

## The Bank of England as registrar: 1968

Since the earlier article under this title five years ago<sup>1</sup> the Bank's work as registrar has been affected both by legislative changes and by technical developments, some far-reaching. There have also been changes in the organisation of the Accountant's Department which carries out this work.

### Changes by legislation

The Stock Transfer Bill mentioned in the previous article became law in October 1963. The Act simplified the system of transferring securities by removing the need for a transferee to sign the transfer document and for the signature of the transferor to be witnessed. The interests of both parties continue to be protected through their professional agents who, by inserting their names in the transfer, in effect confirm their liability for its genuineness.

From the Bank's point of view the new system has worked well and has effectively speeded up the completion of transactions in government securities.<sup>2</sup> But since a transferee no longer has the opportunity to scrutinise a transfer, accuracy in its preparation is of even greater importance than before if time-consuming corrections of records and certificates are to be avoided after transfers have been registered.

In their management of British government stocks the Bank are subject to regulations issued by the Treasury from time to time. In 1965 new Government Stock Regulations took account of the provisions of the Stock Transfer Act and, amongst other things, prepared the way for the use of computers by removing any doubts that might otherwise have existed as to the legality of keeping the stock registers on magnetic tape.

### Technical developments

Stock registrars need to keep records showing the full details of each holding – the amount, the names and addresses of the stockholders, any changes due to transfers, alterations of address and so on. They must also record the data needed for the preparation of dividends. From 1934 onwards the main registers kept by the Bank were in loose-leaf form, transfers being recorded by accounting machines. For the payment of dividends some three million metal stencils and a secondary register were maintained, the latter showing the calculations of gross dividend, tax and net payment.

The dividend preparation system was costly because two different types of record had to be maintained – over and above the main stock registers – and because all dividend calculations had to be done clerically by means of interest and tax tables. Moreover, recalculation was necessary whenever there were changes in the standard rate of income tax. It was clear therefore that any mechanical means which would reduce duplication and carry out the necessary calculations at the same time as the dividend documents

<sup>1</sup> In the March 1963 *Bulletin*.

<sup>2</sup> The new system was described in the December 1964 *Bulletin*, page 270.

were printed would yield significant economies, both in staff and time.

The possibility of doing this was first explored in the late 1940's but it was some years before satisfactory equipment became available. Preparatory work was then begun and in 1959 an experiment was started with Powers-Samas machines, including a high speed printer with calculator attached, and punched card files which were kept up to date by means of a first generation (valve) computer. The first dividend paid to the public by the new method was on 2½% Consolidated Stock in July 1960, and gradually the number of payments by the new method was increased. The experimental equipment was subsequently replaced by a second generation (transistorised) computer – an I.C.T. 1301 – and another computer of this type was added later. By the end of 1964 over four million cards had been punched to set up the main dividend files, in addition to those necessary to keep the files up to date. The new system of dividend preparation not only increased the efficiency of this work, with substantial staff savings, but also laid the foundation for a wider use of electronic devices.

When ordering the experimental equipment the Bank had satisfied themselves that they could take the further step of putting the dividend files on to magnetic tape at some future date, since this more compact and faster medium seemed likely to have considerable advantages, not only for the dividend files but eventually for the stock registers themselves. The dividend files were transferred from cards to magnetic tape by attaching the necessary equipment to one of the 1301 computers.

It was clear that by putting the stock registers themselves on to magnetic tape there would be increased efficiency and considerable economy. Duplication of records could be eliminated, because the computer would need to use only one record of each account for all purposes. And when a new account was opened, one keyboard operation would replace the four separate typing processes that had been needed previously – to create a receipt for the transfer, a certificate of title for the holder, a loose-leaf account page and a dividend record.

An outline scheme for putting the stock registers on to magnetic tape, based on the second generation computers then in use for dividend preparation, was ready by the middle of 1964. But the progress that had been made in the meantime in the design and construction of data processing equipment made it more economic to defer the changeover of the registers until computers of a more modern type could be installed. In March and April 1966 two I.C.T. 1903 computers were delivered, and these first took over the dividend preparation work from the middle of August of that year. The magnetic tape used by the old and the new computers was of different width and format, and special circuitry to convert the files had to be added to one of the old machines.

Meanwhile the whole of the department's procedures was being re-examined so as to take the maximum advantage of the new computer facilities. By April 1967 the work was completed and a suite of some 30 computer programs had

been written and tested. Consequently, the Bank were able, on 21st April 1967, to transfer to the computer the register of the largest stock that they manage, 3½% War Stock – comprising some 650,000 accounts. Since that time the registers of 21 other stocks have been transferred to magnetic tape, and all new issues, including the 6½% Treasury Stock 1971 issued last year in compensation for steel company securities, have been set up under the computer system. By the end of August 1968 nearly 70% of all the 2.6 million accounts on the Bank's registers were being dealt with by computer and it is hoped to complete the operation during the first half of next year. When all the registers have been transferred, the magnetic tape files for them will consist of about 40 reels of tape, each 2,400 feet long.

#### *The new register system*

Once the details of an account are recorded in the register, the only thing the Bank have to do as registrars, unless the account alters in some way, is to pay the dividends on the holding, and in such conditions the dividend record will suffice to service that account. In order to avoid another large-scale punching operation as the registers are changed from loose-leaf form to the computer system, skeleton register records only are created in the first instance, using the dividend records already on magnetic tape suitably rearranged by the computer. Each skeleton record has to be supported by the old loose-leaf account page until such time as the account first alters – when the tape record is expanded to take the rest of the current information from the loose-leaf page. In this way the move to tape registers has been speeded up and additional use has been made of the card punching done since 1959 to create the dividend files. The process has the disadvantage, however, that reference has to be made both to the register on tape and to the old loose-leaf pages in cases where accounts are still in skeleton form. It is planned to expand such accounts systematically when the programme for transferring the register to tape is further advanced. After this, the loose-leaf account pages will become historical records only.

Because stock exchange dealings in government securities have normally to be settled on the day following the transaction, the magnetic tape files are brought up to date daily. At present all amendments – whether numeric or alphabetical – are fed into the computer by means of punched cards; but the use of punched paper tape for alphabetical changes is being investigated. In the course of the daily updating of the registers the computer produces 'print-outs' of accounts subject to amendment or enquiry, and provides the information needed to produce new certificates. The latter are printed the next day either by computer or, where the numbers in a stock are small, on a typewriter working automatically from paper tape produced by the computer. The Bank are able to despatch certificates five days after the receipt of the relative transfer documents – as opposed to nine days under the old system – so that transfer receipts are no longer issued. Jobbers in the gilt-edged market now receive daily statements showing the operations on their accounts.

When the time comes to strike a balance for the payment of a dividend, the register of the stock concerned is copied by computer after the day's processing on to separate reels of magnetic tape. The original tapes are then available for the normal updating of the register on the following day, while the copies are used to prepare the dividend payment.

It is always important that all possible precautions be taken against the loss of records through fire or other mishap, and such precautions are vital now that there is no permanent printed record of accounts on the tape registers. At each day's updating a fresh set of tapes is produced, incorporating new information where accounts have altered, and carrying forward the old information in other cases. Five successive sets of tapes are always available, with six overnight. Two of these sets, together with the necessary data to bring them up to date, are located away from the Accountant's Department building at New Change, so that, in an emergency, one of them could be brought up to date on any computer of a suitable type – enabling the work of the department, and the gilt-edged market, to continue without undue delay. This is a distinct improvement on the arrangements under the loose-leaf system, where security was provided by micro-film records and an appreciable delay would have ensued before all the records could be reconstructed and brought up to date from the micro-film.

#### *Further uses for the computers*

The computers in the Accountant's Department have already made possible significant reductions in the burden of clerical work involved when a security falls due for redemption or an offer of exchange is made. Still greater benefits should accrue when a stock whose register is already on tape has to be redeemed or converted; and these will be particularly valuable during the next few years when the department will have to deal with a number of maturing stocks with large numbers of stockholders.

The accounting of paid warrants for dividend and redemption monies has still to be transferred to the computer. Until 1964 paid warrants had to be sorted by hand, the amount of each unrepresented warrant abstracted from the dividend records and the total agreed with the outstanding cash balance – a laborious and time-consuming operation. Since then, magnetic characters have been added at the bottom of warrants so that sorting can be carried out by a reader/sorter machine. More recently, amounts have been added in magnetic form when warrants are presented for payment, so that totalling may also be done automatically.

A more advanced stage will be reached next year when the computer will record on tape at the time the dividend is printed the number and net amount of each warrant issued. When the warrants, suitably magnetically encoded, are presented for payment, the computer will produce a second tape, and by relating this to the issue tape will be able to carry out the necessary reconciliation, and produce a list of unrepresented items – without the need to sort the warrants at all; it will, however, still be possible to

trace any particular paid warrant if need be from references recorded on the tape files.

The next task, when the transfer of the registers to tape is completed during the first half of 1969, will be to prepare for the decimalisation of the currency in February 1971. When the necessary programming has been carried out, the actual conversion of the registers can be done entirely by computer, and what would have been a very lengthy task under the old system should be accomplished in a matter of a few hours.

The one area where no immediate changes are possible, given the present computer installation and register system, is the work of the Chief Accountant's Office (Head Office) – commonly referred to as 'jobbers' counter'. This office maintains ledgers showing the certifiable balances (*i.e.* those balances against which the Bank are prepared to certify sale transfers) of jobbers, discount houses and certain others – a vital function in providing an efficient market in government securities. It is necessary to have immediate access to such records to ensure that the time-tables laid down by the Stock Exchange and others for stock transactions are observed: for example, the latest time by which certified transfers must be delivered to ensure payment on the same day. The jobbers' counter must therefore continue to operate as at present, with loose-leaf ledgers and accounting machines, until the work can be dealt with by computer on a 'real time' basis, that is to say with immediate access to and updating of records.

#### *Statistical analysis*

As for the provision of statistics, the analysis of the registers by type of holder referred to in the previous article now covers all British government stocks and nationalised industry stocks guaranteed by H.M. Government. The special analysis of stocks where overseas holders can claim exemption from U.K. taxation is also continuing.

When the registers of all stocks have been transferred to magnetic tape it will be possible to provide a comprehensive breakdown, by types of holder, at a common date – previously each stock could be analysed only at its dividend balance date. It will also be possible to calculate changes in the categories of holdings, for all stocks and for individual stocks, and to estimate movements of cash from the changes in nominal amounts obtained from the registers. The improved breakdown of the registers will thus be a valuable aid to the Bank's statistical work on the distribution of the National Debt and the analysis of the financial transactions of the various sectors of the economy.

#### **Organisation of the Accountant's Department**

The increasing use of computers has led to a considerable reorganisation of the department. In 1963 custody of the registers was divided between five offices, each of which dealt with the whole process of transfer work for a certain number of stocks – from the receipt of the transfers to the issue of the new certificates. Now the department is organised on functional lines.<sup>7</sup> Thus, the Transfer Office examines all transfers lodged for registration, the Register

<sup>7</sup> See "The functions and organisation of the Bank of England" in the September 1966 *Bulletin*.

Office deals with the registration of probates and other legal documents, the Dividend Office is concerned with matters affecting the payment of dividends, the Certification Office deals with transfers lodged for certification, and so on. From June 1964 facilities have been provided for the certification of newly-acquired stock which has been re-sold before the Bank have been able to prepare a certificate for it. Provided one day has elapsed since the lodgment of the original transfer, the seller's broker may lodge a transfer for certification at New Change and normally collect it the same day, thereby speeding up delivery of the document to the market.

The Data Office punches the cards from which the files of magnetic tape are brought up to date. The processing of these cards is the task of the Computer Office, which is responsible for all computer production including new certificates, dividend documents and statistical analyses. It is the only office working on a shift basis – to make full and economic use of expensive equipment.

Another change following the introduction of computers has been the establishment of a Planning Section of about 30 people to investigate systems and write the necessary computer programs. There has been no direct recruitment of staff for the Planning Section or of computer operators or, until recently, of punch operators. Bank staff have been specially trained for this work.

Looked at in terms of productivity, the introduction of computers has already proved well worthwhile, even though the benefits have so far been felt very largely on the dividend preparation side of the work. In 1958, before any of these operations were performed by computer, there were just over 3 million accounts in the Bank's registers, and about 1.3 million alterations were made to those accounts during that year as a result of transfers, changes in alphabetical information, new issues, and so forth. The staff employed numbered just over 1,800. In 1967, though the number of accounts had dropped to a little over 2.6 million, there were rather more alterations (1.4 million),<sup>7</sup> partly because of the nationalisation of the steel companies. The number of staff employed full-time, however, was only 1,450 though some 200 women were employed additionally on a part-time basis.

There were, moreover, considerable changes in the composition and nature of the staff of the department during these ten years. As the large numbers of men recruited in the 1920's retired, they were replaced by staff with less experience – in many cases by women. In short, a staff 14% smaller was able in 1968 to handle much the same volume of work as the larger and more experienced staff ten years earlier. Even when the cost of the computers and their maintenance has been taken into account, the overall result has been well justified financially, besides providing the public with a better service.

The main benefits of the new register system have yet to be realised, because two systems (tape and loose-leaf ledger stocks) with different work processes and time schedules still operate side by side in the department. When all the stocks are on tape and the staff can settle

<sup>7</sup> Some statistical information for the year 1967 is shown at the end of this article.

down to working a single system, there will be further economies in manpower.

#### **The future**

Future developments in the methods of maintaining the stock registers are likely to be much influenced by what happens in other related fields. Data processing equipment is being increasingly used for the accounting operations arising from the purchase, sale and custody of securities, as well as their issue and redemption and the receipt and payment of dividends. There clearly needs to be discussion and co-operation between all those concerned if the most efficient use is to be made of the equipment becoming available. The London stock exchange is allocating to all securities an identifying code which it asks registrars to show on dividend warrants and certificates as an aid to processing by banks and others; these codes will be incorporated in the documents issued by the Bank. Banks, building societies and other large organisations have allocated numbers to their accounts so that their records can be processed by computer. It will certainly be of assistance to them if references can be quoted on dividend payments. This is already being done in the case of new dividend mandates in favour of many banks and the Bank intend to make this facility available more widely.

More generally, the Chairman of the Stock Exchange has set up a City Working Party, similar to that which devised the new transfer system, to examine the procedures involved in handling securities now that computers are coming into general use, and particularly to see what improvements are needed to take advantage of current developments in data processing. The Bank are represented on this Working Party, as also are the Stock Exchange, the Committee of London Clearing Bankers, the Issuing Houses Association, the Accepting Houses Committee, the Chartered Institute of Secretaries and the London Registrars' Group of the Corporation of Secretaries.

The next major step for the Accountant's Department may well be to put the computer 'on line', so that staff dealing, for example, with stock transfers or correspondence, can have immediate access to the information on the register files. But this is probably some years ahead. Detailed studies of its feasibility are unlikely until the recommendations of the City Working Party are known, and it is clear how these will fit in with developments in data processing equipment.

## Amounts of stock on the Bank of England registers as at 31st December 1967

£ millions (nominal)

<b>British Government</b>		19,960.7
<b>Guaranteed by the British Government<sup>a</sup></b>		
The Electricity Council	1,165.8	
The Gas Council	465.2	
North of Scotland Hydro-Electric Board	95.2	
South of Scotland Electricity Board	15.0	
British European Airways Corporation	16.0	
Nyasaland Government	1.6	
Sudan Government	1.5	
Tanganyika Government	0.5	1,760.8
		21,721.5
<b>Commonwealth etc.</b>		
Ceylon Government	3.2	
Government of Ireland	5.0	
Government of Malaysia	12.4	
New Zealand Government	139.5	
Government of Northern Rhodesia	12.4	
Government of Nyasaland	3.6	
Government of Southern Rhodesia	65.0	
Queensland Government	1.8	242.9
<b>Local authorities</b>		
Hull Corporation	10.4	
Liverpool Corporation	69.4	
Corporation of London	48.2	
Greater London Council	405.2	
Nottingham Corporation	2.3	
Swansea Corporation	8.9	544.4
<b>Public boards etc.</b>		
The Agricultural Mortgage Corporation Limited	86.2	
Metropolitan Water Board	34.7	120.9
<b>Miscellaneous (mainly Bank Stock<sup>b</sup>)</b>		14.6
		<u>22,644.3</u>

<sup>a</sup> On 1st January 1963 the stocks of the British Transport Commission became government stocks, full liability being assumed by H.M. Treasury under the Transport Act 1962.

As from 1st April 1965, the full liability for stocks of the British Overseas Airways Corporation (amounting to £52 million) was assumed by H.M. Treasury under the Air Corporations Act 1966.

<sup>b</sup> Held by a nominee of H.M. Treasury under the Bank of England Act 1946.

## Some items of work in 1967

Thousands

### Transfers

Transfers registered	758
Transfers not in order and returned for alteration	11

### Dividends

Warrants despatched by post	2,270
Payments direct to bankers	2,854
Dividend mandates received	153
Notifications by bankers of changes in branch to which dividends are to be paid	24
Replacement of lost income tax vouchers	24
Instructions received from the Inland Revenue for dividends to be paid without deduction of income tax and the cancellation of such instructions previously given – accounts affected	21

### Registration of death

Grants of probate etc. received	37
Certificates of death etc. received	16
Accounts affected	92

### Miscellaneous

Certificates issued	564 <sup>a</sup>
Indemnities and enquiries in respect of lost certificates	12
Powers of attorney received	2
Transactions under powers of attorney	11
Orders of Court etc. received	2
Notifications of change of address – accounts affected	100
Forms of request for amalgamation, designation and removal of names of deceased stockholders – accounts affected	32
Letters written by the Bank	95
Other outgoing mail	662

Number of accounts on registers 2,616

<sup>a</sup> Certificates are not issued in the case of transfers in favour of jobbers.