections. Headship rates, that is the proportions in given categories who are assumed to head a household, are applied to the projected population, sub-divided by sex, age and marital condition, in order to provide estimates of the number of households whose heads are in the population categories concerned.

Another application is in the Department of Employment's labour force projections. Economic activity rates are applied to the relevant population categories in much the same way as headship rates are applied in making household projections. Economic activity rates differ for women of different marital status and the sub-division of the projected female population by marital condition is an essential ingredient of these projections.

Many other applications exist, not only in central government but also at a regional and local authority level and in commercial organisations.

For social security purposes the need is for fairly long-term projections. However, the lead times required by the majority of policy makers who make use of household and employment projections are such that marital condition projections are generally only needed for about the next 15 years. Although the projections are calculated for 40 years from the base year, the confidence attached to them decreases, the further one looks into the future, since the assumptions built into the projections become increasingly speculative. Moreover, in the first 15 years it is only necessary to project the marital condition of people already born at the base year; after that period a growing element is the assumed number of future births which itself cannot be predicted with certainty. Indeed, because of the nature of the assumptions, the projections cannot be regarded as forecasts or predictions of the future so much as illustrations of what would happen if the particular assumptions were borne out.

Methodology of the projections

The latest available estimates of the Total population by marital condition, sub-divided by sex and single years of age, are used as the base figures for the pro-

jections. These estimates are prepared annually by the Office of Population Censuses and Surveys for England and Wales, and by the General Register Office for Scotland, using standard demographic flow techniques, with the most recent national census as the baseline. For each of the 40 years after the base year of the projection the numbers by sex and marital status at each age are obtained by applying various transitional rates, that is first marriage rates, divorce rates and so on, to the population at each age and in each category. Leaving migration aside, Figure 1 illustrates the different flows which must be taken into account.

Distinct sets of marriage rates are applied to the marriageable categories in the population: single, widowed and divorced people. Divorce rates are applied to the projected numbers of married men and women. New widows are projected by applying mortality rates for married males to the projected number of married females (and new widowers similarly) since each widow(er)hood arises from the death of a spouse. A simplifying assumption is made that the male partner is three years older than the female, about the average for recent years, but it is not thought that this significantly distorts the results.

There is strong evidence that age-specific mortality varies considerably between the different marital status groups, with married people experiencing lower mortality than single, widowed and divorced people. Accordingly, different sets of mortality rates are used in the projections for each marital status.

One complication is that during any one year it is possible for a person to experience more than one of the 'transitions', for example, divorce and remarriage, or marriage and then death. In the projection, deaths in a given year are calculated by applying mortality rates to the population in each marital status group at the beginning of the year. It is then necessary to absorb the effect of multiple transitions in the other rates; this is done by deriving divorce rates and the various marriage rates from the most recent year for which detailed statistics are available, and by ensuring that these rates reflect the aggregate experience of marriages and divorces age by age over the course of a year. In the main, marriage and divorce rates for future years are assumed to be constant, although, as will be described in the next section, some account is taken of the possible continuation of current trends over the first few years of the projection.

It is, of course, possible to project the population by marital status merely by using assumptions about the level of the various transitional rates together with assumptions about future numbers of births and net migrants year by year according to sex, age and marital status, without recourse to the main population projections. But total numbers in such a projection would tend in time to diverge a little from the aggregate population given by the main population projections, as a result of using differential mortality rates by marital status. This is clearly unacceptable, as would be the independent projection of marriages and divorces for men and women separately without having regard to the need for a one-to-one correspondence between the numbers of spouses marrying and divorcing.

To overcome these problems, two types of control are applied, somewhat artificially, for each year of the projection. Numbers of marriages are first generated independently for men and women by using the transitional rates as described above; the average number is then calculated, and the new number of marriages of each type at each age are rated up or down proportionately so as to produce the same total for each sex. A similar procedure is applied to divorces. This is somewhat unsatisfactory as the procedure does not take any account of the reasons for the occurrence of an imbalance; distortion arises because the rates do not change to allow for differential rates of growth in the stock for example, of unmarried males and females. Factors contributing to this are changes in the age distribution of the unmarried population and the effects of differential rates of widow(er)hood. Other considerations apart, it is to be expected that changes in the composition of the population by age and marital status over time would affect marriage rates, etc., at each age. The assumption of constant rates leads to a divergence in the number of men and women marrying and the effect becomes more important the further ahead the projections are carried. One method of overcoming this difficulty would be to use more disaggregated marriage and divorce rates for future years, in relation to a more detailed breakdown of the projected population stock. However, without an adequate understanding of how the detailed rates might be expected to change in response to changes in the supply of unmarried persons, such a procedure would hardly be less arbitrary than what is done at present.

The second type of control is on the total population by sex and age at the end of each year. The main 'with migration' projection of the Total population is the control factor, since the marital status projections must be consistent with this. Having projected the population forward a year in the various categories the totals at each age for each sex are calculated under four components (single, married, widowed and divorced) and rated up or down proportionately in order to produce the required total population. This assumes that the distribution of new migrants by

marital status is the same as that of persons who were in the country from the start of the year. This is not an altogether satisfactory assumption, but it would be difficult to improve on it even in a more sophisticated model, as the necessary statistics do not exist.

Formulating the assumptions

The first step is to formulate assumptions about present levels of and future trends in the rates of first marriage, divorce, remarriage of widows and the divorced, and mortality rates by marital status – the transitions shown in Figure 1. In order to provide a basis for the assumptions, a detailed analysis is made of trends over the past 15 years or so. Changes in the trends are considered both in relation to possible short-term effects of legislative reforms and to underlying changes in demographic behaviour. In recent years some of the demographic indicators have changed markedly, for example, first marriage and divorce rates, illustrated for England and Wales in Figure 2. The rate of first marriage for women aged 16–19 in England and Wales rose by 23 per cent between 1965 and 1970 (in 1970 the first marriage rate was temporarily increased by the effects of the Family Law Reform Act which lowered from 21 to 18 the age at which young people could marry without parental permission) but has since fallen each year, so that by 1976 the rate was below the value for 1965. Such a marked and rapid change is extremely difficult to interpret, even with hindsight; it is impossible to predict similar rapid periods of change for the future. The steady upward movement in divorce rates during the 1960s was similarly disturbed by the effects of the changed divorce legislation which took effect in 1971 (in England and Wales). To explain past trends in marriage and divorce, reference must be made not only to demographic factors, but also to changes in social attitudes and behaviour; but future changes in attitudes and behaviour cannot be forecast with confidence. Projecting trends in the demographic elements of marital condition projections raises complex technical issues, and also requires considerable subjective judgement.

In practice, OPCS and GAD examine international trends (to look for advance indicators of trends which may first have become apparent in other countries). They also take account of the effects on generations of the continuation of current period rates, before arriving at future assumptions. Thus, for example, in a period of transition towards later marriage, period indicators necessarily give an exaggerated picture of the likely outcome for a generation, since lower marriage rates at younger ages may well be balanced by higher rates at older ages in subsequent years. When assessing future first marriage rates, for example, account is taken of the effects of the projections on the proportions remaining unmarried at each age. A set of annual age-specific rates may imply lower proportions remaining unmarried than have ever been experienced previously; although this is possible it is unrealistic to assume that it will happen, solely on the basis of a single year's rates. The behaviour of generations is much more stable than suggested by annual indicators, as can be seen by comparing the proportions of women in particular generations who have ever been married by given ages with annual first marriage rates (Figure 3). In the mid-1976 and mid-1977 based projections, trends in the various marriage and divorce rates have been projected forward for two and, in some cases, three years and then the rates are assumed to remain level; further extrapolation of the trends or an assumption about their possible reversal was considered to be too speculative.

Table 1 shows, for England and Wales, the first marriage rates for bachelors and spinsters in certain age-groups for several recent years, together with the assumptions made in the mid-1976 and repeated in the mid-1977 based projections for 1978 and later years. Table 2 shows similar information for remarriage rates of divorced men and women.

Assumptions about the relative mortality of people in the different marital status groups were derived from an analysis of population mortality in the years around the 1971 Census, undertaken by the Government Actuary's Department in the course of preparing the report on the English Life Tables for 1971. Table 3 shows the assumed ratios of mortality rates for single, married, widowed and divorced persons to those for all males and females respectively.

Results of mid-1976 based projections for England and Wales

Between 1976 and 1991 the population of England and Wales aged 16 and over is estimated to grow by 5·5 per cent, from 37·3 million to 39·4 million. However, the number married is projected to grow by only 0·6 per cent from 25·0 million to 25·1 million. A significant change in the marital status composition of the population results from an increase in the numbers divorced from 2·4 per cent of the population aged 16 and over in 1976 to 5·2 per cent in 1991. This change, coupled with an expected increase in the proportion remaining single, will lead to a fall in the proportions married, particularly between the ages of 25 and 45. Little change is expected in the proportion of widowed people in the population aged 16 and over. In Table 4 and Figure 4 we set out some of the key features of the mid-1976 based projections. An interesting by-product yielded by the projections is an estimate of the future numbers

of marriages and divorces each year. The total number of yearly marriages is estimated to increase from about 370 thousand in 1977 to reach a maximum of 485 thousand in 1989; divorces are projected to increase from about 130 thousand in 1977 to 155 thousand in 1991. Again, it must be emphasized that these results follow automatically from a certain set of assumptions. They do not constitute a forecast of what will in fact happen.

Some limitations

The limitations of marital status statistics must be kept in mind, for example, when making comparisons over time[3]. The statistics relate to legal categories only: persons cohabiting as husband and wife (with or without children), but not legally married, are classified by their legal status and couples who are separated but not divorced are generally counted as married. This is so, because there are no statutory provisions to require the recording, for example, of informal separations of married couples.

At a time of changing social and legal norms real changes may have occurred which are not shown in the statistics; although changes in the marital composition of the population can be expected to affect household structure, other factors are also operating, so caution should be exercised, for example, when using the marital status projections for making household projections or for similar purposes. The assumed fall in first marriage rates in the projections leads to a small rise in the proportion of single persons at the younger ages. But if the fall in marriage rates were associated with a rise in the number of cohabiting couples then the implications for rates of household formation become complex, with marital status being only one element to be considered among others.

Apart from these difficulties of interpretation, the projection model itself suffers from several limitations, but further work, currently in train, may help to overcome these in due course. We have already mentioned the simplifying assumption that in estimating the numbers of newly widowed persons it is assumed that husbands are three years older than their wives. The correct rate to use would be a weighted mean of the rates for all the possible age combinations of spouses and appropriate changes are being made to the model to allow for this.

Another, more difficult area is that relating to the various controls on the projections. The use of the marriage and divorce controls described above, followed by overall total population controls, does not ensure that the number of married men remains equal to that of married women. These numbers may be expected to differ slightly, as they do in the base population, as a result of husbands or wives in some marriages being excluded from the definition of Total population for one of several reasons. For instance, a resident of this country may marry a member of the US Armed Forces stationed in this country who is not regarded as part of the Total population of the United Kingdom. Larger differences should not, however, occur, and current developmental work on the application of the control mechanisms will ensure that the divergences are kept within reasonable bounds.

Further details

The figures produced in the various tables and illustrated in the charts in this article relate to England and Wales only. However, projections are also constructed for Scotland, and in a somewhat simpler fashion for Northern Ireland. Detailed results of the projections are available from:

Government Actuary's Department,
Steel House,
Tothill Street,
London SW1H 9LS.
Telephone: 01-273 5200.

References

(1) *Population Projections 1976–2016*, Series PP2 No. 8, (HMSO, May 1978) (Price £2·75 net)

(2) Watts, J. R., 'Great Britain population projections by marital condition', *Statistical News No. 7*, November 1969. (HMSO) (Price 30p net)

(3) Leete, R., 'Changing marital composition', *Population Trends* 10, Winter 1977, (HMSO, January 1978) (Price £2·00 net)

APPENDIX

Table 1

First marriage rates (per 1,000 single men or women) at selected ages

England and Wales

	Age-group – Males				*Age-group – Females*			
	16–19	*20–24*	*25–29*	*30–34*	*16–19*	*20–24*	*25–29*	*30–34*
Year								
1965	19	163	193	93	78	265	160	73
1970	27	177	176	91	95	262	169	74
1971	26	170	170	86	94	250	168	76
1972	26	166	174	93	94	247	181	88
1973	25	153	163	88	88	226	170	82
1974	23	143	154	85	81	209	165	84
1975	21	138	151	86	76	208	156	87
1976	18	123	138	83	67	191	142	84
Assumed in the mid-1976 based projections								
1978 and later	18	121	137	82	66	186	141	84

Table 2

Re-marriage rates (per 1,000 divorced men or women) at selected ages

England and Wales

	Age-group – Males			*Age-group – Females*		
	25–29	*30–34*	*35–39*	*25–29*	*30–34*	*35–39*
Year						
1965	510	417	298	454	286	172
1970	507	380	303	383	235	161
1971	502	396	293	364	237	161
1972	526	418	333	402	274	202
1973	429	351	291	353	247	180
1974	398	321	257	325	226	165
1975	359	290	236	304	212	155
1976	319	253	207	286	184	140
Assumed in the mid-1976 based projections						
1978 and later	284	218	172	243	169	124

Table 3

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

England and Wales

Age	*Bachelors*	*Married men*	*Widowers*	*Divorced men*
22	1·215	0·621	1·333	1·380
32	2·082	0·806	2·019	2·053
42	1·747	0·885	1·770	1·931
52	1·499	0·924	1·576	1·719
62	1·256	0·941	1·438	1·457
72	1·064	0·944	1·208	1·251
82	1·004	0·918	1·104	1·050

Age	*Spinsters*	*Married Women*	*Widows*	*Divorced Women*
22	1·351	0·770	1·578	1·551
32	2·154	0·875	1·658	1·615
42	1·631	0·928	1·382	1·357
52	1·303	0·941	1·206	1·216
62	1·106	0·934	1·128	1·160
72	1·007	0·935	1·049	1·089
82	0·975	0·905	1·025	1·181

Table 4

Projected population[1] by marital condition, 1976 to 1991

England and Wales **Thousands**

Year	*Males*				*Females*			
	Single	*Married*	*Widowered*	*Divorced*	*Single*	*Married*	*Widowered*	*Divorced*
	Ages 16 to 24				**Ages 16 to 24**			
1976	2,643	590	–	6	1,993	1,061	2	12
1981	3,019	563	–	9	2,370	1,029	1	14
1986	3,075	617	–	11	2,381	1,123	1	15
1991	2,776	583	–	10	2,094	1,078	1	15
	Ages 25 to 44				**Ages 25 to 44**			
1976	1,015	5,108	15	204	538	5,310	51	267
1981	1,153	5,071	12	357	598	5,303	47	431
1986	1,350	5,207	13	411	734	5,450	48	505
1991	1,557	5,412	13	437	853	5,700	48	529
	Ages 45 to 64				**Ages 45 to 64**			
1976	494	4,780	161	138	461	4,555	682	189
1981	463	4,550	143	225	371	4,337	623	279
1986	431	4,429	135	294	306	4,177	586	368
1991	404	4,412	126	345	252	4,153	536	445
	Ages 65 and over				**Ages 65 and over**			
1976	199	2,017	498	28	567	1,564	2,127	56
1981	214	2,134	504	44	527	1,586	2,293	93
1986	218	2,151	507	58	469	1,583	2,366	132
1991	228	2,185	514	73	406	1,609	2,399	175
	Ages 16 and over				**Ages 16 and over**			
1976	4,351	12,495	674	376	3,559	12,490	2,862	524
1981	4,849	12,318	659	635	3,866	12,255	2,964	817
1986	5,074	12,404	655	774	3,886	12,333	3,001	1,020
1991	4,965	12,592	653	865	3,605	12,540	2,984	1,164

[1]Mid-1976 based population projections

FIGURE 1

Transfers of population of a given age, sex and marital condition between age x and x+1

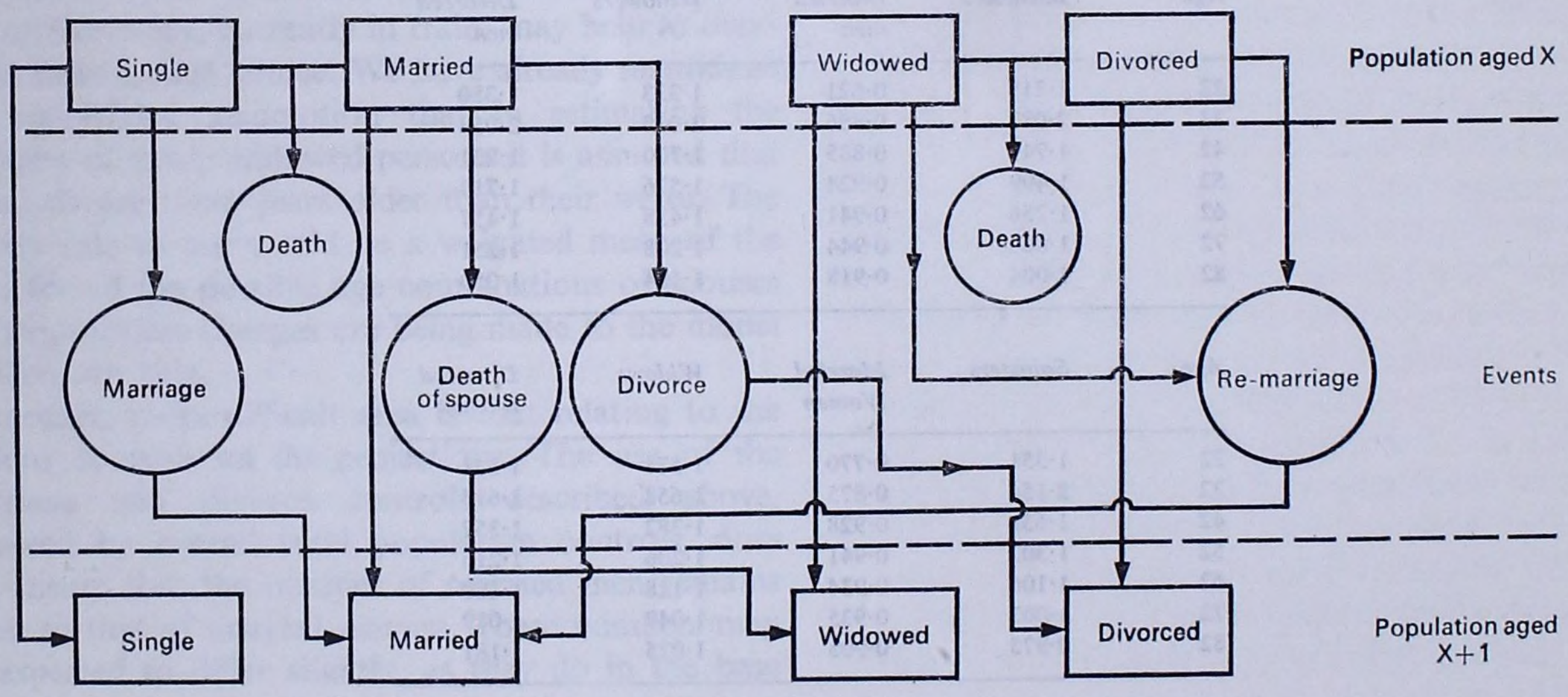


FIGURE 2

Rates of first marriage and divorce, actual and projected, 1965-1985

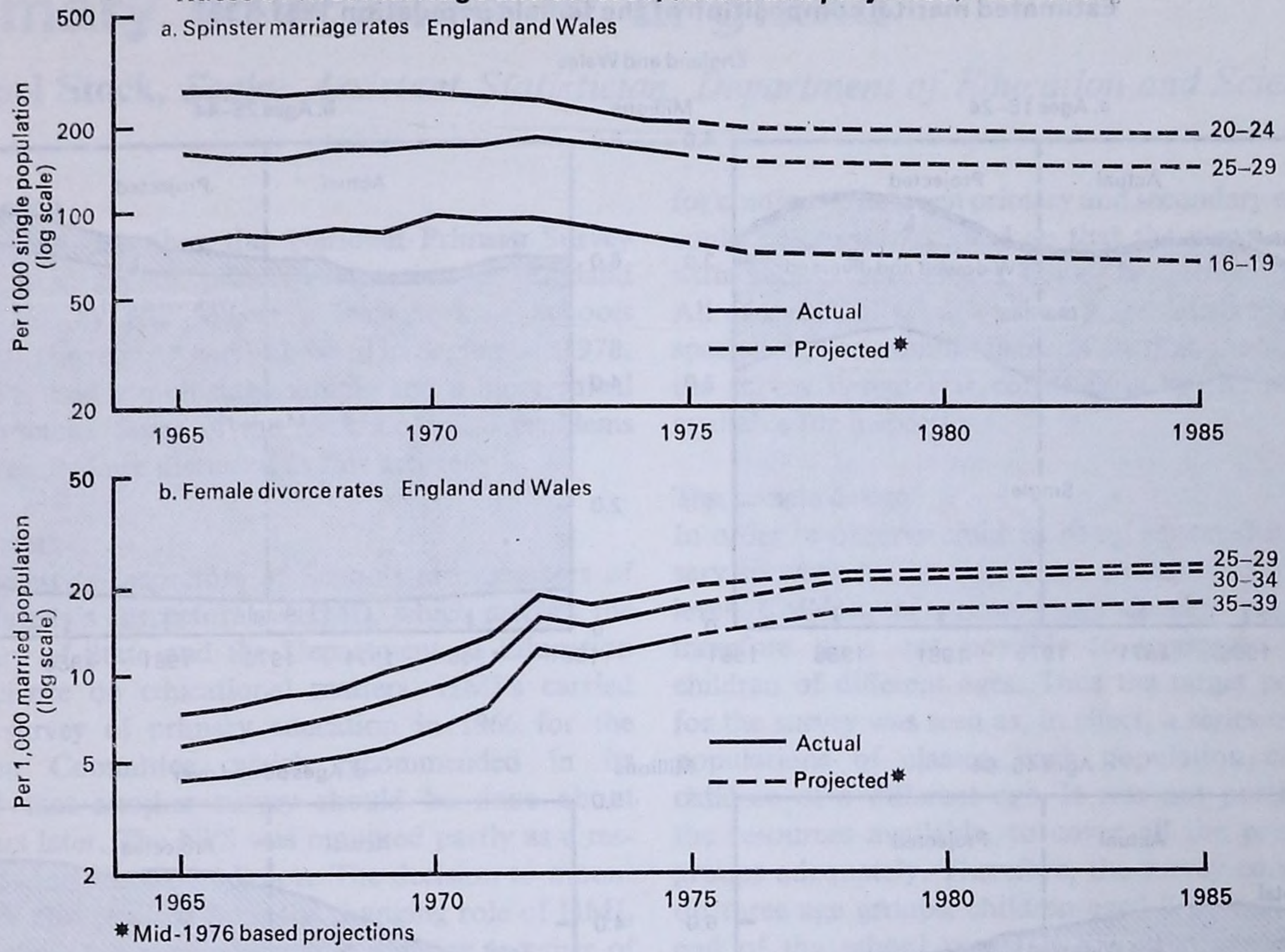


FIGURE 3

First marriage trends, period and cohort indicators, 1965-76

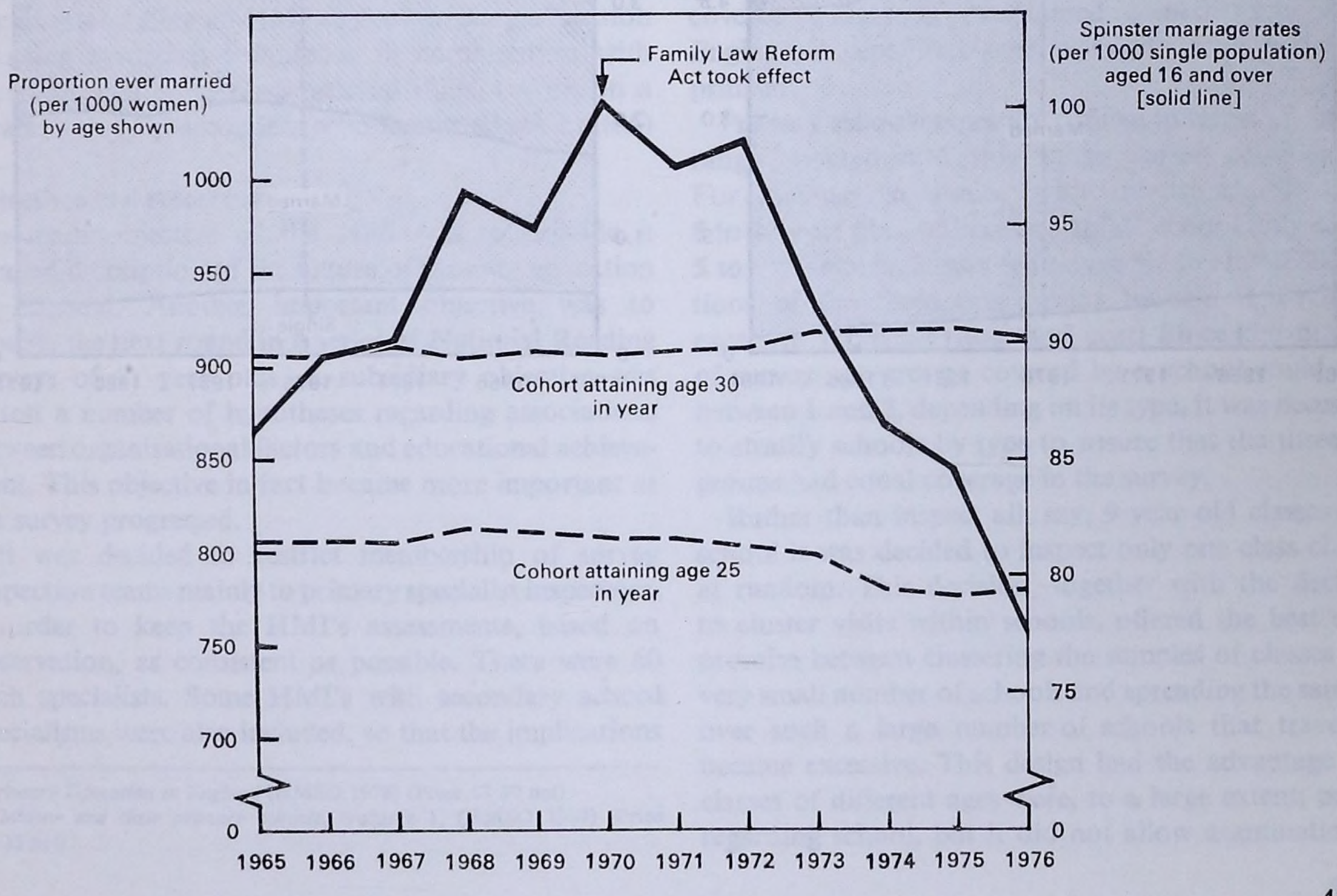
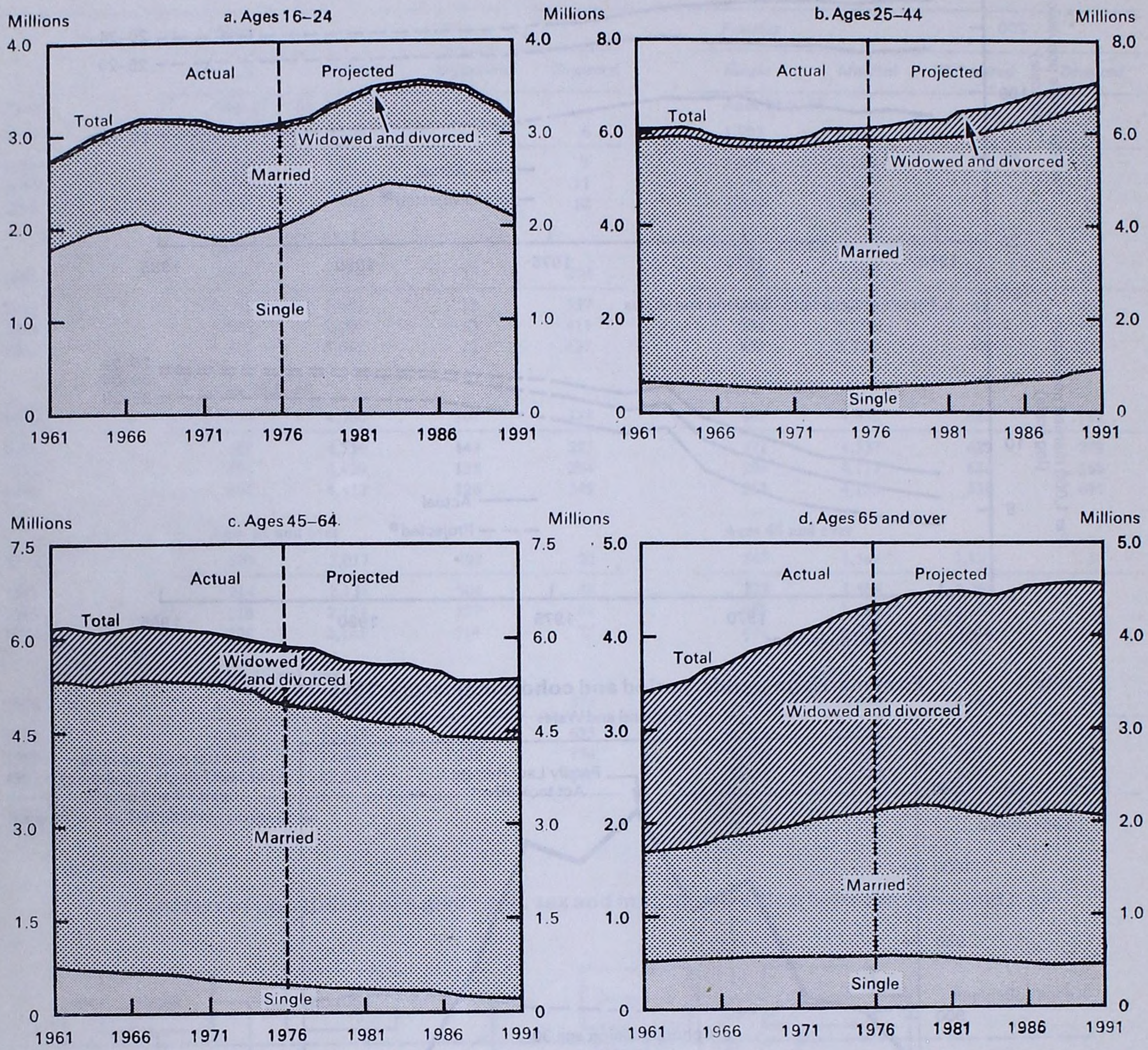


FIGURE 4

Estimated marital composition of the female population 1961-1991

England and Wales



Primary education in England

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Introduction

This article describes the National Primary Survey (NPS), a survey of primary education in England carried out by Her Majesty's Inspectors of Schools (HMI's). The report* was published in September 1978. The NPS used a multistage sample and a hierarchical data structure. Some of the methodological problems which resulted are discussed in this article.

Background

Her Majesty's Inspectors of Schools are members of Her Majesty's Inspectorate (HMI), which advises the Secretary of State and the Department of Education and Science on educational matters. HMI's carried out a survey of primary education in 1966 for the Plowden Committee, which recommended in its report† that another survey should be done about ten years later. The NPS was mounted partly as a response to this recommendation. The decision to mount the NPS also resulted from the changing role of HMI, which requires a more systematic drawing together of the results of inspections of schools than was the case. Planning of the NPS started in 1974. It was seen as a way of establishing an HMI view of primary education by using statistical techniques in combination with the traditional HMI observational skills. (Work on a parallel survey of secondary schools started soon after.)

Objectives and resources

The main objective of the NPS was to provide a detailed description of the nature of primary education in England. Another important objective was to provide the next round in a series of National Reading Surveys of 11 year olds. A subsidiary objective was to test a number of hypotheses regarding associations between organisational factors and educational achievement. This objective in fact became more important as the survey progressed.

It was decided to restrict membership of survey inspection teams mainly to primary specialist inspectors, in order to keep the HMI's assessments, based on observation, as consistent as possible. There were 60 such specialists. Some HMI's with secondary school specialisms were also included, so that the implications for continuity between primary and secondary education could be considered, and so that the views of HMI's with subject specialisms could be brought to bear. All of the HMI's, both primary specialists and subject specialists, had commitments other than the survey and the survey design was constrained by the manpower available for inspections.

The sample design

In order to observe children being educated it is necessary to work at the class level, rather than the school level. Children of primary age develop rapidly and therefore it is not possible to aggregate data for children of different ages. Thus the target population for the survey was seen as, in effect, a series of parallel populations of classes, each population containing children of a different age. It was not possible, with the resources available, to cover all the primary age groups adequately. Therefore, the survey concentrated on three age groups, children aged 7, 9 and 11 at the end of the school year (i.e. top infants, second year juniors, top juniors). These three age groups represented a balanced coverage of the age range. The survey covered classes in maintained primary schools in England, except for classes in middle schools deemed primary.

Primary schools types are defined in terms of the age range covered and this range varies considerably. For instance, a Junior with Infant school covers 5 to 11 year olds, whereas an Infant school only covers 5 to 7 year olds. It was felt advisable to cluster inspections of the three age groups by school, to avoid excessive travelling time and cost. Since the number of survey age groups covered by a school could vary between 1 and 3, depending on its type, it was necessary to stratify schools by type to ensure that the three age groups had equal coverage in the survey.

Rather than inspect all, say, 9 year old classes in a school it was decided to inspect only one class chosen at random. This decision, together with the decision to cluster visits within schools, offered the best compromise between clustering the samples of classes in a very small number of schools and spreading the samples over such a large number of schools that travelling became excessive. This design had the advantage that classes of different ages were, to a large extent, paired regarding school, but it did not allow examination of

**Primary Education in England* (HMSO 1978) (Price £3·50 net)
†*Children and their primary schools*, Volume 1, (HMSO 1967) (Price £1·25 net)

variation between classes of the same age within schools.

In practice primary school children are not necessarily arranged in single age classes. They may be vertically grouped; in other words children from two or more age groups are placed in a single class. This might be done in smaller schools to even out class sizes but, particularly with younger children, it might be a deliberate policy on the part of the school. Because of the possible presence of vertical grouping the sample unit was defined as a teaching group, a group of six or more children of the same age within a class. This definition excluded excessively small groups of children. In many cases the teaching group and the class would be the same thing.

Annual returns to the Department are not sufficiently detailed to identify teaching groups and therefore a two stage sample was necessary. Since the main focus of the survey was on teaching groups, rather than schools, it was desirable that the samples of teaching groups were as nearly self-weighting as possible. This implied, at the first stage, selecting schools with probability proportional to the number of teaching groups per age group. Because this number was not known, a measure of size, based on the number of 8 year olds (7 year olds in the case of Infant schools) was used to estimate the number of classes per age group and schools were selected at the first stage with probability proportional to the measure of size. There were three values for this measure of size, one, two and three classes per age group. Since the measure of size was an approximation, weighting of the data would be necessary. The sample of schools was stratified by HMI division to give an even geographical spread.

At the second stage, one teaching group per age group, if present, was selected in each school. For 9 and 11 year olds there was a third stage to the sample. These children were given tests in mathematics and reading. The tests were supplied by the National Foundation for Educational Research (NFER) who also supervised their administration. Where a teaching group of 9 or 11 year olds contained 20 or less children, all of them were tested, but where there were 21 or more children only half of them were tested, taking a systematic sample from the register. This procedure avoided an unnecessarily large sample of children, and thus reduced costs. It also tended to counterbalance the undersampling of small teaching groups which occurred at the second stage of the sample. The sample of children was thus brought nearer to being self-weighting.

The sample contained 542 schools (a 2·6 per cent sample), spread over 85 strata. It covered 406, 376 and 347 seven, nine, and eleven year old teaching groups respectively. (A 1·4 per cent sample at each age group). Approximately 5,000 nine year olds and 5,000 eleven year olds were tested. The differing teaching group sample sizes were due to the exclusion of middle schools deemed primary.

The methods of data collection

There were three distinct types of data and each was collected in a different way. Factual data concerning the schools was obtained by means of a questionnaire given to the head teachers. They also completed a questionnaire giving brief details of all the staff in the school. Similarly, the class-teachers of the classes containing the sampled teaching groups gave details of the organisation of their class in a questionnaire. Disregarding the invitations for comments at the end of the questionnaire, the staff were not asked to express opinions.

In contrast, the inspectors were asked to observe and record their judgements on a wide range of subjects. They were asked to record their views on general questions such as the discipline and type of teaching approach in a class; they had to respond to detailed checklists about the availability and use of resources and the content of the work for each subject in the primary curriculum. In all 400 responses were required from the inspectors for each teaching group. The schedules for HMI use and the class teacher questionnaires were the same for all three age groups; it was anticipated that, particularly for the 7 year olds, some of the questions would receive the response 'not applicable'.

The final type of data was test results. HMI's, in consultation with the Department, chose suitable tests from the selection offered by the NFER.

The field work

A feasibility study, covering eight schools, and then a full scale pilot survey, covering fifty six schools, were mounted to test the questions and the complex administrative arrangements necessary.

Field work for the main survey took place during term time from November 1975 to April 1977. Local education authorities were informed at the beginning of each term which of their schools were to be surveyed during the term. The schools themselves were informed by letter of the visit and the head was asked to complete a grid giving full details of the age structure of his classes. About three weeks before the survey visit a member of the survey team visited the school. This visit had several purposes. The HMI selected, in a prescribed way, classes to be surveyed. He or she also discussed the purpose of the survey visit with the head and distributed the head teacher and class teacher questionnaires. The head was asked to send back the

completed questionnaires to the HMI before the survey visit, to allow the team to examine them and correct any errors at the time of the visit. For each age group the survey class was selected by using the first letters of the surnames of the class teachers for that age group. Names of foreign extraction tend to start with letters near the beginning or end of the alphabet. To avoid biases in selection, the HMI was given an alphabet whose starting letter had been randomly chosen.

For the survey visit proper, the survey teams consisted of two inspectors. They both observed all the survey teaching groups in the school and made agreed responses on the schedules. The teams were rearranged after each visit, to avoid consistent biases. Also, using the inspectors who worked on the pilot study as an initial pool, each team had at least one member who had done a previous survey visit. This arrangement was intended to keep the judgements of teams as consistent as possible.

To avoid distortion of the test results by the survey visits, the NFER carried out the testing in two parts, in June of 1976 and 1977. Hence the vast majority of teaching groups had a delay of at least half a term between the survey visit and the testing, although the survey visit and testing for a teaching group always occurred in the same school year so that the children tested were the ones who had been surveyed.

Out of the 542 schools data for 540 were successfully collected. Data for one school were lost in the post and data for another were discarded, since it was felt that the schedules could not accurately reflect the situation in the school. All teaching groups provided test data.

The computer system

The amount of data per school was very large, so that it was necessary to encode each questionnaire and schedule separately. Also, the data had a complex hierarchical structure (see Figure 1). An added complication was that, depending on its type, for a particular school data for one or even two age groups might not be present. The solution adopted was to form a large record (2,400 fields) for each school, containing a module for each age group (see Figure 2). Where an age group was not present the corresponding module was zero-filled. The teacher records and the test result records for individual children were held on two separate files. Summaries of this data, for each school, were appended to the main file record. This was wasteful, since a third of the main file was zero-filled and the data on the teacher and test result files was repeated, in summary form, on the main file. With a survey the size of the NPS this was not serious, but it could have been a major problem with a larger survey.

The Department's own tabulation systems were able to cope with the records of the main file, but the records were too large to be read by the bought in analysis software. A special program to create files with smaller records 'at will' had to be written.

Analysis

The amount of data not only meant unwieldy records, as mentioned above, it also necessitated an initial tabulation run of over 1,200 tables to summarise the data for HMI use.

The data could be analysed at three levels; for the school, the teaching group or the child. At each level the data needed weighting to account for unequal selection probabilities, which arose, in the case of schools, due to deliberate choice in the sample design, but, in the case of teaching groups and children, reflected the approximate nature of the measure of size. In fact, about 75 per cent of the teaching groups were selected with the design probability, so that the measure of size did work well in practice, but the problem of unequal selection probabilities still remained. After the application of weights the sample sizes appearing in the tables were different from the actual sizes. The true sampling errors, taking account of the actual sample sizes and the weights, were compared with the sampling errors which resulted if the weighted sample sizes were used and simple random sampling assumed. Suitable adjustments, to convert from the latter sampling errors back to the true ones were calculated. Tabulations showing the weighted sample sizes, and assuming simple random sampling were then used. This had the advantage that the sampling errors could be calculated by standard software and it was only necessary to apply 'rule of thumb' adjustments by hand to estimate the true sampling errors.

The use of significance tests, such as Chi-squared, was problematic since the significance levels were affected by weighting the data. Current unpublished research at Southampton University suggests that for small tables (less than about 25 cells) the distortion is usually not great, although there is chance that it might be. The distortion, if present, is likely to generate an apparent significance where it is not present, rather than obscure truly significant differences. With larger tables the distortion can be immense and even taking very conservative significance levels, say 0·1 per cent, is no protection. For small NPS tables one per cent significance was used for Chi-squared. With larger tables it was a matter of judgement whether they contained real differences or not.

Weighting assumes that population statistics are being estimated from the sample. For many of the analyses, aimed at establishing associations between

variables, the data was used unweighted. The justification for this was that unless the unweighted sample was grossly unrepresentative of the population an association identified in the unweighted sample was likely to carry through to the population. This assumption made analysis much simpler. Standard software could be used for such techniques as analysis of variance with the teaching group mean test scores.

One purpose of the survey, as mentioned earlier, was to produce the latest in a series of national reading surveys of 11 year olds, using the NS6 reading test. This involved analysis of the test scores of individual children, rather than teaching group mean scores. The standard error of the estimated national mean score had to be estimated accurately. Simulation studies suggested that assuming simple random sampling would give sampling errors that were only about 50 per cent of the true values. Estimation of the true values represented a problem, since the sample design involved unequal sized clusters within unequal sized clusters (teaching groups within schools; children within teaching groups) with unequal and non-proportional selection probabilities. No exact method for estimating sampling errors for this design are known. Several simplifying assumptions were made, based on Kendall and Stuart[1] and then an approximate method, taken from Kish[2], was used. Even then the formulae used (which are quoted in full in the report) were extremely complicated. Acknowledgement is made of the help given by Mr. B. Sexton of the NFER, who had assisted in developing the formulae and wrote the necessary computer programs.

Conclusion

The complex sample design and hierarchical data structure were fully justified, because the survey design envisaged by the HMI would not have been possible without them. However, much of the theory underlying the analysis of survey data from complex sample designs is still not well understood. Certainly, rules for use by applied statisticians are lacking.

The survey was well received by the Press and the educational world, when it was published in September 1978. It provided a detailed and comprehensive account of primary education, which had previously been lacking. The analysis of the data raised a number of issues, such as the deployment of teachers within schools, which have far reaching policy implications.

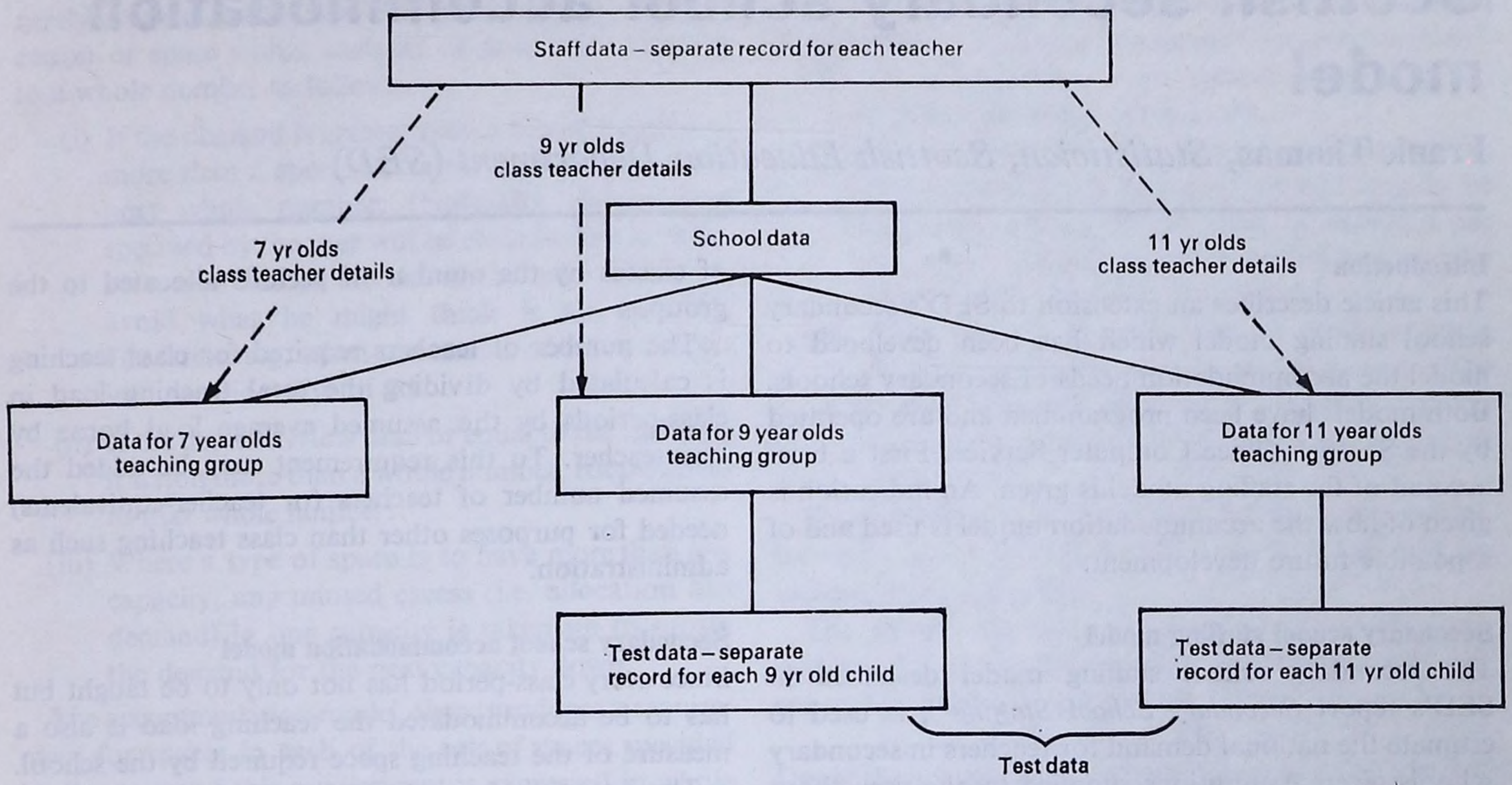
References

(1) Kendall, M. G., and Stuart, A. '*The Advanced Theory of Statistics* Vol. III (London: Griffin & Co., 1958)

(2) Kish, L. *Survey Sampling* (New York: John Wiley & Sons, 1965)

FIGURE 1

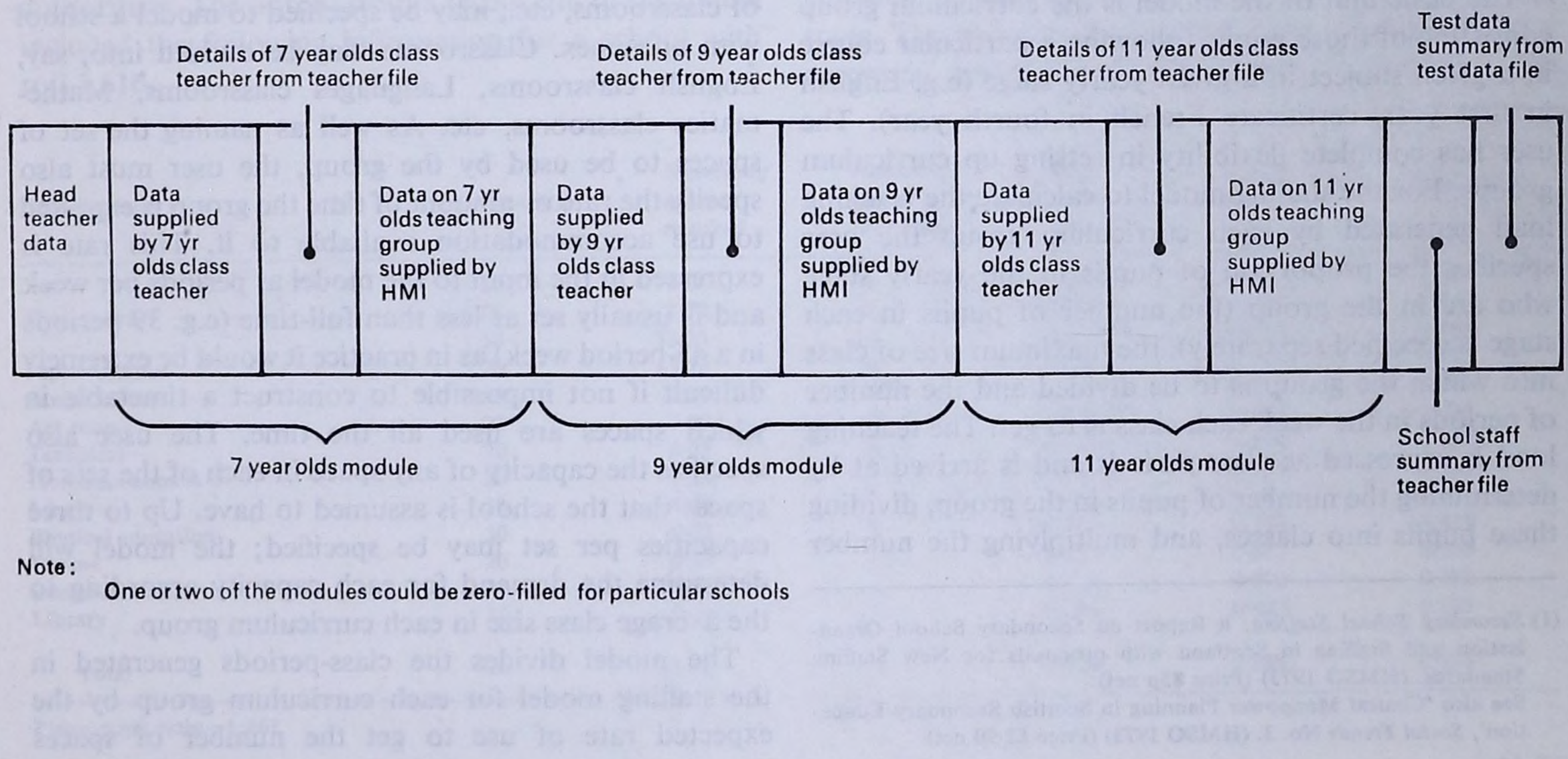
The hierarchal data structure of the National Primary Survey



Note :
Data for the 7 year olds, or the 11 year olds, or both 9 and 11 year olds might not be present for a particular school

FIGURE 2

The structure of a main file record for the National Primary Survey



Note :
One or two of the modules could be zero-filled for particular schools

Scottish secondary school accommodation model

Frank Thomas, *Statistician, Scottish Education Department (SED)*

Introduction

This article describes an extension to SED's secondary school staffing model which has been developed to model the accommodation needs of secondary schools. Both models have been programmed and are operated by the Scottish Office Computer Service. First a brief account of the staffing model is given. An indication is given of how the accommodation model is used and of a possible future development.

Secondary school staffing model

The secondary school staffing model described in SED's report *Secondary School Staffing*[1], is used to estimate the national demand for teachers in secondary schools given assumptions supplied by the user about the curriculum and organisation of schools. The national demand is built up from the requirements of single schools. The user divides the present or future number of schools into subsets, uses the model to determine the requirements of a typical school in each subset and grosses up the results.

The staffing model is, then, a model of an individual school. The following paragraphs describe the methodology of the staffing model which is also used for the secondary school accommodation model.

The basic unit of the model is the curriculum group consisting of those pupils following a particular course in a given subject in a given yearly stage (e.g. English in first year, certificate French in fourth year). The user has complete flexibility in setting up curriculum groups. For the staffing model to calculate the teaching load generated by each curriculum group the user specifies the proportion of pupils in the yearly stage who are in the group (the number of pupils in each stage is specified separately), the maximum size of class into which the group is to be divided and the number of periods in the week each class is to get. The teaching load is expressed as class-periods and is arrived at by determining the number of pupils in the group, dividing these pupils into classes, and multiplying the number of classes by the number of periods allocated to the group.

The number of teachers required for class teaching is calculated by dividing the total teaching load in class-periods by the assumed average load borne by one teacher. To this requirement may be added the assumed number of teachers (or teacher-equivalents) needed for purposes other than class teaching such as administration.

Secondary school accommodation model

Since every class-period has not only to be taught but has to be accommodated the teaching load is also a measure of the teaching space required by the school.

The accommodation model, accordingly, takes up its workings from this point of the workings of the staffing model. A description of the accommodation model follows.

In addition to those assumptions leading to the calculation of the teaching load, a user of the accommodation model must name the set of spaces to be used by each curriculum group. Normally, each set will correspond to a particular type of space e.g. classroom, science laboratory or workroom, but the naming of sets is completely flexible so that, for example two sets of classrooms, etc., may be specified to model a school with an annex. Classrooms may be divided into, say, English classrooms, Languages classrooms, Mathematics classrooms, etc. As well as naming the set of spaces to be used by the group, the user must also specify the rate or amount of time the group is expected to use accommodation available to it. This rate is expressed in the input to the model as periods per week and is usually set at less than full-time (e.g. 39 periods in a 45-period week) as in practice it would be extremely difficult if not impossible to construct a timetable in which spaces are used all the time. The user also specifies the capacity of any space in each of the sets of spaces that the school is assumed to have. Up to three capacities per set may be specified; the model will determine the demand for each capacity according to the average class size in each curriculum group.

The model divides the class-periods generated in the staffing model for each curriculum group by the expected rate of use to get the number of spaces

(1) *Secondary School Staffing:* a Report on Secondary School Organisation and Staffing in Scotland with proposals for New Staffing Standards. (HMSO 1973) (Price 85p net)
See also 'Central Manpower Planning in Scottish Secondary Education', *Social Trends* No. 3. (HMSO 1973) (Price £2·90 net)

required by each group. The number of spaces required in each set of spaces is accumulated. This demand, rarely an exact whole number, is turned into an allocation of space within each set of spaces by rounding to a whole number as follows.

(i) If the demand is greater than a whole number by more than a specified fraction, round up to the next whole number. (Normally the fraction specified by the user will be close to zero or zero. Non-zero values are set if the user wishes to avoid what he might think is an excessive allocation e.g. when a demand of 1·1 is turned into an allocation of 2.)

(ii) If the demand is less than or equal to the specified fraction more than a whole number, round down to that whole number.

(iii) Where a type of space is to have more than one capacity, any unused excess (i.e. allocation *less* demand) in one capacity is taken up to satisfy the demand for the next capacity down.

The accommodation model, then, produces a requirement for spaces in each of the sets of spaces specified by the user and this requirement is expressed in whole numbers (in contrast to the staffing model which legitimately leaves staffing requirements by subject expressed as fractions). Multiple use of certain types of space can be dealt with by the accommodation model either by specifying such use from the outset or by inspection of the output, in particular, looking for those sets of spaces where there is a considerable unused excess. Such scrutiny is often carried out when the model is being run for a particular school (see paragraph below on the use of the model by education authorities). The output from a recent run of the model included the following information for a school with roll 1,616.

As shown, the model also calculates other useful indicators namely a place-pupil ratio and measures of the use by the school of the accommodation the model has allocated to it. Three measures of use are calculated.

(i) Space utilisation – an indicator of how full accommodation is when in use.

(ii) Time utilisation – an indicator of how often accommodation is in use. (This will usually be less than implied by the rates of expected use originally specified by the user because usually allocation is greater than demand.).

(iii) Utilisation–an overall indicator of use which is the product of space and time utilisation. (The precise definition used in the model also means that this indicator is the inverse of place-pupil ratio.)

These indicators are calculated for the whole school, for each set of spaces, for each yearly stage and for various other groupings.

The model does not convert the number of spaces required by a school into areas nor does it deal with spaces other than teaching spaces.

Use of the accommodation model by education authorities

The model has been used during the past 3 years in two ways. First, education authorities have used the model to investigate the accommodation problems of particular existing or proposed schools. For example, since the specification of sets of spaces is completely flexible two sets of each type of space may be specified if the school has an annex. The model has been used in this way and to determine the accommodation required after the school being studied has had an abrupt change of roll e.g. if the school is to be amalgamated or divided, or to have an additional yearly stage. The accommodation problems of schools with a suspected imbalance between, say, classrooms and

Set of spaces	*Capacity*	*Number of spaces required*	*Number of spaces allocated*	*Space utilisation*	*Time utilisation*	*Utilisation*
Classrooms	10	3·08	3	0·782	0·874	0·683
	20	7·72	7	0·850	0·867	0·737
	30	33·23	34	0·866	0·867	0·751
Junior science	20	5·13	6	0·945	0·741	0·700
Senior science	20	7·64	8	0·736	0·828	0·609
Art rooms	20	7·00	7	0·796	0·867	0·690
Technical	20	6·05	6	0·786	0·874	0·687
Home economics	20	6·36	7	0·753	0·787	0·593
Music	30	4·44	5	0·743	0·769	0·571
Physical education	30	5·26	6	0·801	0·759	0·608
Drama	20	0·69	1	0·852	0·600	0·511
Business studies	20	1·85	2	0·735	0·800	0·588
Library	30	0·49	1	0·400	0·422	0·169
Total	—	88·92	93	0·826	0·829	0·684

Place–pupil ratio = 1·461

practical rooms, have been studied. Authorities have made considerable use of the model in formulating the accommodation needs of new schools. A special document has been designed which authorities complete and which is punched directly for input into the model. (Incidentally, the staffing model has never been used in this way for particular individual schools.)

Use of the accommodation model by the Scottish Education Department

The second purpose the model has served is in calculating the national demand for accommodation in secondary schools, in particular for assumed changes in roll or curriculum. The model was used in the exploratory studies by SED of the recommendations of recent reports[2] on secondary school education. The model can be used to set up scales relating accommodation required to school roll for a given set of assumptions on the curriculum and organisation of schools.

Possible future developments

Work is in progress in SED to streamline the calculations involved in determining the national demand for teachers in secondary schools and similar work based on the accommodation model is being considered.

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(2) *The Structure of the Curriculum in the Third and Fourth Years of the Scottish Secondary School* (The Munn Report) (HMSO 1977) (Price £1·50 net); *Assessment for all*, report of the Committee to Review Assessment in the Third and Fourth Years of Secondary Education in Scotland (The Dunning Report) (HMSO 1977) (Price £2·00 net)

A meeting of the Central Statistical Office Heads of Branches held on 2 October 1978. Also present were Sir Claus Moser, the former Director; Mr. A. A. Sorrell and Mr. B. Mower.

Recently available statistical series and publications

The following publications containing social statistics have recently, or will soon, become available during the January–March quarter of 1979. Unless otherwise specified, copies may be purchased from Her Majesty's Stationery Office. A list of release dates of economic series is published monthly in *Economic Trends*.

Central Statistical Office
Annual Abstract of Statistics No. 115
Regional Statistics No. 14

Department of Education and Science
Statistics of Education, Volume 2, 1977: School leavers and CSE/GCE examination statistics, 1976–77
Statistics of Education, Volume 6, 1976: University statistics, 1976
Statistics of Education, Volume 1, 1977: Schools statistics, 1977
Statistics of Education, Volume 3, 1976: Further education statistics, 1976

Department of Employment
Employment Gazette, published towards the end of each month, contains indicators on earnings, unemployment and prices. Issues due in the first quarter will contain the Family Expenditure Survey results for the first and second quarters 1978. It will also include an article *RPI 'General Index' households, one- and two-person pensioner households, and all households*

Department of the Environment
Housing and Construction Statistics, Issue 27: figures for the third quarter 1978
Local Housing Statistics, Issue 47: figures for the third quarter 1978

Home Office
Liquor Licensing Statistics, 1977–78
U.K. Fire Statistics, 1977

Office of Population Censuses and Surveys
Population Trends No. 15
OPCS Monitors available free from the Office of Population Censuses and Surveys include:

Births and Deaths	VS	Weekly
Deaths from Accidents	DH4	Monthly
Legal Abortions	AB	Monthly
Adoptions	FM3	Quarterly
Infectious Diseases	MB2	Quarterly

Scottish Office
Scottish Mental Health Inpatient Statistics, 1977
Scottish Housing Statistics No.3
Health in Brief 1977
Residential Accommodation for Children 1976–77
Children in Care or Under Supervision 1977
Children's Hearing Statistics 1976
Scottish Abstract of Statistics No.8, 1978

Welsh Office
Welsh Social Trends No. 2, 1978

In addition to the above, the following analyses in the Department of Health and Social Security statistical series have recently become available. Extracts and summaries from these will eventually be published in *Social Security Statistics*.

Unemployment benefit
Quarterly analysis of decisions of Insurance Officers, quarter ending 30 September 1978
Monthly analysis of claims by sex and region:
Period ending 4.11.78
Period ending 2.12.78
Quarterly analysis of registered unemployed by class, sex and region, quarter ending 6.11.78

Child benefit
Analysis by families and children, 3 months ended 31.12.78

Family Income Supplement
Monthly analysis of numbers and characteristics –
September 1978, October 1978, November 1978

Guardian's allowance/Child's special allowance
Quarterly analysis of children for whom allowance is in payment, year ended 31 December 1978

Further information can be obtained from:
Mr. R. J. McWilliam,
Department of Health and Social Security,
Room 2216,
Newcastle Central Office,
Newcastle upon Tyne NE98 1YX.

New surveys assessed by the Survey Control Unit

September to December 1978

For further information on the surveys listed, the appropriate departmental contact may be obtained from Mr R. C. Ponman (01-233 8551), Survey Control Unit, Central Statistical Office, Great George Street, London SW1P 3AQ.

An introductory note was given in Statistical News 36.41

New surveys assessed September – December 1978

Title	*Sponsor*	*Those approached*	*Approximate number approached*	*Location*	*Frequency*
		Business Surveys			
Sprayed concrete survey	BRE	Building contractors	50	UK	AH
New uses for redundant farm buildings	CC	Farmers	60	EW	AH
2nd survey of Small Firms Employment Subsidy Scheme	DEM	Manufacturers	850	GB	AH
Companies manufacturing waste heat recovery equipment	DEN	Manufacturing companies	475	UK	AH
Dangerous substances discharged to rivers and other waters – pilot survey	DOE	Managers	500	NW	AH
Monitoring inner city change in the manufacturing industry	DOE	Manufacturing firms	700	SE	AH
Continuing road goods transport – international transport	DTP	Goods vehicle operators	200	UK	W
ETB workshops conference evaluation survey	ETB	Visitors	1,950	E	AH
Hotel profitability and investment intentions 1979	ETB	Hotels	420	SE	AH
Economic effects of bypasses on local communities	HIDB	Service companies	150	S	AH
Review of drainage progress in Northants division	MAFF	Farmers	45	EM	AH
Manpower needs of the veterinary profession	MAFF	Veterinary surgeons	7,500	UK	Y5
Persistent organochlorine compounds in milk samples	MAFF	Farmers	35	UK	AH
Sources of pig breeding stock survey	MAFF	Farmers	1,416	GB	AH
Grain storage capacity	MAFF	Farmers	4,500	EW	Y5
Special Programmes occupancy survey	MSC	Employers	1,600	GB	AH
Review of the Professional and Executive Register: survey of employers' recruitment practices	MSC	Employers	50	GB	AH
Survey of training needs in North Staffordshire	MSC	Employers	600	WM	AH
Employers' attitudes to employment of disabled people	MSC	Employers	80	GB	AH
Skill shortages within manufacturing firms in Fife	MSCS	Manufacturers	200	S	AH
Garage doors preliminary survey	PC	Manufacturers/ distributors	80	UK	AH
Metal windows' and doors examination	PC	Manufacturers/ installers	452	UK	AH
Prices, costs and margins of car parts	PC	Manufacturers/ distributors	550	UK	AH
Video tape recorders examination	PC	Retailers/dealers	140	UK	AH
British Oxygen Company customer survey	PC	Customers	250	UK	AH
Demand on the construction industry in South Wales	WO	Managers/LA planning departments	34	W	AH
		Local Authority Surveys			
New uses for redundant farm buildings	CC	Planning departments	250	EW	AH
Survey into the costs of books, equipment and materials	DES	Further education establishments	100	GB	AH
Enquiry into re-offending by children and young persons	DHSS	Social services departments	108	E	AH
Co-ordination of local authority departments' provision for the elderly	DOE	Social services and housing departments	90	E	AH
Housing authority allocation practices survey	SDD	Housing departments	62	S	AH

Title	*Sponsor*	*Those approached*	*Approximate number approached*	*Location*	*Frequency*
	Other Surveys				
Survey of engineering careers	CIEP	Graduates	NK	GB	AH
Home insulation: press campaign pre-test	COI/DEN	Owner-occupiers	300	GB	AH
Energy conservation attitudes: omnibus survey	COI/DEN	Adults	2,000	GB	AH
Extension to the motoring economy campaign	COI/DEN	Drivers	600	GB	AH
Kidney donor research – stage C survey	COI/DHSS	Adults	2,500	UK	AH
Drink and drive campaign evaluation 1978/79	COI/DTP	Drivers	1,728	GB	AH
Drink and drive campaign commercial pre-tests	COI/DTP	Drivers	500	GB	AH
'Twenty times more likely': motorcycle documentary film research	COI/DTP	Youths	520	E	AH
Seatbelt campaign evaluation 1979	COI/DTP	Drivers	26,000	GB	AH
Motorcycle filler research	COI/DTP	Youths	60	E	AH
'The Blunders' 1979 seat belt commercial pre-tests	COI/DTP	Drivers	200	GB	AH
Two-wheeler campaign qualitative research	COI/DTP	Youths	40	GB	AH
Police recruitment quantitative research	COI/HOME	Youths	1,300	UK	AH
Pilot investigation into prison officer recruitment	COI/HOME	Applicants	50	E	AH
Car theft animatic test – group discussions	COI/HOME	Drivers	50	E	AH
Car theft campaign evaluation research	COI/HOME	Drivers	5,400	GB	AH
Armed Forces careers check 1978	COI/MOD	Youths	2,350	GB	AH
RAF ground trades commercial test	COI/MOD	Youths	35	GB	AH
Careers for '79 Exhibition research	COI/PETT	Youths	930	GB	AH
Study of claimant attitudes to supplementary benefit changes	DHSS	Claimants	200	EM	AH
Value of psychotherapy for vaginitis patients	DHSS	Patients	100	WM	AH
Uptake of immunisation in the St. Thomas's health district	DHSS	Mothers	300	SE	AH
Supplementary benefits: survey of families with problems	DHSS	Claimants	70	SW	AH
Ambulatory medical care for the handicapped	DHSS	Disabled	100	SE	AH
The effect of unemployment on families	DHSS	Claimants	20	SE	AH
Employment and social policies in Hackney	DOE	Adults	1,000	SE	AH
Monitoring tenants' attitudes to recent local authority housing	DOE	Tenants	3,500	EW	I
National dwelling and housing survey – phase II	DOE	Households	200,000	E	AH
Population movements in the London Metropolitan Region	DOE	Moving households	900	SE	AH
Effects of vibration in buildings on the occupants	DOE	Employees	200	GB	AH
Migration and its effect on the inner city	DOE	Households	7,000	NW	AH
Body lead levels, behaviour and intelligence in children	DOE	Children/parents	600	EW	AH
Blood lead levels and behaviour in children	DOE	Children/mothers	NK	WM	AH
Entry of school leavers to the labour market	DOE/MSC	Youths	2,500	SE	AH
A41 Berkhamsted by-pass – public exhibition	DTP	PPE	NK	SE	AH
Telephoned tourist information enquiries to LTB/ETB	ETB	Applicants	220	UK	AH
1979 Holiday intentions survey	ETB	Adults	2,500	GB	AH
Attitudes towards Merseyside for short holidays survey	ETB	Tourists	400	NW	AH
Value of public safety – first stage	HOME	Adults/youths	300	SE	AH
Incidence of pests in Greater Manchester	MAFF	Households	40	NW	M
Work Experience Programme follow-up survey	MSC	Youths	1,910	GB	AH
Special Programme schemes: travel costs survey	MSC	Trainees	1,000	GB	AH
Sheffield and Rotherham labour market – schoolleavers survey	MSC	Youths	1,100	YH	AH
Family finances survey	OPCS	Households	5,900	GB	AH
London airports – origin and destination survey	OPCS	Passengers	80,000	SE	AH
Free school meals survey	OPCS	Households	5,520	GB	AH
Surgical latex gloves	OPCS	Doctors	400	EW	AH
Drinking in Scotland – stage 3 survey	OPCS	Adults	1,384	S	AH
Public attitudes to engineering – NOP omnibus	OPCS	Adults	3,332	GB	AH
Metal doors and windows examination – consumer survey	PC	Adults	600	GB	AH
Rutex – integrated hospital timetables survey	SDD	Travellers	250	S	AH
Rutex – shared hire car survey in Stair	SDD	Adults	180	S	AH
Housing action areas: movers survey	SDD	Households	330	S	AH
Journey-to-work difficulties in Hackney	TRRL	Adults	160	SE	AH
Tyne and Wear public transport impact study – shopping survey	TRRL	Households	NK	N	AH
Rutex survey – Taw Valley car scheme	TRRL	Users/non-users	100	SW	AH
Drivers' use of traffic information broadcasting (TIB)	TRRL	Drivers	500	WM	AH
Visual impact of cars parked at the roadside	TRRL	Adults	60	SE	AH
Public transport access to countryside recreation areas	TRRL	Individuals	1,300	W	AH
Rutex – Northallerton hospital transport service	TRRL	Hospital visitors	430	YH	AH

Abbreviations used

General

LA – Local Authorities
LTB – London Tourist Board
NK – Not known
NOP – NOP Market Research Ltd.
PPE – Public Participation Exercise
RAF – Royal Air Force
RUTEX Rural Transport Experiment

Frequency

AH – *Ad hoc* (*or* single time)
I – Intermittent
M – Monthly
W – Weekly
Y5 – Every 5 years

Sponsors

BRE – Building Research Establishment
CC – Countryside Commission
CIEP – Committee of Inquiry on the Engineering Profession
COI – Central Office of Information
DEM – Department of Employment
DEN – Department of Energy
DES – Department of Education and Science
DHSS – Department of Health and Social Security
DOE – Department of the Environment
DTP – Department of Transport
ETB – English Tourist Board
HIDB – Highlands and Islands Development Board
HOME– Home Office
MAFF– Ministry of Agriculture, Fisheries and Food
MOD – Ministry of Defence
MSC – Manpower Services Commission
MSCS – Manpower Services Commission Office for Scotland
OPCS – Office of Population Censuses and Surveys
PC – Price Commission
PETT – Project Engineering and Technologies for Tomorrow
SDD – Scottish Development Department
TRRL – Transport and Road Research Laboratory
WO – Welsh Office

Locations

E – England
EM – East Midlands
EW – England and Wales
GB – Great Britain
N – Northern England
NW – North West England
S – Scotland
SE – South East England
SW – South West England
UK – United Kingdom
W – Wales
WM – West Midlands
YH – Yorkshire and Humberside

Notes on current developments

REGIONAL STATISTICS

Digest of Welsh statistics

On November 20 1978 the Welsh Office published the 24th edition of their main statistical publications, '*Digest of Welsh Statistics*'.

This publication has grown from 80 tables in 1954 to over 200 in this 1978 edition. Data on a wide range of subjects are presented under eight main headings.

Section I shows the population and vital statistics for the Principality. Section II gives details of Social conditions such as Housing and Recreation. Section III summarises data on Education. Section IV presents information on the labour force and on related matters such as vacancies, redundancies and unemployment. Section V shows industrial and agricultural activity. Section VI deals with transport and communications. Section VII covers such financial subjects as central government and local authority expenditure; details of personal and household increases are also shown. Section VIII shows climatic conditions, pollution and tourism.

The majority of tables show annual figures. For longstanding series historical data are shown together with the latest 5 years data. Where available, figures are given for the counties or planning sub-divisions of Wales.

Reference

Digest of Welsh Statistics (HMSO) (Price £5·25 net)

POPULATION AND VITAL STATISTICS

Population estimates – New series mid-1971 to mid-1977

A new series of population estimates for the years 1971–77 has recently been made by OPCS using the latest information available and a more consistent methodology than in the past. Reference to this new series of estimates has already been made in issues 38/44 and more information can be obtained from *Population Trends No. 13* which contains an article explaining briefly the changes in method and gives a summary of the results.

Population estimates from the new series have been published in the following *OPCS Monitors:*

PP1 77/3 gives mid-1971 to mid-1976 England and Wales estimates by age and sex

PP1 78/2 gives mid-1977 revised England and Wales estimates by age and sex

PP1 78/3 gives mid-1977 local authority estimates by sex

PP1 78/5 gives mid-1971 to mid-1977 local authority estimates by sex

The following estimates will shortly be published in *OPCS Monitors:*

Mid-1971 to mid-1977 Health District estimates by sex

Mid-1971 to mid-1977 United Kingdom and Great Britain estimates by age and sex

OPCS Monitors are available, free of charge, from the following address:

Information Branch (Dept. SN),
Office of Population Censuses and Surveys,
10 Kingsway,
London WC2B 6JP.

An Annual Reference Volume (PP1 No. 3) will also be published this year by HMSO giving a more detailed breakdown of the mid-1977 estimates. For more detailed figures for the earlier years, and more information please contact Marian Dennehy on 01-242 0262 ext. 2249 or write to her at the following address:

Population Estimates Unit,
Room 643,
Office of Population Censuses and Surveys,
10 Kingsway,
London WC2B 6JP.

Population Trends

The latest edition of *Population Trends* the journal of the Office of Population Censuses and Surveys was published in January. This latest issue contains the following articles:

Population trends in 1977

In the 12 months from mid-1976 to mid-1977, deaths exceeded births by some 12,000. This, together with a net loss of 6,000 by migration, led to a decline in the population of England and Wales for the third successive year. The editorial gives an analysis of live births, fertility rates, patterns of childbearing, abortions, marriages and divorces, mortality and international migration in 1977.

Adoption trends and illegitimate births 1951–77

This article describes trends in annual adoptions in the post-Second World War era and their relations

to other demographic trends. The period analysis of annual adoptions is supplemented with a generation study, which looks at what has happened to a particular group of illegitimate children and changes in trends over time.

Towards a world census
A brief look at the history of the census of population from ancient times to the present, and a description of recent moves towards international co-operation and census comparability.

Household mortality from the OPCS Longitudinal Study
Since 1971, OPCS has been conducting a longitudinal study of one per cent of the population of England and Wales. This article describes how the longitudinal approach is being applied to mortality data; in particular, how mortality between 1971 and 1975 is related to characteristics of households.

The regular series of tables continues brought up to date with the latest available figures.

Reference
Population Trends 14 (HMSO) January 1979 (Price £2·25 net)

Occasional papers

In June 1977 OPCS published the first of its new series of *Occasional Papers* – Grid references of centres of population Great Britain 1971. The aim then, as now, was to publish and circulate material produced by OPCS, or outside organisations using OPCS statistics, and which might be classed as an interim summary of work in progress, working papers describing methodology and definitions.

Since then thirteen titles have been published and readers might be interested in a summary of the papers available. *Occasional Papers* are obtainable direct from OPCS. For copies and further information please write to:

Information Branch (Dept. SN),
Office of Population Censuses and Surveys,
St. Catherines House,
10 Kingsway,
London WC2B 6JP.

1. *Grid references of centres of population Great Britain 1971* – John Craig
   (ISBN 0 906197 00 7 – price 50p)
Gives the reference of the point calculated to be the centre of population for each local authority, county and region (both before and after local government reorganisation). Includes some historical trends and details of the methodology.

2. *Census based area profiles: a review* – Catherine Hakim
   (ISBN 0 906197 01 5 – price 30p)
Reviews the use of census Small Area Statistics in descriptive and diagnostic profiles of local authorities, with a bibliography of published and unpublished census-based area profiles held by OPCS library.

3. *Census confidentiality, microdata and census analysis* – Catherine Hakim
   (ISBN 0 906197 03 1 – price 30p)
Describes the policy of census confidentiality in Britain and its implementation. The implications of confidentiality constraints for census-based research are outlined, with particular reference to microdata.

4. *Practical problems of sampling in the census of population, and techniques for ensuring the confidentiality of census information in Great Britain* – Dennis Newman
   (ISBN 0 906197 11 2 – price 95p)
Sampling methods which can be easily followed and at the same time are not subject to distortion by the field staff are the subject of the first of the two papers. The second study discusses some of the techniques used by OPCS to ensure that individuals can not be identified in the census tables produced for small areas.

5. *Social and community indicators from the census* – Catherine Hakim
   (ISBN 0 906197 08 2 – price £1·20)
Reviews recent developments in research utilising social and community indicators derived from the census, in particular census Small Area Statistics. Presents lists of some 300 indicators in current use on the social and economic characteristics of areas, with a bibliography of British research in this area.

6. *Census data and analysis bibliography* – Catherine Hakim
   (ISBN 0 906197 12 0 – price 70p)
Provides a selective annotated bibliography on the population census, the data produced from it and applications of the data.

7. *Perinatal mortality and low birthweight 1965–73* – Robert Newcombe
   (ISBN 0 906197 04 X – price 30p)
This study includes a full tabulation for all local authorities in England and Wales of the total birth rate, perinatal mortality, still birth and early neonatal death rates and proportion of low birthweight babies, giving trends in all these parameters and comparing each

trend with the corresponding trend for England and Wales.

8. *Ethnic origins 1* – Ken Sillitoe
   (ISBN 0 906197 05 8 – price 80p)
9. *Ethnic origins 2* – Ken Sillitoe
   (ISBN 0 906197 06 6 – price 80p)
10. *Ethnic origins 3* – Ken Sillitoe
    (ISBN 0 906197 07 4 – price 80p)

These three occasional papers describe the development of a direct question about race or ethnic origin from research undertaken by OPCS for possible use in the 1981 Census.

11. *Data dissemination for the population census* – Catherine Hakim
    (ISBN 0 906197 13 9 – price 70p)

A comprehensive review of the primary and secondary outlets for census data describing the role of OPCS as the primary disseminator of census results with an outline of the contribution of other organisations as secondary distributors of census data. The range of data analysis services currently offered is given.

12. *Social and biological factors in infant mortality 1975–6*, Medical Statistics Division – OPCS
    (ISBN 0 906197 09 0 – price 60p)

This study reports the coverage of infant deaths in 1975 and 1976 linking each individual record of death to its corresponding record of birth. The factors analysed are social class of parent, parity of mother and age of mother.

13. *Parliamentary constituencies – a socio-economic classification* – Richard Webber
    (ISBN 0 906197 11 2 – price £1·30)

Sets out the results of a national classification of the 623 parliamentary constituencies based on socio-economic data from the 1971 Census. By applying certain statistical techniques to this data, constituencies which are broadly similar are identified.

GRO (Scotland) – Census

A voluntary test of field procedures for the 1981 census will be carried out in early April 1979 in four areas chosen to represent different enumeration conditions (inner city, town with oil-related industry, small town with farming hinterland, and remote rural). Although the main purpose is to test the procedures for recruitment, training and control of the field enumeration force and evaluation of their work, a proposed call-back survey to vacant and occupier-absent houses and some details of question formulation will also be tested. The resulting data will also be used to test clerical and computer systems in the census office, in preparation for the main 1981 census processing. About seventeen thousand households will be approached.

The GRO will again carry out the Scottish part of the 1979 Labour Force Survey on behalf of the Department of Employment and the SOEC.

GRO (Scotland) – Population and Vital Statistics

The Registrar General's Annual Report for 1977 was published in December.

Part 1 – Mortality Statistics (HMSO) (Price £15 net)

Part 2 – Population and Vital Statistics (HMSO) (Price £9.50 net).

The first and second quarterly returns for 1978 have also been published. (HMSO) (Price £1·50 net each).

SOCIAL STATISTICS

Survey Control Unit's evaluation of past surveys

Following the satisfactory completion of a pilot survey, the Survey Control Unit has now launched a quarterly postal inquiry into various aspects of recently-conducted surveys addressed to the departmental sponsors. Questions cover response rates, reminders used, average times of interviews, quality of survey questions, adverse public reactions, assessments of organisations (if the work was contracted out), any problems experienced in sampling or other aspects of the survey, and publication dates. The Unit expects to be able to use this information when assessing new surveys, especially when they are similar to previous surveys.

Some of those approached said that they looked forward to reading about the results of this evaluation project and the Unit expects to report fully later in 1979. One quarter's results suggest that, in general, surveys did not encounter any major difficulties and that sponsors would not change their survey plans if asked to repeat them.

National Dwelling and Housing Survey

The report of the National Dwelling and Housing Survey was published in January. Articles on the organisation and fieldwork of the survey and on the number of enquiries received from members of the public appeared in issue No. 42 of *Statistical News*.

The report includes 21 pages of cross tabulations giving the main results of the survey for England as a whole, with a brief commentary on the results and on trends since 1971. A further 120 tables give results for each planning region in England, each London borough and each of the 16 other districts intensively surveyed. There is a full description of the methodology of the

survey, including sections on the grossing procedure adopted and on the sampling errors associated with a selection of survey estimates. The questionnaire, interviewers' instructions and editing manual are included as appendices.

The fieldwork for the three follow up surveys to NDHS (on the private rented sector, movers and sharing and concealed households) has now been completed and it is hoped to publish reports on these later in the year.

As well as collecting information on housing similar to that obtained from the 1971 Census, NDHS included questions on the respondent's degree of satisfaction with his accommodation and area, on council house waiting lists and on the ethnic group of each member of the household. 82 per cent of respondents said that they were very satisfied or satisfied with their accommodation and 80 per cent that they were very satisfied or satisfied with their area. Degree of satisfaction with accommodation was related to such measures of housing circumstances as the use of amenities and density of occupation, but only some 40 per cent of households lacking a basic amenity were less than satisfied with their accommodation and a similar proportion applied to households with two or more bedrooms below the bedroom standard.

In six per cent of households, the respondent said that the head of household was on a council house waiting or transfer list. Almost half of such households already lived in council accommodation, and were therefore on the transfer list. A further 28 per cent were in privately rented unfurnished accommodation, representing one in six of all households in that tenure. Almost one quarter of households with a head on the list were elderly persons living alone, and 14 per cent were elderly couples.

The survey showed marked differences in the housing conditions of ethnic groups. One in five West Indian households, and one in three Indian, Pakistani and Bangladeshi households lived below the bedroom standard, compared with one in twenty White households. One in seven West Indian households and one in four Indian, Pakistani and Bangladeshi households lacked sole use of a basic amenity, compared with one in twelve White households. Tenure patterns were also dissimilar. Nearly half of West Indian households rented from a council or housing association, as against a third of White households and only a tenth of Indian, Pakistani and Bangladeshi households.

Copies of the report of the survey may be purchased from HMSO bookshops or through booksellers.

Reference
The report of the National Dwelling and Housing Survey. (HMSO) **(Price £8·50 net)**

Scottish Housing Statistics

The third issue of *Scottish Housing Statistics*, published by HMSO, includes, in addition to the regular tables on housebuilding, improvement and finance, an article on homelessness statistics. This article gives a fairly detailed statistical picture of the working of the Housing (Homeless Persons) Act in Scotland in the period April–June, 1978, the first three months of its operation. The main features are brought out in a series of tables and associated commentary. Also included in this issue are details of capital allocations for 1979/80 to local authorities as part of the Housing Plans system, and of 1979/80 public sector housing subsidies under the new Housing Support Grant arrangements.

Reference
Scottish Housing Statistics (HMSO) (forthcoming)

HEALTH AND SOCIAL SERVICES

Hospital Activity Analysis

Routine annual statistics are now produced from Hospital Activity Analysis data. A complete set consists of eight volumes – one for each Area Health Authority in Wales – and gives analyses of discharges and deaths from each specialty by age, sex, type of admission, time spent on the waiting list, length of stay, disposal and area of residence.

Companion volumes containing diagnostic statistics are also available on request from:

Mrs. S. Blake,
Economic Services 4c,
Welsh Office,
31 Cathedral Road,
Cardiff,
CF1 9UJ.
Telephone: 0222 – 42661 Ext. 29.

Patients' attitudes to the Hospital Service

The report of a study carried out by Social Survey Division OPCS,at the request of the Royal Commission on the National Health Service looking at patients' attitudes to the hospital service was published in January 1979.

The survey reports on the experiences and attitudes of a sample of 2,500 outpatients and 800 inpatients who had attended hospitals in the United Kingdom as NHS patients during specified periods. Their views on hospital facilities and services, including transport to and from the hospital, on privacy, communication and discharge arrangements were sought and where dissatisfaction with the existing arrangements was expressed, the patient was asked how important they

regarded improvement in that area. Various aspects of the outpatient appointment system were also examined; patients were asked whether having to wait for their first outpatient appointment caused them any distress or inconvenience, and whether they regarded the length of time they had to wait in the outpatient clinic before being attended to, as unreasonable. The experiences of patients with appointments for fixed times, of these with open appointments, and of these who had attended without an appointment were compared and their preferences for any future hospital visits reported upon. The distress caused to inpatients by waiting for a hospital bed to become available was similarly examined.

Reference
Royal Commission on the National Health Service: Research Paper No. 5, *Patients attitudes to the Hospital Service*, (HMSO 1979) (Price £4·00 net)

Social security claimants

A report of a survey among the customers of one local social security office carried out for the Department of Health and Social Security by the Office of Population Censuses and Surveys was published in February. The study, which was undertaken in 1974 as part of a general review of local office organisation, was intended as a preliminary investigation to explore how the public view the process of claiming and receiving social security benefits. The report provides an in-depth examination of the opinions and experiences of nearly 500 people claiming supplementary benefits and various contributory benefits. The research has formed part of the evidence considered by the team of DHSS officials in their review of the supplementary benefits scheme.

Copies of the report are available free from:
The Information Division Leaflets Unit,
Block 4,
Government Buildings,
Honeypot Lane,
Stanmore HA7 1AY.

Reference
Social Security Claimants (DHSS, S1043 1979)

Mental illness and mental handicap hospitals and units in Wales – Statistics 1975–1976

The second volume of statistics of mental hospitals and units in Wales is now available – giving detailed figures for 1975 and 1976 together with some trend data back to 1972.

The tables include national analyses of admissions, discharges and deaths of mental illness and mental handicap patients by sex, age, diagnosis, legal status and length of stay together with analyses of 'resident' patients by sex, age and length of stay. A wide range of data for individual hospitals is also contained in the report including bed availability, special units, staff, day time activities, out-patients and day-patients.

Copies are available on request from:
Miss F. Hill,
Economic Services 4e,
Welsh Office,
31 Cathedral Road,
Cardiff,
CF1 9UJ.
Telephone: 0222 – 42661 Ext. 33.

National Health surgical footwear – a study of patient satisfaction

A report of a study carried out by Social Survey Division, OPCS of patients who had been supplied with National Health surgical footwear was published in February 1979. The survey was conducted on behalf of DHSS and aimed to assess the extent of satisfaction with both the footwear itself and the procedures for its supply. It also aimed to determine which people are more likely to be dissatisfied and to find out what causes their dissatisfaction.

Reference
National Health surgical footwear - a study of patient satisfaction (HMSO) (£4.25 net)

Health and Personal Social Services Statistics for Wales

Health and Personal Social Services Statistics for Wales has been published annually since the reorganisation of the National Health Service in 1974.

This publication gives data for the Principality in a similar format to its English counterpart – most tables show annual figures for the latest four years; other tables show more detailed data for the latest year only.

MANPOWER AND EARNINGS

British Labour Statistics: Yearbook 1976

British Labour Statistics: Yearbook 1976 published recently is the eighth in the series which bring together the main statistics for particular years compiled by the Department of Employment.

Subjects covered include wage rates; earnings; hours of work; retail prices; employment; labour turnover; unemployment; vacancies; family expenditure; membership of trade unions; industrial disputes; industrial accidents; costs per unit of output; employers' total labour costs and output per person employed. Some time series for up to 10 years and regional analyses of many items are also included.

The year books from 1969 onwards complement the

information contained in *British Labour Statistics: Historical Abstract 1886–1968*. More recent figures are to be found in the *Department of Employment Gazette*.

References
British Labour Statistics: Year Book 1976 (HMSO 1978) (Price £20 net)
British Labour Statistics: Historical Abstract 1886–1968 (HMSO 1971) (Price £7·00 net)

Indices of wage rates

The Department of Employment discontinued the publication of the separate monthly indices of nationally-negotiated basic wage rates and normal hours for men, for women and for juveniles at the end of 1976 (*Statistical News* 37.33). The Department did however continue to compile the separate indices which were made available on request. It has been decided that the separate compilations are no longer justified and they were discontinued at the end of 1978.

New Earnings Survey 1979

As reported in *Statistical News* 41.35, some additional information about employees and their employers is being obtained in the New Earnings Survey, 1979. This will enable obligations under EEC regulation 495 of 1978 (concerning the organisation of a survey throughout the Community on the structure and distribution of earnings in Index of Production industries (manufacturing, mining and quarrying, construction, gas, electricity and water supply), wholesale and retail distribution, banking, finance and insurance to be met, so far as practicable, without burdening employers in the United Kingdom with a separate large scale survey.

The additional questions will obtain information on the total gross earnings paid to the employee by the company or organisation for a twelve-month period ending March or April 1979; whether the amount related to employment for a full year; the amount, if any, of periodical (e.g. quarterly or annual) bonuses included in the total; the employee's length of service with the company or organisation; the employee's job category (e.g. top manager, unskilled worker); the number of persons employed by the company or organisation; and for those in manufacturing establishments, the number of employed in the establishment.

Otherwise the questionnaire is very similar to that used for the last six surveys. The 1978 question on type of collective agreement has been replaced by one for the Government Actuary's Department on the employee's national insurance category in relation to the State pension scheme.

Family Expenditure Survey 1977

The Family Expenditure Survey report for 1977 was published in December 1978. The report contains 75 tables and 10 charts detailing average weekly household expenditure on 94 commodities or services, classified by income level and type of household, together with complementary information on the income and characteristics of households.

Some preliminary annual results for 1977 (with comparisons for 1975 and 1976) were published in the August 1978 issue of the *Department of Employment Gazette*. Quarterly results for 1977 have been published in the Gazette as they became available. An article in the December 1978 issue of the Gazette gave more detailed information on household spending in 1977, and presented data showing how the spending patterns of different types of household have changed over the past twenty years. This article examined also how expenditure has varied over the last ten years with the level of household income.

Average expenditure on goods and services among the households in the United Kingdom which took part in the 1977 survey was £71·84 per week, an increase of 16·4 per cent compared with 1976. In real terms, this increase is about half a per cent after making allowance for price rises between 1976 and 1977. Average expenditure in itself is of limited interest. By taking account of the differences between households in the number of persons and number of workers in the household, their income, their geographical location and other factors considered in the annual report and the associated Gazette article, a clear understanding of the spending patterns of households in the United Kingdom during 1977 is obtained.

References
Family Expenditure Report for 1977 (HMSO) (Price £4·75 net)
Department of Employment Gazette, August 1978 and December 1978 (HMSO) (Price £1·25 net)

Articles on manpower planning

Recent issues of the *Department of Employment Gazette* have included further articles on manpower planning and related subjects (*Statistical News* 43.34 etc.). The September 1978 issue contained an article on the relationship between age and redundancies notified under the Redundancy Payments Act, the conclusion being that recent redundancies have tended to be among older people nearing retirement after long service. The December 1978 issue contained two articles – one examining the statistical evidence on graduates and employment (particularly in the industrial sector of the economy), and covering international comparisons, industry's views of graduate recruits, and graduates'

attitudes to employment – and the other (based on a recent paper by the Engineering Industry Training Board) looking at the supply of potential engineers.

Reference
Department of Employment Gazette: September and December 1978 (HMSO) (Price £1·25 net)

Sexual divisions within the labour force: occupational segregation

An article in the *Department of Employment Gazette* presents a new analysis of material on the occupational segregation of men and women drawn from decennial population censuses for the period 1901–71. It considers how far the increasing participation of women in the labour force has led to changes in traditional distinctions between men's and women's work.

The article begins with a brief discussion of possible measures of occupational segregation, particularly as these have been developed in North America. It goes on to present a variety of data relating first to 'horizontal' segregation (which arises where men and women are to be found working in different types of occupation) and secondly to 'vertical' segregation (where men commonly work in higher grades and women in lower grade occupations or *vice versa*). A concluding section argues that taken overall the various indicators discussed point to little or no change in the occupational distribution of men and women over the first sixty years of this century, but that more recently new trends may be emerging. It notes also that the various measures of segregation used in the paper could have applications in other kinds of occupational analysis, such as those concerned with age and race.

Reference
C. Hakim, 'Sexual divisions within the labour force: occupational segregation', *Department of Employment Gazette*. November 1978. (HMSO) (Price £1·25 net)

Trade union membership

Statistics of trade union membership in 1977 are reported in an article in the December issue of the *Department of Employment Gazette*. The figures include analyses of numbers of trade unions by size of membership with comparisons covering the previous decade. They have been compiled by the Department from data supplied by the Certification Office for Trade Unions and Employers' Associations about trade unions with head offices in Great Britain supplemented by information supplied directly to the Department.

Reference
Department of Employment Gazette December 1978 (HMSO) (Price £1·25 net)

Employment analysed by sector and industry 1972–77

Mid-year estimates of employment in the United Kingdom from 1972 to 1977 analysed by sector and by broad industry group were published in an article in the January issue of *Economic Trends*. Out of a total employed labour force of 24·9 million at mid-1977, 17·5 million (70·3 per cent) were employed in the private sector. The remaining 7·4 million were employed in central government (2·3 million) local authorities (3·0 million) and public corporations (2·1 million).

Corresponding estimates up to 1976 have been published in previous articles in *Economic Trends*.

Reference
'Employment analysed by sector and industry 1972–77', *Economic Trends* No. 303, January 1979 (HMSO) (Price £2·10 net)

AGRICULTURE AND FOOD

National Food Survey

The recently published National Food Survey Committee's Annual Report for 1977 is the second successive Annual Report to contain an abbreviated text in response to public requests for Reports to be made available as early as possible, yet contain the normal full range of statistical material. The Report therefore briefly discusses changes in average household food consumption, expenditure and nutrition in Great Britain in 1977, but the greater part of the Report is devoted to tables of quarterly and annual statistical data compiled from analyses of 7,696 food budgets provided voluntarily by the randomly selected stratified sample of households during their week of participation in the survey. Thus, the tables show national (G.B.) averages of consumption, expenditure and prices paid by housewives for each of over 150 categories of food (but excluding meals out, sweets, soft drinks, alcohol and any food not entering into the household supply), together with index numbers for the main food groupings illustrating changes since the previous year. Other tables show averages for households classified according to standard statistical region, type of area, income, family composition, and ownership of a refrigerator or of a deep-freezer. For all these classifications, further tables show the average energy and nutrient content of the food obtained for consumption in the home and compare them with levels based on recommendations made by the Department of Health and Social Security.

The survey, in addition to measuring food acquired by families for consumption in the home, also records actual consumption of liquid milk by individual persons in those families. An innovation is the presentation of frequency distributions of persons in

various age/sex categories classified according to their level of milk consumption.

Because of the increase in bulk buying, and especially that in connection with long-term storage in domestic deep-freezers, a further innovation is that the survey has provided, for broad food groups, alternative estimates of consumption which take into account changes in freezer stocks and which are therefore probably more accurate, in the short run, than the conventional estimates based solely on food acquisitions.

Tables in an Appendix give estimates of percentage standard errors of the averages of food consumption and expenditure in families of different composition, and of average nutrient intake and adequacy in all the standard classifications of households featured in the Report.

In a further Appendix estimates are given of income elasticities of demand for food as a whole and for each food in the survey classification, together with their standard errors. Tables of price and cross-price elasticities of demand together with other derived parameters are also presented, and include estimates for more foods than have been given in previous reports.

Summarised results of the survey are published in the *Monthly Digest of Statistics* as soon as they become available. They are supplemented by brief quarterly commentaries in *Trade and Industry*, usually within three months of the end of the quarter to which they relate. Additional information in a more detailed form is also obtainable each quarter; applications for such data should be addressed to:

National Food Survey Branch,
Ministry of Agriculture, Fisheries and Food,
Tolcarne Drive,
Pinner,
Middlesex HA5 2DT.
Telephone: 01-868 7161 Ext. 44

Reference
Household Food Consumption and Expenditure: 1977 (HMSO) (Price £4·50 net)

Self-sufficiency for food in the United Kingdom

These calculations are carried out every year and the results are published in the *Annual Abstract of Statistics* and by Press Notice in the '*Food Facts*' series.

The calculations have in the past been on the basis of crop years (July to June) but in line with other statistical series for agriculture and agricultural supplies, they are being changed to a calendar year basis. Results are now available for the latest three years (1975, 1976 and 1977) and for 1970. The task of re-calculating all previous years of the series is taking a considerable time as each stage of the complicated calculations has to be re-worked. It is, however, expected that the recalculated tables will be ready for publication within the next month or two.

Reference
Annual Abstract of Statistics, No. 115, 1979 (HMSO) (Price £8·50 net)

Agricultural Censuses and Surveys

The June 1978 agricultural census

The provisional results for England were published in Statistical Information Notice STATS 314/78 on 8 November, 1978. This was the first occasion that a separate notice was issued for England. Combined results for England and Wales were published in Press Notice No. 279 on 21 August, 1978.

The August 1978 sample pig enquiry

The results of this enquiry in England and the United Kingdom were published in Statistical Information Notice STATS 288/78 on 13 October, 1978.

Agricultural statistics in United Kingdom 1975

This recently published volume contains details of agricultural holdings, crop areas, number of livestock and workers at June 1975. Sections also cover agricultural machinery, horticulture (areas and production) and monthly and annual prices indices for agricultural products.

The 1978 September sample censuses

The results of this census in England and Wales were published in Press Notice No. 384 on 28 November, 1978. Estimates based on these results of this sample enquiry, show that dairy cows increased and beef cows decreased in number compared with September 1977. There was an increase in the pig breeding herd. The poultry results are under review.

September results for England only were published in Press Notice No. 413, on 20 December, 1978.

The October 1978 vegetables and flowers census

Results of the October 1978 census in England and Wales, will be published shortly.

Mushroom survey 1978

Results of the survey in England and Wales will be published shortly.

Hardy nursery stock survey

Results of this survey in England and Wales will be published shortly.

March 1977 orchard fruit survey
County/Regional results (P.S.M.) of this survey, giving the area by species and varieties were published in August 1978.

All the statistical material mentioned above may be obtained from:

Ministry of Agriculture, Fisheries and Food,
Room A615,
Government Buildings,
Epsom Road,
Guildford, GU1 2LD.

Decentralisation to Wales: Land prices and rents
Following the transfer of functions to the Secretary of State for Wales on 1 April, 1978 certain changes are being made in the arrangements for publishing various agricultural statistics. This note details the new arrangements in respect of the regular official series on agricultural land prices and farm rents.

There are two official series on agricultural land prices covering England and Wales. One, based on sales notified to the Inland Revenue, is comprehensive but subject to a delay of approximately 6–9 months between the date on which a sale is agreed and the date on which it is included in the series. The other, which is based on information collected by the Agricultural Development and Advisory Service and the Agricultural Mortgage Corporation, provides more up-to-date information but is less comprehensive. Both series are now published for England and Wales separately by the Ministry of Agriculture, Fisheries and Food and the Welsh Office respectively, the Inland Revenue series in quarterly Statistical Information notices and the ADAS/AMC series in monthly (England) and quarterly (Wales) Press Notices. In addition more detailed annual information (covering sales notified in years ending 30 September) for both England and Wales will continue to be published in a single report in the ADAS/SLP series. Annual figures covering the two countries will also continue to be published in *Inland Revenue Statistics*.
Information on farm rents in England and Wales are obtained through an annual rent enquiry which is conducted each October by MAFF's Economics and Statistics Group and ADAS Land Service. Under the new arrangements the resulting information will be published first in separate MAFF (England) and Welsh Office (Wales) press notices issued around Christmas. A more detailed report covering both countries will however continue to be published in the following spring in the ADAS/SFR series.

Reference
Inland Revenue Statistics (HMSO) (Price £4·75 net)

Final results of the June 1978 Scottish agricultural census
Final results of the Scottish Agricultural Census held on 1 June 1978 were published as a Scottish Office Press Notice on 29 November, 1978 (Press Notice 1212/78).

For the first time since 1973, the dairy herd has not decreased and shows a marginal rise in numbers. With a reduction of 11,000 (2 per cent), the fall in the number of beef cows is much smaller than in either of the two preceding years but, at 493,000, the beef cow herd is slightly below its 1973 level. The total number of sheep has increased by 115,000 (2 per cent). The pig breeding herd declined slightly by 2,000 (3 per cent) but the number of gilts in pig showed a 6 per cent rise. There was an overall reduction of 286,000 (2 per cent) in the poultry flock. An increase of 93,000 (2 per cent) in the laying flock was more than offset by a 186,000 (11 per cent) reduction in the number of pullets being reared for the laying flock, a fall of 106,000 (8 per cent) in the breeding flock and a marginal cut of 77,000 (1 per cent) in the number of broilers.

The total area of cereals has increased by 13,000 hectares (3 per cent) to its highest level since 1948. Within this total, the wheat and oat areas declined by 700 hectares (3 per cent) and 4,000 hectares (9 per cent), respectively. The wheat area is the lowest since 1931 and the further decline in the oats area has left it at half its 1972 level. In contrast, the barley area has been increased continuously since 1970 and, at 426,000 hectares, a 19,000 hectare (5 per cent) increase over last year, this crop now accounts for 86 per cent of the cereals area and 70 per cent of the cropped area. After two years of increased plantings, the potato area has fallen by 2,000 hectares (6 per cent). The ware crop area fell by 3,000 hectares (19 per cent) but the seed potato area rose by 1,000 hectares (5 per cent). The area used for producing vegetables for human consumption showed little change, having fallen by 100 hectares (2 per cent). After a five year decline, the soft fruit area has increased by 300 hectares (7 per cent), the increase of 100 hectares (12 per cent) in the strawberry crop took the area to 950 hectares, the largest since 1972.

The total labour force in Scotland fell by 370 (1 per cent), to 41,505.

August 1978 sample pig census – Scotland
The results of the Census in Scotland were published as a Scottish Office Press Notice on 3 October, 1978 (Press Notice 1024/78).

Results of the August 1 Scottish sample pig census show that the numbers of both in-pig and maiden

gilts have continued the recovery first indicated at the December 1977 Census.

Since June the breeding herd has dropped slightly by 1,500 pigs (3 per cent), but within this, the number of in-pig gilts has risen by 300 (4 per cent). The number of maiden gilts has also increased by 300 (6 per cent).

Store pig numbers are 16,000 (4 per cent) lower than in June with the decreases being concentrated in the lower weight ranges.

INDUSTRIAL STATISTICS

Department of Industry investment intentions surveys

An article comparing forward estimates of capital expenditure based upon the investment intentions inquiries into both manufacturing and the distributive and service industries with the actual outturn was published in *Trade and Industry* for 27 October, 1978. The comparisons cover the years 1968–77 and bring up-to-date the corresponding tables in '*Investment Intentions, authorisations and expenditure*' by P. J. Lund, C. L. Melliss and Miss V. J. Hamilton, Government Economic Service occasional paper No. 12 published in 1976. It is intended to publish these comparisons annually in *Trade and Industry* as a supplement to the more limited information given regularly in *Economic Trends*.

Recent changes to output statistics

In common with other economic indicators, the output measure of gross domestic product and the index of industrial production have been expressed in terms of the base year 1975 with effect from September 1978. Though there have been a number of improvements to indicators, the methodology in the compilation of these output measures has remained broadly the same as that used in the previous 1970-based series, described in *The measurement of changes in production* (HMSO 1976, price £1·05 net) supplemented by a series of occasional papers available from the Central Statistical Office. Full descriptions of the 1975-based series will be available in due course but, in the meantime, lists of weights and indicators used in the current estimates of the index numbers of gross domestic product and of industrial production are available on request from:

Branch 5,
Central Statistical Office,
Great George Street,
London SW1P 3AQ.
Telephone: 01-233 7239.

Commercial and industrial floorspace statistics

Background

The Department of the Environment recently published the sixth in a series of booklets on commercial and industrial floorspace statistics. The first published in 1969 gave the changes from 1964 to 1967 of the floorspace in industrial, shopping and office use. The latest report gives the changes from 1974 to 1977 in floorspace of the major non-domestic use classes and brings up to date the information obtained in the last floorspace census of 1974. An earlier census of floorspace was taken in 1967. A list of the published booklets is given at the end of this note.

Source

As part of their work in surveying property for rating valuation the District Valuers of Inland Revenue make floorspace measurements. It is from these floorspace measurements that floorspace statistics are derived. Periodically after a rating revaluation a census is taken of all floorspace in the major non-domestic use classes. Subsequently changes in floorspace are reported annually to the Department. At present returns are made for each local authority area* in the classes: Commercial Offices, Shops and restaurants, Shops with living accommodation, Warehouses (covered), Industrials each with three or four size group categories and Warehouses (open land) without size grouping. Analogous floorspace areas of central Government offices are supplied by the Property Services Agency. Prior to 1974 no floorspace information was supplied for shops with living accommodation. Warehouses were introduced in 1967 and divided into the two classes in current use in 1974.

Results

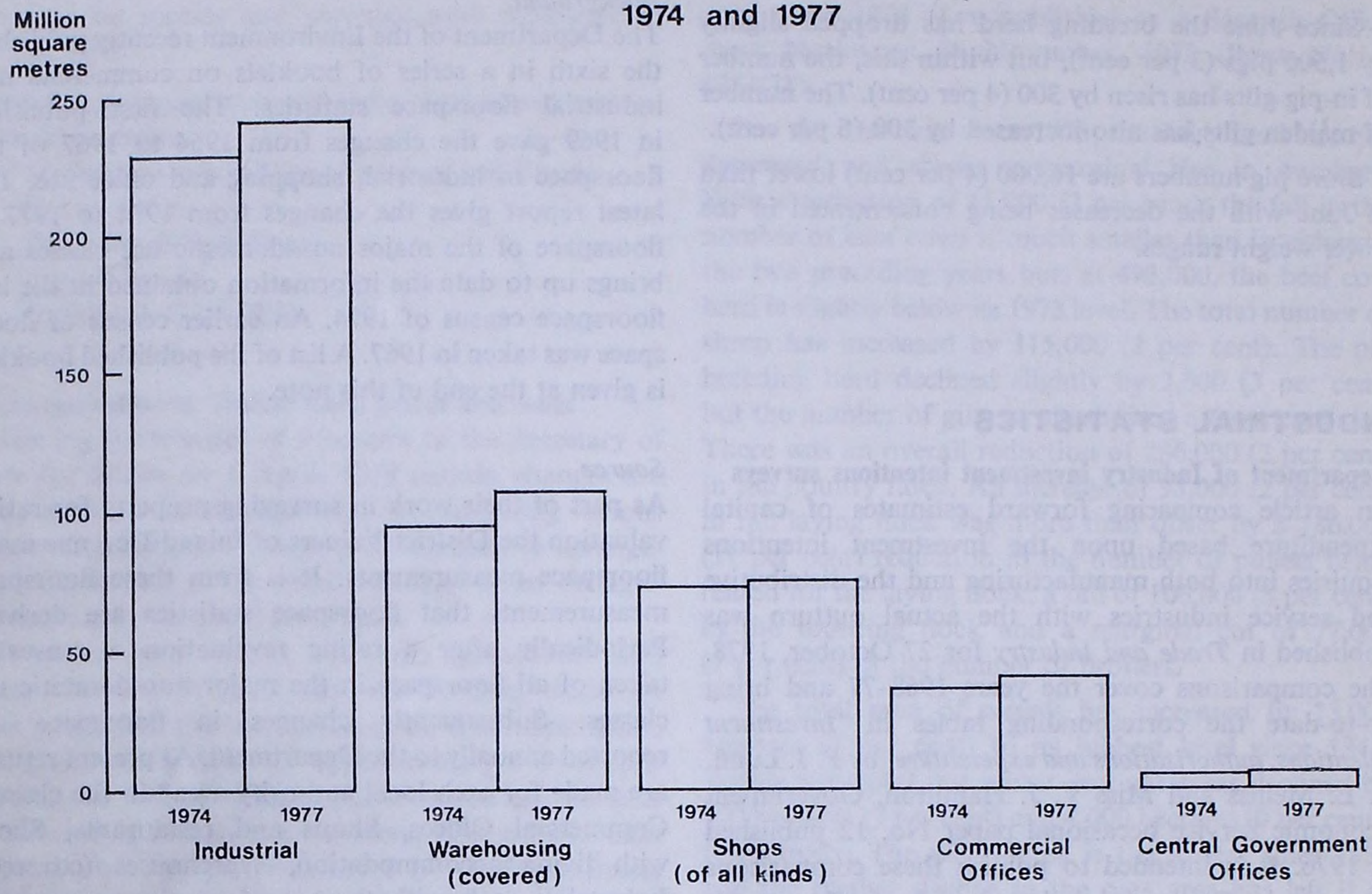
In 1974 and 1977 the greater part of commercial and industrial floorspace was classified as industrial followed by covered warehousing with rather less than half the floorspace area of industrial hereditaments. Shops comprised the next largest component with offices coming last. For the categories reported in the publication industrial hereditaments accounted for half the aggregated floorspace. Covered warehousing amounted to just over a fifth of all floorspace with shops of all kinds at about 15 per cent. Offices both in central government use and in commercial use were together less than 10 per cent of the aggregate floorspace.

Floorspace stock of industrial hereditaments in England and Wales as at 1 April, 1977 was estimated

*References in this paper to local authorities mean the London boroughs in Greater London and the local authority districts outside of London.

CHART 1

Floorspace in England & Wales 1974 and 1977



to amount to 241 million square metres. This represents an increase in floorspace of 3 per cent since 1974. Covered warehousing floorspace was 106 million square metres which is an 11 per cent increase in floorspace sine 1974. The floorspace of shops of all kinds was very much less at 74 million square metres representing a 3 per cent increase since 1974. There were 41 million square metres of commercial office floorspace, a 12 per cent increase since 1974.

Some uses of floorspace statistics

Floorspace area provides a non-financial indicator of property size which is not subject to inflationary bias. Comparisons of stock can therefore be made between two or more dates without invoking the assumptions implicit in comparisons at constant price. This is particularly useful in comparisons at the regional level where constant price deflators are unavailable. New construction which can be equated to the sum of 'extensions' and 'new' similarly gives a picture of building activity in which a high cost part of the country can be reliably compared with a low cost part of the country. This prevents misinterpretation due to differences in cost.

Size group analysis of the stock depicts the current distribution of property by size reflecting past building practice while the size group analysis of gross changes indicates the special features of current building practice with regard to the size of building. Since this information is available for each use class at the local level as well as the national level it can be of interest to a wide audience.

Unusual features

The basic unit used in rating is the hereditament. This is a term employed by valuers to indicate an entry in the rating list. Usually it will be the largest grouping of adjacent accommodation which can be ascribed to one occupier. It can range from a one room apartment in a block of flats to a large industrial complex with numerous buildings covering several acres.

The analysis code on which the use class depends is drawn up from a description of the hereditament produced during the survey. Frequently this is considered from the point of view of the potential use for the property rather than the current use. One consequence of this approach is that buildings in the same use can be assigned to different rating classifications by Inland Revenue and then appear in tabulations under different use classes. As an example a bank in a shopping centre would be coded as a shop but a bank situated in an office area would be coded as an office. The rating

classification is therefore sometimes misleading particularly when comparisons need to be made with statistics drawn from another source.

In common with other statistics produced as a by product of an administrative procedure discontinuities in the administrative system are reflected in the derived statistics. For the rating procedures these discontinuities occur at the time of the rating revaluation. Legislation allows for this to take place every five years but in the past it has usually occurred at intervals nearer ten years. At the time of the revaluation the opportunity is taken to incorporate improvements and developments into the rating system. For example in the 1973 revaluation the units used for floorspace measurement were changed from imperial measurement i.e. square feet to metric measurements i.e. square metres. This necessarily led to a slight alteration in the size group intervals used. Also at this time a rating classification system was brought into use employing all number codes rather than the letter-number code previously used. To facilitate the use of the new coding a detailed list of descriptions was prepared by the Chief Valuers Office which resulted in certain hereditaments being assigned to a distinct classification rather than being relegated to the miscellaneous category. Although wrongly classified hereditaments are normally corrected as they are discovered, errors in classification are more likely to be found at the time of the revaluation when each hereditament is considered afresh. For these and other reasons there is an essential discontinuity at each revaluation. Caution must therefore be exercised when considering a period of time including a revaluation.

Form of return

A specially designed form is used by Inland Revenue in making the return of floorspace changes to the Department. Gross changes are reported by the size-group of the hereditament and at the same time a running tally is kept of the estimated stock by size-groups. This is achieved by the use of an extra column showing the total area after alterations have been made in addition to the gross changes. In order to restrict the form to a reasonable size certain types of gross changes are combined leading to some degree of ambiguity in the reported figures. Although increases in floorspace are reported separately for 'extension', 'new' and 'change of use' decreases are only distinguished as 'demolitions' and 'other reductions' (in floorspace area). Furthermore, in order to maintain the size group analysis of the stock this last column (of the reductions in floorspace area) also contains book-keeping entries to compensate for the floorspace reported in the total area column. In the published tables of gross changes an adjustment is made to eliminate these irrelevant entries but from time to time the adjustment produces a negative result.

Demolitions are only reported as such when the hereditament is taken out of rating which is the normal course of events when premises are demolished. In some circumstances i.e. a multibuilding hereditament, the demolition of a complete building will leave the hereditament intact so that it is not taken out of rating. Where this occurs the floorspace area demolished is assigned to the 'other reductions' category rather than to the 'demolition' category. Similarly, although the erection of a complete new building usually leads to a fresh entry in the rating list and the floorspace area being assigned to the 'new' category when the new building is situated within the site of an existing hereditament, the floorspace area is described as an extension.

Data availability

The Valuation Office of Inland Revenue supplies floorspace data (stock and changes) in an aggregated form for each local authority area†. From 1974 estimated stock and changes are known at this level of aggregation for the following use classes and in the associated size groups –

Commercial offices:
less than 100 square metres, 100–299 square metres, 300–999 square metres, 1,000 square metres and over
Shops and restaurants:
Shops with living accommodation
less than 200 square metres, 200–499 square metres, 500 square metres and over
Warehouses, Stores and Workshops (covered):
less than 200 square metres, 200–999 square metres, 1,000 square metres and over
Industry:
less than 500 square metres, 500–2,499 square metres, 2,500–9,999 square metres, 10,000 square metres and over.

For the period 1967–73 less detailed returns were made in which imperial measurements (square feet) were employed. Slightly different size groups based on square feet were therefore used in these earlier returns. Returns were made for the local authority areas then in use prior to the 1974 reorganisation of local government, so in general it is not easy to make comparisons between the earlier and later sets of data. Additionally, some reclassification took place during the revaluation in 1973. Nevertheless, some figures equivalent to the new regions (after 1974) are available for these earlier years and an attempt is being made to lace together the complete series of returns at a lower level of aggregation.

†see previous footnote

Subject to the availability of staff past figures can usually be supplied on request and advice given on the interpretation of the figures. Interested persons are invited to write to:

Statistics, Planning and Regional Division,
Room P2/038,
Department of the Environment,
2 Marsham Street,
London SW1.
Telephone: 01-212 8473

Appendix

Floorspace statistics publications

No. 1	Floorspace in industrial, shopping and office use changes April 1964 to March 1967	HMSO 1969 (Price 40p net)
No. 2	Floorspace in industrial, warehouse etc., shopping and office use Total stock at 1 April 1967 and changes April 1967 to March 1968	HMSO 1972 (Price £1·45 net)
No. 3	Floorspace in industrial, warehouse etc., shopping and office use changes April 1967 to March 1969	HMSO 1974 (Price £1·20 net)
No. 4	Floorspace in industrial, warehouse etc., shopping and office use Stock at 1 April 1974	HMSO 1976 (Price £2·70 net)
No. 5	Floorspace Statistics (Selected Non-Domestic Uses) changes April 1969 to March 1971	1977 free of charge
No. 6	Commercial and Industrial Floorspace Statistics 1974–77	HMSO 1978 (Price £3·25 net)

Booklets Nos. 1 to 4 appeared in the series II of Statistics for Town and Country Planning and are available from HMSO and other bookshops. Booklet No. 5 is available from the Department of the Environment.

Business Monitors – Annual Censuses of Production 1974 and 1975

Readers of *Statistical News* will be made aware of the results of the 1974 and 1975 Censuses of Production as the Business Monitors become available. The following table lists the Monitors published since that which appeared in the last number of *Statistical News*.

Business Monitor Number	*Description*	*Standard Industrial Classification Minimum List Heading*
PA 336	Construction and earth-moving equipment	336
PA 415	Jute	415
PA 450	Footwear	450
PA 499.1	Musical instruments	499/1

Business Monitors – Annual Censuses of Production 1974 and 1975
PA 1002 – Summary Volumes

Business Monitor PA 1002 Volume 1, the first of two parts comprising the Report of the Censuses of Production 1974 and 1975 has recently become available. As in previous years' monitors (PA 1002) there appear a number of tables which summarise results previously published in the separate industry monitors (PA 101–PA 603). The second part, shortly to be published will show tables analysing census data by enterprise, similar to previous years.

Business Monitor – Annual Census of Production 1977
PA 1000 – Provisional Results

This volume, the first relating to the Census of Production 1977, was published recently. It shows estimates for some of the principal results of the 1977 Census with comparative data for 1974–1976. In addition to information about output, employment and details of net capital expenditure, it provides data for total sales and work done, cost of purchases, an analysis of employment and wages and salaries between operatives and other employees.

Copies of these *Business Monitors* are available on standing order from Her Majesty's Stationery Office, PO Box 569, London SE1 9NH (telephone 01-928-6977), or through any Government Bookshop. They are not, however, included in the global subscription arrangements of the Business Monitor series.

Further information on the PA series of Business Monitors and the Censuses generally can be obtained from:

Mr. R. J. Egerton,
Business Statistics Office,
Cardiff Road,
Newport,
Gwent NPT 1XG.
Telephone: Newport 56111 (STD Code 0633) Ext. 2455

Wholesale trades in 1974

Final results of the large-scale wholesaling and dealing inquiry conducted by the Business Statistics Office in respect of business done in 1974 are now available in a Business Monitor (SDO 26) obtainable from Her Majesty's Stationery Office.

This inquiry was the first comprehensive inquiry into wholesaling and dealing since 1965. It was also the first inquiry to be conducted from the Central Register of Businesses developed by the Business Statistics Office (BSO) from the Value Added Tax (VAT) information made available by H. M. Customs and Excise under the provisions of the 1973 Finance Act.

Business Monitor PA 1003

Analyses of UK manufacturing (local) units by employment size

A further Business Monitor in the PA 1003 series will shortly be available. It presents analyses for 1976 of the information recorded in the register of business maintained by the Business Statistics Office. The monitor includes tables showing the number of manufacturing units in various size groups by industrial classification and by area and the total number of persons employed in each category. Previous monitors in the PA 1003 series provided similar analyses for 1971, 1972, 1973 and 1975.

Rebasing of the construction materials price index

The 1975 index of construction material prices was published in *Housing and Construction Statistics* No. 26 in December 1978. Sub-indices will also be available for materials used in house-building, in other new work and in repair and maintenance.

In the absence of comprehensive information on the construction industry's purchases, the weights to be given to different materials have been estimated from sales and production data, with the co-operation of materials producers. In line with current practice, disaggregation of products was extended, the new index being based on price indices of 59 products, whereas 48 products formed the basis for the 1970-based index. For reasons of confidentiality it will not be possible to publish details of the price movements of all 59 products but as many as possible will be shown.

Sales and production data are far from satisfactory for the purpose and the possibility was considered of merely rescaling to the new base year, retaining the previous weights of individual products, derived partly from the 1968 purchases inquiry which was not wholly successful. However, changes in use of materials resulting from the development of new techniques and the substitution of materials because of the unprecedented price increases that occurred in the early 1970's, pointed firmly to a need to re-base the index using the best estimates possible. The purchases questions to be included in the 1979 Annual Census of Production by the construction industry, will provide a much firmer basis for the next re-basing on 1980.

The 1975 ACOP showed that the construction industry's purchases of construction materials that year, totalled about £4,000 million, but there was no further information available. This total had to be broken down between the products used in the construction industry, using production and sales data from regular Business Statistics Office and Department of Environment inquiries and information on usage supplied by producers and their trade associations. Aggregating the various estimates of purchases led to an overall total which was five per cent below the ACOP total of purchases.

One of the major problems was that sales of most of the products are not made only – or even overwhelmingly – to the construction industry and that purchases are very largely made through merchants who do not sell exclusively to the construction firms. Secondly, double counting of sales of some primary and intermediary products must be avoided when using producers' sales figures.

Materials can be roughly categorised into three groups: those which are specific to construction, with probably 90 per cent or more of production being used in construction, secondly, other materials of which it is estimated at least half are destined for construction, and, thirdly, other materials.

The first group includes, for example, aggregates and cement which are bought by ready-mixed concrete producers and pre-cast concrete manufacturers who in turn sell their finished products to the construction industry, important examples of the dangers of double counting. After making allowances for cases like this, it is reckoned that about three-tenths of the construction industry's purchases are accounted for by materials which are almost wholly produced for use in construction work. Incidentally, it is estimated that less than 40 per cent of the output of cement is sold direct to the construction industry.

The second group chiefly comprises various types of timber, predominantly imported softwood. These materials are bought by a wide range of industries and for 'do-it-yourself' work, with some of the industries making secondary products such as cupboards, windows, doors, which are largely purchased by construction firms. About one-fifth of the industry's purchases are estimated to be accounted for by these products.

The third group contains the largest number of materials and accounts for about half of the industry's purchases. For information on these products there was heavy dependence on the producers and, as was to be expected, some trade associations and manufacturers were very knowledgeable about the market for their products and their co-operation was valuable. However, others were less able to help and for many products it was a long struggle to glean any worthwhile information.

Compared with the weights used in the 1970-based index, the most notable changes were increases in the representation of pre-cast concrete goods and lower weights for bricks and for cement, reflecting the increased use of secondary rather than primary products

and the substitution of blocks for bricks in internal work, particularly in housing.

Finally, to construct sub-indices for three 'types of work', purchases had to be apportioned between them and very few suppliers were able to make this break-down in their sales. Results of work done by the Building Research Establishment were the principal source for this stage of the excercise. This method was in line with past practice but with perhaps more reliance being placed on the work done at the BRE which was not available at the time of the previous rebasing.

This breakdown of material usage is important since not only does the overall proportion of materials used in the three work sectors differ significantly but the actual quantity of individual materials of products used will vary quite considerably in some cases.

It has been customary in the past to publish only one of the three sub-indices that for New Housing. With the added interest now being shown it is intended to publish all three sub-indices in '*Housing and Construction Statistics*' and also in the *Monthly Statistics of Building Materials and Components*.

Reference

Housing and construction statistics No. 26 (HMSO) (Price £3·00 net)
Monthly statistics of building materials and components (HMSO) (Annual subscription £18·00 net)

Method of deflating manufacturing industry stocks

In the course of the recent rebasing of manufacturers' stocks figures from 1970 to 1975 prices, the methods of estimating physical changes in stocks from commercial accounting data (as described in '*National Accounts Statistics: Sources and Methods*' HMSO 1968 Chapter XIII) were reconsidered and substantially revised. A detailed paper discussing the basic concepts, the data problems and the new methods adopted is available from the address at the end of this note.

The assumption has been maintained that the bulk of stocks (other than those expressed at standard cost) are treated on the accounting convention of 'first in, first out, lower of cost or net realizable value'. On this assumption a formula has been derived for combining stock holding periods and price indices for different commodities and industries to give an index for estimating movements in the actual prices underlying the stocks of materials or finished goods of a broad industry group. This formula is really appropriate to an ideal situation in which data would be available on the volume of each commodity purchased or produced during a period and held in stock at the period's end by each industry, together with exactly corresponding wholesale price indices. In practice this is not the case and the paper shows how the limited amount of data actually available has been used to derive price indices for deflating stocks which approximate, as closely as possible, to the theoretical formula. One innovation is that, instead of taking an average stockholding period and giving equal weight to the price indices for each month during that period, the greatest weight is now given to the price index for the current month and declining weights to previous months; this allows for variations in stockholding periods for different items around the average for the industry.

For work in progress, changes are more fundamental in that both the method of calculating the build up period and the method of combining materials and finished goods price indices to obtain a cost index for work in progress have been revised. Instead of the assumption previously made for most industries that the work in progress cost index could be taken as a simple unweighted arithmetic average of materials and finished goods price indices, only the labour and overhead content of the finished goods index is now being used. This involves deducting the materials content from the finished goods index so that the work in progress index has a series of both positive and negative weights for material price indices at different dates, depending on the stockholding period for materials and the build up period for work in progress for the industry.

For further information and copies of the paper mentioned please contact:

Economics and Statistics Division 6B,
Departments of Industry, Trade & Prices & Consumer Protection,
Room 247,
Sanctuary Buildings,
16–20 Great Smith Street,
London SW1P 3DB.
Telephone 01-215 3176.

The construction and use of commodity balances

The September 1978 edition of *Economic Trends* contained a short article entitled 'Progress report on the construction and use of commodity balances within the National Accounts'. This describes briefly the development of a new system of economic accounts covering thirty industries designed to help identify and thus eliminate the discrepancy between the output and expenditure measures of gross domestic product at constant prices. Because the system draws on input–output methodology as well as the macro-economic national accounts, it opens the way to undertaking analysis of the economy with an industrial dimension based on comtempory data. A paper containing a

longer description of the work and a set of the industry accounts is available to interested readers from:

Mrs. Anne Harrison,
Central Statistical Office,
Great George Street,
London SW1P 3AQ.
Telephone: 01-233 7605.

Reference
Economic Trends, September 1978. (HMSO) (Price £1·95 net)

TRANSPORT

1977 edition of Transport Statistics

Transport Statistics Great Britain 1967–1977 has now been published by HMSO. It contains forty-six new tables or extended versions of existing tables making almost 200 tables in all covering a wide range of transport topics. The new material includes many analyses on personal travel patterns and car ownership drawn from the Department of Transport's National Travel Survey and Long-distance Travel Surveys. Also published for the first time are a table containing estimates of the pollutants emitted by road vehicles, a table showing the regional distribution of mileages travelled by each class of road vehicle and several tables on indicators of change in bus and coach usage over the last eleven years.

The latest edition adds 1977 figures to its regular tables on such topics as expenditure on transport, the road network and the traffic it carries, motor vehicle stock, public road passenger transport, road goods transport, railways, inland waterways, sea and air transport and pipelines, and employment in the transport sector. Other sections deal with energy use, overseas travel, driving licences and tests, and vehicle offences while of particular interest will be the forecasts of future vehicle numbers, traffic levels and car ownership. An international section provides figures for EEC and other countries for the main transport series. Most tables cover the eleven year period 1967 to 1977 although some span longer or shorter periods.

Reference
Transport Statistics Great Britain 1967-1977 (HMSO 1978) (Price (£5·75 net)

A historical abstract of inland transport statistics

At the time of his death in 1976, Denys Munby, fellow of Nuffield College and Reader in the Economics and Organisation of Transport at Oxford University, had been working for more than 10 years on the compilation of a comprehensive historical abstract of inland transport statistics for Great Britain going back to 1900. A first volume resulting from this work, edited and completed at the joint invitation of the Department of Transport and Nuffield College by Anthony Watson, former Director of Statistics at the Ministry of Transport and the Department of the Environment, was published in October 1978 by the Oxford University Press under the title *Inland Transport Statistics Great Britain 1900–1970 Volume 1.*

This first volume of some 700 pages, deals with rail transport, public road passenger transport, and London's transport by all modes. Its 350 pages of detailed tables, almost all in annual series form, cover revenue account data, working receipts and expenditure, capital investment, employment, earnings and wage rates, traffic and traffic revenue, fares and freight rates, physical assets and operations. The tables are supported by a detailed guide to the sources, and by 250 pages of extremely full notes on coverage and definitions of the data, and on the many changes over the years in accounting and statistical treatment in the sources: a principal aim of the author was to make as clear as possible to the user the precise meaning of the data and the changes in comparability of discontinuities. There are also full background notes on organisation, regulation and the main developments in the various sectors over the years.

A second volume will cover the road system, road vehicles, traffic and accidents, road goods transport and inland transport as a whole in the economy.

Reference
Inland Transport Statistics Great Britain 1900–1970 by D. L. Munby (Oxford University Press) (Price £20 net)

INCOME AND WEALTH

The effects of taxes and benefits on household income 1977

The latest article in this series is published in the January issue of *Economic Trends*. The purpose of these articles is to show how the payment of taxes, and the receipt of government benefits such as social services, cash benefits and consumer subsidies affect the observed distribution of income for different types of household. Important changes were introduced in last year's article, notably the presentation of data on a quantile basis rather than in terms of fixed income ranges and a comparison between the results of the current year and those for five years before. These changes have been retained for this year's article which compares 1977 with 1972.

Previously, the data has been analysed only by household composition, that is households grouped according to the numbers of retired and non-retired people and children they contain. This year the analysis

has been further developed by the inclusion of two additional sections, one dealing with the impact of taxes and benefits on households categorised by the numbers of workers in the household, and the other relating the analysis to the stages reached by the household members in the life-cycle.

HOME FINANCE

Financial Statistics

In the November issue of *Financial Statistics* the central government capital account was expanded to show seasonally adjusted figures. This allows the user to see how movements in individual current and capital account transactions contribute to movement in the seasonally adjusted central government borrowing requirement. At the same time the table has been enlarged to show the components of the 'accruals adjustment', thus enabling those items in the account shown on an accruals basis to be converted separately to a cash receipt or expenditure basis. The table showing the financing of the central government borrowing requirement now contains, for the non-bank private sector, an analysis by type of instrument for banking months and further details of other public sector transactions. Tables within the central government section have been re-arranged into a more logical order. Certain tables in the banking section were re-arranged to provide a breakdown of UK residents' sterling deposits and advances, where not already shown, between the UK private sector and the public sector, and also to distinguish throughout the summary tables for banking in the United Kingdom between sterling and foreign currency items. Some sub-totals previously included were omitted. Banking month figures for the central government borrowing requirement are now shown in the table on domestic credit expansion and money stock and also the purchases of central government debt by the non-bank private sector and the net contributions of the rest of the public sector. In the table on superannuation funds, a revised presentation distinguishes purchases of unit trust units.

The December edition contained a new supplementary table giving monthly local authority borrowing figures. The table on National Girobank was dropped from this issue, following the inclusion of the figures with the 'Other British banks' table. The table on selected liquid assets of industrial and commercial companies has been widened to include holdings of local authority longer-term debt and British government securities. Figures for Petroleum Revenue Tax came into the table on Inland Revenue duties for the first time. The figures for investment by insurance companies and private sector pension funds were published one month earlier.

The January issue showed some revisions to the section on industrial and commercial companies. An alternative presentation of the accounts has been introduced which shows the items leading to a new financial balance – the net borrowing requirement of industrial and commercial companies – and its financing (an article describing this new balance is reviewed in the section on Home Finance on page 151). Some consequential changes have been made to the appropriation account and sources and uses of funds tables.

Company finance and profitability

The tenth issue of the annual Business Monitor M3 – *Company finance* (price £2·00 available, on subscription, from HMSO, PO Box 569, London SE1 9NH) was published in January. The Business Monitor provides summaries, in a standardised form, of the balance sheets, appropriation accounts and the sources and uses of company funds, both in total and by a number of broad industrial groups, for some 1,600 large listed and non-listed industrial and commercial companies operating mainly in the United Kingdom. It also contains tables of certain accounting ratios and size distributions.

The third in an annual series of articles 'Structure of company financing' appeared in the 16 February 1979 issue of *Trade and Industry*, updating the statistics of the sources and uses of funds of industrial and commercial companies presented in an article in *Economic Trends* September 1975 – 'Structure of company financing'. The recent article gives figures for large listed and unlisted companies in manufacturing, distribution and certain other services (1972–76), large listed and unlisted companies in manufacturing (1972–76); large listed companies (only) in manufacturing, distribution and certain other services (1972–77 provisional); and all industrial and commercial companies (1967–77). Figures back to 1964 for the first two groups of companies were published in the *Economic Trends* September 1975 article; earlier figures for the third group are available on request (see article). The figures for the first three groups of companies are based on the Department of Industry analysis of the published, consolidated accounts of companies as published in Business Monitor M3; those for all industrial and commercial companies form part of the national accounts, published quarterly in *Financial Statistics* and annually in the National Income and Expenditure Blue Book.

Another article – 'Companies' rate of return on capital employed, 1960 to 1977' – appeared in *Trade and Industry* on 22 September 1978. This was the fourth of an annual series of articles bringing together

the latest information on various measures of the rate of return on capital employed by companies. The accounting rates of return given in the article include the ratio of net trading income to net capital stock *plus* book value of stocks for all industrial and commercial companies and, separately, for the first time for manufacturing companies with capital stock and depreciation valued (*a*) at historic cost and (*b*) at replacement cost, and stock appreciation deducted from net trading income with assets valued at replacement cost. 1977 figures for industrial and commercial companies *excluding* their North Sea activities are also given.

Equivalent figures for large listed companies engaged mainly in manufacturing industry, in retailing and in wholesaling (separately), based on the Department of Industry analysis of company accounts, are given in tables 2 and 3 of the article. Separate figures are given for six broad industry groups within manufacturing (table 2). Accounting ratios based on the book values recorded in companies' own accounts are also given (table 4).

Inquries concerning the Business Monitor and the articles should be addressed to:

Home Financial Statistics (Room 241C),
Economics and Statistics Division 6A,
Departments of Trade, Industry and Prices and Consumer Protection,
1 Victoria Street,
London SW1H 0ET.
Telephone: 01-215 3132/5705.

Consumer credit

The monthly inquiry into hire purchase and other instalment credit business of finance houses has been replaced by a new monthly inquiry to consumer credit grantors. The new inquiry includes the business of check traders and other consumer grantors (other than retailers) as well as of finance houses. The first results of the new inquiry will be published in *Trade and Industry* on 9 March 1979 and, in more detail, in the *Business Monitor SD6* for January 1979 which is available from mid-March.

Following the introduction of the Consumer Credit Act 1974, the new inquiry concentrates on regulated consumer credit business (broadly, loans to individuals for amounts not exceeding £5,000). Summary totals for non-regulated loans made by consumer credit grantors (i.e. by credit granting businesses who do not lend exclusively to companies) will be given in *Business Monitor SD6* only each month. The statistics of regulated credit include figures for fixed-sum instalment credit at fixed and at variable rates of charge, for non-instalment fixed-sum credit and, for the first time, for running-account credit agreements, for rental receipts and for the non-check business of check traders. Separate statistics of the charges made for credit are also available for the first time. A commodity analysis of new advances of fixed-sum instalment credit is given.

As part of the changeover to the new inquiry the statistics have been rebased on the results of the benchmark Inquiry to Consumer Credit Grantors for 1976 (see *Business Monitor M13* and *Statistical News* 42.34) and a revised panel of voluntary respondents to the monthly inquiry has been recruited. The figures given by these respondents have been grossed-up (to allow for non-response and for those consumer credit grantors who are unable to provide monthly figures and those who are too small to approach for monthly returns) using changes between successive months' figures for matched panels of contributors. These panels are stratified by size, as measured by debt outstanding at the end of 1976. The former hire purchase and other instalment credit grantors inquiry was grossed-up using changes between the current month and the last month of the previous quarter. The two linkage periods gave very similar results and the month on previous-month method was therefore adopted for practical reasons related to coverage of the matched panels, etc. Further details of the new inquiry and of the rebasing exercise will appear in the *Business Monitor SD6* for January 1979.

Descriptions of the new monthly inquiry have already been published in the journals *Credit* (Volume 19, No. 1, March 1978) and *Hire Trading* (Volume 32, No. 1, Summer 1978). Further information is available on request from:

Economics and Statistics Division 6A,
DITPCP,
Room 349,
Sanctuary Buildings,
20 Great Smith Street,
London SW1P 3DB.
Telephone: 01-215 3162

Financial balances of industrial and commercial companies

An article in the December 1978 issue of *Economic Trends* described a new financial balance for industrial and commercial companies – the net borrowing requirement – which has been included in *Financial Statistics*, starting in the January 1979 issue, in addition to the existing presentations. The net borrowing requirement measures the companies' need for external finance, net of certain financial assets, and equals the amount by which their expenditure on fixed assets, stocks, trade investments, acquisition of subsidiaries in the United Kingdom, investment abroad and net

trade credit extended exceeds the increase in their internal funds. It will be of particular use to those who are concerned with the cash flow of companies operating in the United Kingdom.

The new balance has been developed following criticism of the use of the net acquisition of financial assets (NAFA) as an indicator of the financial position of industrial and commercial companies. These criticisms, which concern the treatment in the national accounts of retained profits, the measurement of the transactions in goods and services on which NAFA is based on an accruals rather than on a payments basis, and the definition of investment, are explained and discussed in the article.

The net borrowing requirement generally shows industrial and commercial companies to be deeper in deficit than NAFA. Trends in the new balance are described in the article and compared with those of NAFA. The problem of classifying the unidentified transactions and their effect on the interpretation of financial balances is also discussed.

The Government's Expenditure Plans 1979–80 to 1982–83

The annual White Paper on the government's expenditure plans (Cmnd. 7439) was published on 17 January 1979. It sets out the government's plans for public expenditure for the years 1979–80 to 1982–83, expressed at 1978 survey prices.

The plans provide for growth of about two per cent a year over the next four years. The plans are intended to be within the growth of national income discussed in the White Paper in terms of an illustrative range of two to three per cent a year. As in last year's White Paper, the projections of general government revenue and borrowing are shown for the current year and two years ahead, and this year's White Paper also provides a projection of the public sector borrowing requirement for the same period.

New features include a section on tax reliefs and allowances and their estimated costs for 1978–79.

The White Paper also includes a section containing explanatory and technical notes which bring up-to-date material published by H. M. Treasury in 1972 in the booklet '*Public Expenditure White Papers – Handbook on Methodology*'.

Reference
The government's expenditure plans 1979–80 to 1982–83. (Cmnd. 7439) (HMSO) January 1979 (Price £4·25 net)

Guide to public sector financial information

The Treasury and the Central Statistical Office are together preparing a new guide to public sector financial information. It is expected that it will be published in the Spring.

This guide, will be a companion volume to the CSO's *Guide to Official Statistics*, and describes, (*a*) the main information published by the government about it's non-expenditure, revenue, borrowing and debt, (*b*) the main financial information published by the government about local authorities, nationalised industries and other public corporations, and the public sector as a whole and (*c*) some of the similar information published by, or for, local authorities and public corporations, and by international organisations. The purpose of the guide will be to help the reader to find information amongst the large amount of such material available and to relate it to information in different publications.

The guide will consist of a forward and two main parts (bound in a single volume). The first part will set out the sources relevant to selected topics of public sector financial information. The second part will consist of a detailed descriptive bibliography of each of those sources and some other significant sources of public sector financial information.

Reference
Guide to Official Statistics, 1978 (HMSO) (Price £8·25 net)
Guide to public sector financial information (HMSO) (forthcoming)

Bank of England Quarterly Bulletin

Note on the future composition of the statistical annex

This note in the December 1978 Bulletin explains that changes will be made in the range of statistical services provided by the Bank for the general public. These will comprise:

(i) The annex reduced to about half its present size. With only minor exceptions, the information no longer to be carried in the annex will all be contained in '*Financial Statistics*'. The reduction is planned to begin with the March 1979 issue of the Bulletin.

(ii) A magnetic tape service, covering all the tables in the December 1978 issue of the annex but with longer runs and, in some cases, more frequent observations and additional details. This service is immediately available.

(iii) Long runs of certain series or groups of series generated to meet more specific demand and duplicated from computer print out. It is hoped that this service will be available from June 1979.

A charge will be made for items (ii) and (iii) to cover basic production costs.

Distribution of the National debt at end-March 1978

This article continues the annual series which was begun in June 1962.

Measures of real profitability
This article examines longer-term trends in real profitability, measured for the most part in terms of the share of profits in national income.

Tables 2.1 to 2.10
Banks in the United Kingdom – have been slightly re-arranged to provide a breakdown between the private and public sectors of UK sterling deposits and advances and also in Table 2.1 to distinguish throughout between sterling and foreign currency items. Details of eligible liabilities and reserve ratios have been omitted but are still shown in Table 3.

Tables 7 and 8
Government borrowing. Holdings of central government debt by other parts of the public sector and by the non-bank private sector are now shown separately.

Table 11.3
Public sector borrowing requirement, domestic credit expansion and money stock. The monthly figures for the public sector element of DCE are now sub-divided into: CGBR; purchases of central government debt by the non-bank private sector; and the net contribution of the rest of the public sector. The three-monthly series which previously included this analysis no longer appears. A further analysis of purchases of central government debt by the non-bank private sector is given in the additional notes to Table 11.

Copies of the Bank's Bulletin and off-prints of the 'profitability' article may be obtained, free of charge, from:

The Economic Intelligence Department,
Bank of England,
Threadneedle Street,
London EC2R 8AH.

OVERSEAS FINANCE

External and foreign currency flows and the money supply

An article in the Bank of England's December 1978 Bulletin is intended to provide an up-to-date guide. It is, however, a description of the statistical framework only, and makes no attempt to identify causal relationships.

Copies of the Bank's Bulletin and off-prints of the article may be obtained, free of charge, from:

The Economic Intelligence Department,
Bank of England,
Threadneedle Street,
London EC2R 8AH.

Low-value consignment limit raised to £200

Partly as a result of changes in EEC regulations it has been possible for Customs and Excise to raise the value limits for simplified export documentation from the present level of under £150 (f.o.b.) to under £200 (f.o.b.) as from 1 January 1979.

It is expected that this reduction in the form filling burden, resulting from the use of simplified export forms will affect about 15,000 export forms a month.

Low-value trade is recorded (under SITC (Rev 2) heading 931.0) though not analysed by commodity or country. Although the coverage of this heading will be changed for January 1979 after the change in the threshold value, it is estimated that, because of rising prices, the proportion of trade covered will be no greater than that covered when this system of recording low-trade was introduced some years ago (i.e. less than 0·5 per cent of exports and less than 0·25 per cent of imports).

United Kingdom trade competitiveness

A new table is to be presented in *Economic Trends* showing various indicators of the competitiveness of UK manufactured goods in the export and domestic markets. The indicators include indices of relative export prices, relative wholesale prices and relative normalised unit labour costs, an index of import competitiveness and an index of the profitability of exports relative to home sales. An introductory article appears in the February issue.

Reference
Economic Trends (HMSO) (Price £1·95 net)

INTERNATIONAL

National Institute Economic Review

An article by G. F. Ray and G. M. Walsh on the European energy outlook to 1985 surveys the changes in recent years in the energy plans/forecasts of 17 West European countries and in the prospects for European energy supplies. Economic growth since the 1975 recession has been slower than foreseen at the time of our similar survey two years ago; expectations concerning growth to 1985 are now also lower, resulting in energy requirements which are below those forecast earlier. The previous ambitious nuclear plans have in many cases been considerably reduced but higher future use of natural gas is planned. Europe's dependence on imported energy may be reduced from 64 per cent in 1973 to just over 50 per cent in 1980 and 1985 but seems likely to increase rapidly later on unless new domestic energy sources are found by then.

National Institute Economic Review, November 1978, *Vol. 4/78*, (No. 86), pp. 65–73 (English).

A second article by A. E. Daly on UK visible trade and the Common Market examines changes in the pattern of the United Kingdom's visible trade with the original members of the European Economic Community and with Ireland, Denmark and the EFTA countries since her entry to the EEC in January 1973. It is concluded that UK-EEC trade has grown faster than might have been expected in the absence of entry, with little or no loss of non-agricultural trade in the other markets. *National Institute Economic Review*, November 1978, *Vol. 4/78*, (No. 86), pp. 42–54 (English).

Statistical publications of the Commission of the European Communities

Recent and forthcoming publications by the Statistical Office of the European Communities (SOEC) are listed regularly in '*Eurostat News*', itself produced by SOEC. '*Eurostat News*', which was described in *Statistical News* No. 34, is issued six to eight times a year, and can be obtained regularly, free of charge, by writing to:

Statistical Office of the European Communities,
For the attention of Mrs. Simmet,
Bîote Postale 1907,
Luxembourg.

Taxes and social security contributions: international comparisons

An article by the Central Statistical Office published in the December 1978 issue of *Economic Trends* gives a comparison of taxation in nineteen countries within the Organisation for Economic Co-operation and Development (OECD) for the years 1970–76. The tables are based mainly on national accounts returns supplied to OECD by member countries and show for each country total taxes and social security contributions as a percentage of gross national product; main categories of tax as percentages of gross national product and total taxation; and income taxes and social security contributions paid by households as a percentage of total personal income.

Reference
Economic Trends, December 1978 (HMSO) (Price £1·95 net)

THE ENVIRONMENT

Environmental pollution

A digest of environmental pollution statistics has recently been published by HMSO for the Department of the Environment. (An in-house version of the digest containing data for earlier years was described in *Statistical News* No. 37, May 1977). The publication contains considerably more statistical information on pollution than its in-house predecessor. In particular two new sections on marine pollution and noise have been added, whilst the sections on air pollution, fresh water pollution and waste have been expanded. Where appropriate, the pollution data are classified according to whether they relate to emissions of pollutants, concentrations of pollutants, human exposure to pollution, or abatement measures, with particular emphasis being given to showing trend data where available. In an attempt to make the data more readily understandable to the public at large, detailed notes providing background information accompany each table. The publication is intended to be the first in a regular series.

Copies are obtainable direct from HMSO. Queries about the publication should be addressed to:

Department of the Environment,
Room N8/06,
2 Marsham Street,
London SW1P 3EB.

Reference
Digest of environmental pollution statistics No. 1. 1978 (HMSO) (Price £3·25 net)

OVERSEAS AID

British aid statistics 1973–1977

The 1978 edition of *British Aid Statistics* was published during December 1978. As with previous issues, this volume gives nearly 50 tables of statistics showing many different analyses of British aid flows to developing countries together with a fairly detailed explanatory text. Successive tables show the composition of aid in terms of grants and loans, commitments and disbursements, flows through multilateral organisations (e.g. United Nations agencies and the World Bank) and directly the recipient countries, expenditure on financial and technical assistance, the purposes of financial aid, the economic distribution of each type of aid flow between different countries and economic sectors, the income levels and indebtedness of recipient countries, the fields of activity and study of, respectively, technical assistance personnel serving overseas and students receiving specialist training outside their own country. Most of the financial figures are on a UK public expenditure basis but there are also tables that show the main totals and components on the international 'official development assistance' basis. (The two bases are defined in the explanatory text). Summary tables show the key figures on both bases. The structure

and type-face of the table headings has been changed to make the volume easier to use and two diagrams have been added to show how some component flows are related to one another.

Reference
British Aid Statistics 1973–1977. (HMSO) (Price £6·25 net)

OTHER PUBLICATIONS

Economic Trends Annual Supplement 1979 edition

The 1979 edition of the *Economic Trends Annual Supplement* was published on 4 January and is available from HMSO at £2·65 net. This fourth issue of the Supplement brings together long runs of quarterly and annual data for the key series of economic statistics and is of special value to economists, planners, analysts and academic researchers. Some 300 series are included, linked to give continuous runs as far back as possible in the post-war period. Certain series show figures for earlier years and quarters for the first time. Over half span 25 years or more. The Supplement also contains concise notes and definitions and an index to more detailed sources.

Annual Abstract of Statistics, 1979 edition

Annual Abstract of Statistics, No. 115 1979 edition, was published on 23 January 1979. The following new tables have been introduced:

Table 7.11 Medical discharge of UK service personnel

Table 14.2 Gross national product by category of income

Reference
Annual Abstract of Statistics, No. 115, 1979 (HMSO) (Price £8·50 net)

Amendments

The following amendments should be made in this edition:

Table 2.10 Projected total population at mid-year
UK females 55–59
1981 **Delete** 1,883 **Insert** 1,683

Table 5.31 Pupils in schools: all schools
As a percentage of population. Boys and girls 2–4
1977 **Delete** 24.83 **Insert** 24.89

Table 6.7 Numbers unemployed
Construction United Kingdom
1975 June **Delete** 59,600 **Insert** 159,600

Table 8.2 Index of industrial production
Chemicals, coal and petroleum products
Delete ·0 for the years 1968 to 1972 and **Insert**:—
1968 **80·4**: *1969* **85·3**: *1970* **90·1**: *1971* **92·2**: *1972* **96·9**

CONFERENCES AND MEETINGS

Institute of Statisticians' conference

The Institute of Statisticians' 1979 Annual Conference will be held at King's College, Cambridge from 11 to 14 July. The theme of the conference will be 'Statistics for business and industry' and topics to be covered will include: sampling in auditing, monitoring industrial performance, quality control and the measurement of price movements. Further details and an application form are available from:

The Institute of Statisticians,
36 Churchgate Street,
Bury St. Edmunds,
Suffolk IP33 1RD.
Telephone: 0284 63660.

GOVERNMENT STATISTICAL SERVICE

Appointments and changes

Mr. K. G. Forecast, Under Secretary, Director of Statistics at the Department of Education and Science will transfer to the Central Statistical Office on 1 March 1979 to succeed Mr. Wakefield as Assistant Director, Division IV (Social Statistics, Central Services and Regional).

Mr. W. B. Wakefield, Under Secretary, Assistant Director, Division IV in the Central Statistical Office will transfer to the Department of Education and Science on 1 March 1979 to succeed Mr. Forecast as Director of Statistics.

Dr. S. Rosenbaum, Chief Statistician, Director of Studies in Statistics and Operational Research at the Civil Service College, retired on 31 December 1978.

Mr. J. R. Merchant, Statistician in the Ministry of Defence transferred to the Civil Service Department on 1 February 1979 with temporary promotion to Chief Statistician to replace Dr. Rosenbaum.

Mr. G. M. Goatman, Chief Statistician, Department of Education and Science, on return from secondment to the Price Commission, transferred on loan to the Manpower Services Commission for special duties with effect from 1 November 1978 pending reassignment.

Mr. B. C. Brown, Chief Statistician in H. M. Treasury, transferred to Health and Safety Executive on 1 December 1978.

Mr. J. R. Howe, Chief Statistician, formerly at the Scottish Education Department, transferred to the Central Statistical Office on 1 January 1979 for the period of his secondment to the Government of the Republic of Malawi with effect from 7 December 1978.

LATE ITEM

Business monitors – annual censuses of production 1974 and 1975

Business Monitor Number	*Description*	*Standard Industrial Classification Minimum List Heading*
PA 101	Coal mining	101
PA 104	Petroleum and natural gas	104
PA 221	Vegetable and animal oils and fats	221
PA 229.1	Margarine	229/1
PA 229.2	Starch and miscellaneous foods	229/2
PA 231	Brewing and malting	231
PA 239.1	Spirit distilling and compounding	239/1
PA 239.2	British wines, cider and perry	239/2
PA 272	Pharmaceutical chemicals and preparations	272
PA 273	Toilet preparations	273
PA 274	Paint	274
PA 279.7	Photographical chemical materials	279/7
PA 313	Iron castings, etc.	313
PA 333	Pumps, valves and compressors	333/1/2/3
PA 335	Textile machinery and accessories	335
PA 354	Scientific and industrial instruments and systems	354
PA 361	Electrical machinery	361
PA 367	Radio, radar and electronic capital goods	367
PA 368	Electric appliances primarily for domestic use	368
PA 370	Shipbuilding and marine engineering	370
PA 383	Aerospace equipment manufacturing and repairing	383
PA 384	Locomotives, railway track equipment, railway carriages, wagons and trams	384/1/2 385/1/2
PA 392	Cutlery, spoons, forks and plated tableware, etc.	392 392
PA 399.1	Metal furniture	399/1
PA 399.6	Metal hollow-ware	399/6/7
PA 413	Weaving of cotton, linen and man-made fibres	413
PA 416	Rope, twine and net	416
PA 432	Leather goods	432
PA 441	Weatherproof outerwear	441
PA 443	Women's and girl's tailored outerwear	443
PA 444	Overalls and men's shirts, underwear, etc.	444
PA 462	Pottery	462
PA 463	Glass	463
PA 469.1	Abrasives	469/1
PA 471	Timber	471
PA 479	Miscellaneous wood and cork manufactures	479
PA 492	Linoleum, plastics floor-covering, leathercloth, etc.	492
PA 493	Brushes and brooms	493
PA 494.3	Sports equipment	494/3
PA 495	Miscellaneous stationers' goods	495
PA 499.2	Miscellaneous manufacturing industries	499/2
PA 601	Gas	601

Alphabetical Index

The index to *Statistical News* covers the last nine issues. Page numbers are prefixed by the issue number, e.g. 36.30 signifies number 36, page 30.

Generally speaking articles relating to the United Kingdom, Great Britain, England and Wales or covering several geographical groups are not indexed under these groups, but topics with a significant regional interest are indicated, e.g. regional earnings. Articles and notes dealing particularly with Scottish statistics are 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: references to items appearing in articles are shown by (A); italics are used for the titles of published books or papers.

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CENTRAL STATISTICAL OFFICE

Social Trends 9

Social statistics are a vast topic: finding all the data available from the numerous sources can be a formidable task.

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Index of sources (for more detail)
Subject index

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