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The State of the Art—(a) Commercial Computers in Britain, June 1959

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Summary: The past year in the commercial computer field has been one of consolidation. It has been a time of getting down to the job. Gone are the days of "the expert," willing to talk to all and sundry about experiences which he has never had and there is now evidence that a great deal of useful work has been done. Firms in this country who have installed computers are now obtaining valuable information from their machines. It is necessary to emphasize this, because the business computer last year seemed to be very much in the doldrums. There were disquieting reports of unexpected difficulties from the United States and, at the same time, many of the people charged with getting a computer to work realized for the first time the size of the task confronting them, and this before achieving anything.

COMPUTERS ON ORDER AND DELIVERED

At the time of writing in June 1959, the very approximate total number of computers on order or delivered for commercial work is 109. This number has been analysed between computers using cards or paper tape, and those which have, in addition, got magnetic tape or film (see Table 1). Out of a total of 76 machines now delivered, 66 have arrived in the past two years. This alone means that the state of the art in this country has changed considerably since June 1957.

TABLE 1

COMPUTERS ORDERED AND DELIVERED FOR COMMERCIAL WORK IN THE BRITISH ISLES

	Cards or paper tape only	*With magnetic tapes or films*	*Total*
Approximate total of firm orders received by manufacturers to June 1959	67	42	109
Number delivered by			
June 1955	1	—	1
June 1956	2	—	2
June 1957	7	3	10
June 1958	30	12	42
June 1959	49	27	76

The total order position has, however, altered very little in the past year, and the most interesting speculation at the moment is what will happen when all the present orders have been met. According to the present delivery promises, there should only be one or two orders outstanding by June 1960. However, there is still a big potential market; according to the Board of Trade Census of Production for 1951, there were over 1,000 separate manufacturing establishments in this country employing more than 1,000 people. This figure covers only manufacturing, and does not include such fields as hire purchase, insurance, or banking. In fact, the sale of two quite large installations was announced within a few days of completing the above figures, one by Leo Computers Ltd. and the other by E.M.I. Electronics Ltd.

There are probably a number of reasons why people have been slow to place orders. The most obvious one is that they are waiting to see how successful the present installations will be. Almost every manufacturer is believed to be designing a new computer, and this also may be affecting the market at present.

However, a number of firms have decided to make their first step into the computer field by installing a punched-card system which includes an electronic calculator. An approximate estimate is that nearly 300 such calculators were on order or delivered in June 1959 and, at that time, over 100 of these had actually been delivered.

This method of approach has, in fact, a great deal to commend it in the right circumstances. Punched-card techniques have advanced considerably since the days when they were used only for sorting and tabulating, and this indeed was a fact which some of the present computer users did not fully realize.

There may be a number of jobs now being done on computers which could have been done equally efficiently and easily on a calculator and, at the same time, more cheaply. However, this is by no means always true, because to do an effective job can become a very clumsy and slow procedure using a small calculator, and many who have adopted this method of approach have had to limit the scope of the application, completing the remainder of the work by hand. To quote an example which is typical of many, punched cards were recently adopted by a firm of manufacturers for invoicing and stock control of finished goods in the warehouse. They found that they could not use the punched cards to relate sales to production to decide the order in which goods should be manufactured to replenish the warehouse. It was therefore decided to continue to do this part of the work by hand. They plan to buy a computer one day, but claim that the use of punched cards will give them an opportunity to learn to organize a central system.

Similar considerations in some cases have led to the purchase of small computers such as the I.C.T. 1200 series, where firms have claimed that they wish to obtain

experience in the use of computer techniques by first using a small machine.

In this connection there should also be a market in the future for the small computers such as the Ferranti Sirius, the Elliott 802, or the Stantec Zebra. The main difficulty here so far is that they have not been offered as part of a ready made data-processing system, such as a punched-card installation.

COMMERCIAL WORK ACHIEVED

With regard to the larger computers, the general comment is that, having regard to the level of work being tackled, the achievements, as against the tremendous effort involved, have often been disappointing. In some cases, firms have merely attempted the accounting work being done previously by clerks, and have taken it over virtually unchanged. Some of the applications planned do not use the facilities of the computer to the full, and, as stated earlier, might well have been done on smaller machines.

On the other hand, some of the larger installations have done very little useful work for several months after they had been installed. Writing in June 1959 one or two of these are still virtually unproductive, but with others, the planned work load is now gradually building up. However, it must be emphasized that this was not unexpected in some installations where takeover of work has been deliberately slow and the installation treated as part of a development programme.

Other installations, however, were expected to give clerical savings in a short period and have, in some cases, not succeeded in this. It is now becoming clearer that for routine accounting work, the cost of preparing programs and computer procedures, and of installing them, is far higher than many at first envisaged. There will seldom be the spectacular savings once expected—certainly not until fully integrated schemes have been installed, and this is still a long way off.

For accounting work, the advantages of a computer will, therefore, lie in providing simpler routines to administer and run. All the complex parts of the routine would be taken over by the computer. For example, considering payroll, the calculation of holiday pay and the accumulation of various deductions often cause a great deal of work and complication. With a computer, these can be dealt with quite automatically. At the same time, a smaller clerical force will probably be required when a computer is used, which is again an advantage, as clerks are still in very scarce supply. The cardinal point, therefore, is that while the costs of using a computer may be greater than the cost of the present procedures, there may still be advantages in going ahead. This has certainly been done quite deliberately in the past, when deciding to install punched cards.

ACTUAL WORK DONE

Of the types of work which have been tackled, payrolls are by far the most popular. Out of 109 computers on order or delivered, 52 installations have included payroll as one of the jobs to be covered. (See Table 2.) For very large wage schemes this has proved a most efficient job, although others have turned out to be more complex than originally expected. A payroll job has often been planned as a sort of aperitif, before going on to the main course, but sometimes the job has grown far larger than expected.

TABLE 2

COMPUTER INSTALLATIONS IN THE BRITISH ISLES FOR COMMERCIAL WORK

	Computers using		
	Cards or paper tape only	*With magnetic tapes or films*	*Total*
Approximate total of firm orders received by manufacturers to June 1959	67	42	109
Numbers of applications running or planned:			
Payroll	36	16	52
Stock control	16	18	34
Costs	21	6	27
Sales invoicing	8	9	17
Sales statistics	8	9	17
Production control	9	5	14
Hire purchase, insurance or government	10	5	15
Other	6	4	10

The next favourite has been stock control, with 34 firms tackling some form of stock accounting—particularly the stocks of finished goods and spares. Particular mention here should be made of the statistical methods of sales forecasting, and the forecasting of future stock requirements. Work here has been done by a large number of people, including Mr. A. Muir of Bibby's (Muir, 1958) and also The Ford Motor Company Ltd., who are using similar techniques to forecast the sale of spares.

Seventeen firms are planning to use a computer for invoicing, and here there is a large variation in the suitability of the job for a computer. For the large job, where the discount calculations are complex, this may be the only possible method. For example, the Imperial Tobacco Company's application at Bristol (Wright, 1959). At the other extreme, where invoicing merely consists of a calculation of quantity times a price and summarizing to give totals, the computer may become a comparatively inefficient and expensive printer.

Only 14 firms have so far planned to undertake production control, which is disappointing. It is probably in this field more than any other that computers will be most effective, for here they should be able to do work which could not be done in the time by any other means. This should in theory be the corner stone of an integrated data-processing job, for, once the information is on the computer, such jobs as payroll and invoicing would appear as by-products. However, the execution is very much more difficult than its discussion, and it is known

that many people are thinking of the problems, or using calculators, before committing themselves to using large-scale machines. In the production-control field, the excellent work that I.C.T. Ltd. have done at their Letchworth factories is mentioned elsewhere (Bryen, 1959).

DIFFICULTIES

There are a number of general difficulties which it is worth mentioning separately, since they have been experienced by the pioneers, and it should be possible to avoid them in the future.

Firstly, the employment of insufficient staff. Some firms, having installed a computer, have found that the clerical work consists of a large variety of small jobs inherent in the nature of the business. As a result they have required a larger programming effort than at first envisaged. This experience can be contrasted with firms carrying on market-research work, or hire-purchase accounting, where there is a very large volume of repetitive work, and computers are being used very effectively with far less effort.

Coupled with the shortage of staff, insufficient time has been allowed sometimes to re-think jobs before the computer arrives. This is partly the reason why some jobs have been adopted with little change and, in one or two cases, programming has become an emergency measure to get work on the computer at all costs. Often the time necessary to get agreement on some items has been greatly underestimated and, as an example, one firm has quite reasonably taken over a year to adopt a logical numbering system to cover engineering parts, and this before they could consider any detailed plans to use a computer.

Another point which should be mentioned is staff organization. At the start, the general view was that the methods people and programmers, each experienced in their own field, would work together as equal partners, the programmer being responsible for the general layout of the job on the computer. Most people have, indeed, found this to be the most effective way, but there has sometimes been a wide divergence from this. The choice of poor or inexperienced programmers has, in some cases, delayed the installation considerably, and even now this is not sufficiently realized—even by the firms themselves. This, of course, does not include the particularly long time which has usually been taken on a first job, when both methods personnel and programmers are in effect being trained in the new techniques, and where the same job being done now would be completed in a fraction of the time.

One industrial organization has adopted the policy of promoting their methods staff only from programmers. This seems to underestimate the skill and experience required on the methods side, and indeed the computer routines designed have perhaps not been as effective as they could be. Another firm appointed quite senior men to work on the methods side with young graduate programmers. It was not realized that the programmers, as a result, would be very much in the junior position, and this again has not been very effective. The methods people have designed the detailed computer flow charts resulting in rather cumbersome and slow programs.

HIRE-TIME FACILITIES

A surprising fact is that so little use has been made so far of hire-time facilities on computers for commercial work. Leo Computers Ltd. have probably done more than others, particularly in the field of payroll. Hiring computer time, in fact, seems to be a very sensible method of trying out theories and gaining experience with computers before embarking on the ordering and installation of an expensive machine. This, indeed, was done by most firms buying a computer for scientific work. However, very few firms have tried to hire time for commercial accounting work, even some of those known to be on the brink of ordering a machine at present. The problem of hiring time and obtaining the necessary skilled advice has been discussed at greater length by Mr. F. C. de Paula (de Paula, 1959).

There has not been a very great demand either from the smaller firms who are unlikely ever to justify their own big computer. There are exceptions to this, for example Mr. Baggett of Job White & Sons Ltd. (Baggett, 1958), who has used an English Electric Deuce for production control. There are other cases, and it is notable that in most of these the people who are interested in the project are directors or senior managers.

This leads up to the last point. In so many firms there is still a large gap between the ideas of senior management and what the computer people are trying to do. Managers and directors will need years to understand and accept the information, to really trust it, and use it for day-to-day control. On the other hand, there is a great lack of people with both sufficient training and experience to recognize what managers really need.

It will take five or ten years, or even longer, before computers fulfil our early hopes, and are really being used as management tools, rather than merely advanced accounting machines—effective as they are in this latter role.

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