

Vol. 4 No. 7

1. LEAPS Article - Page 1027
MARCH, 1959
2. Analogue Computer - Page 1023



Automation

AND AUTOMATIC EQUIPMENT NEWS

INCORPORATING AUTOMATION AGE

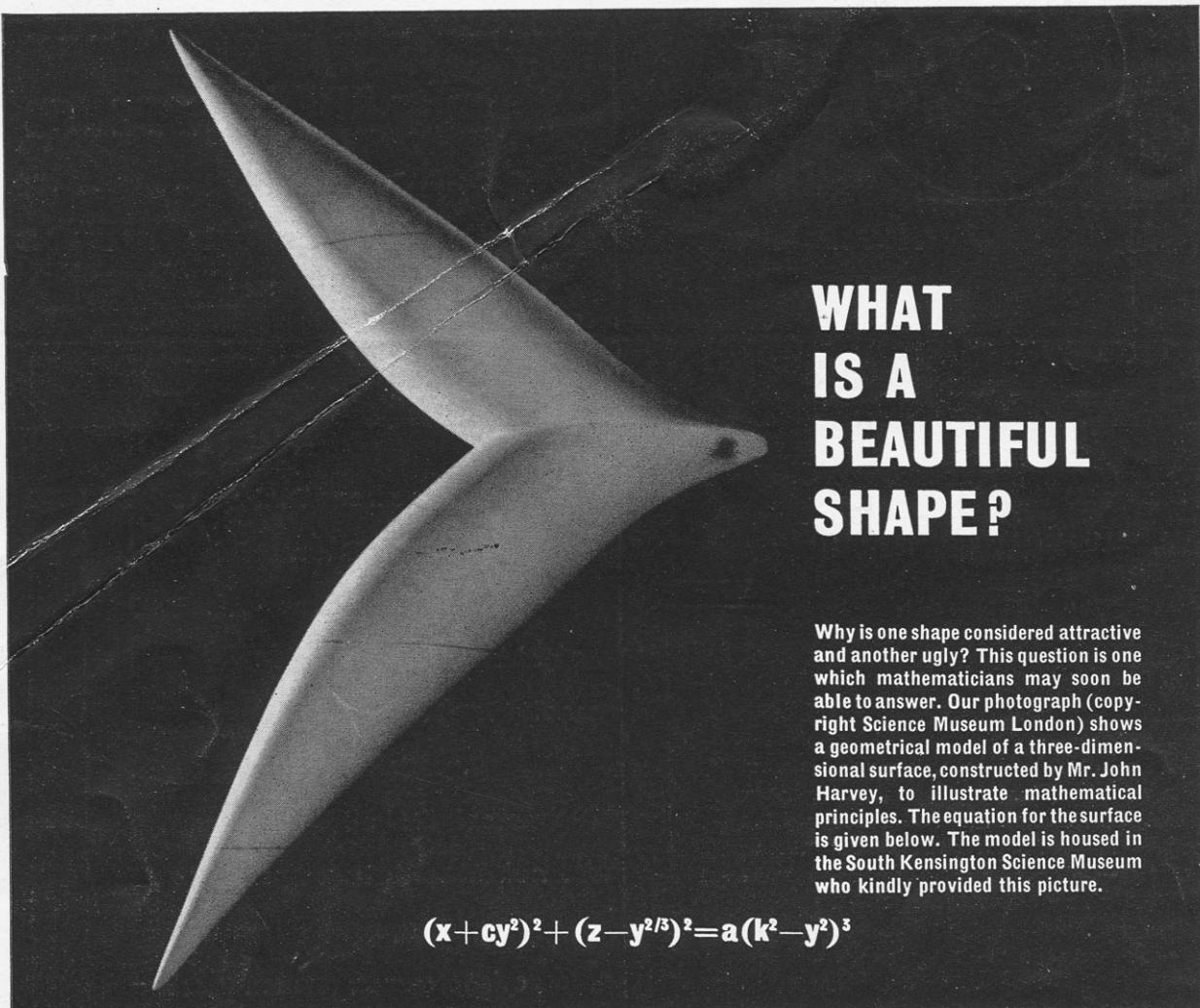


Britain's Need for
Automation becomes
Urgent

Xerography and the
Xeronic

The Analogue Computer

G.P.O. LEAPS



WHAT IS A BEAUTIFUL SHAPE?

Why is one shape considered attractive and another ugly? This question is one which mathematicians may soon be able to answer. Our photograph (copyright Science Museum London) shows a geometrical model of a three-dimensional surface, constructed by Mr. John Harvey, to illustrate mathematical principles. The equation for the surface is given below. The model is housed in the South Kensington Science Museum who kindly provided this picture.

$$(x+cy^2)^2 + (z-y^{2/3})^2 = a(k^2-y^2)^3$$



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Activity in Gresham Street, off St. Martin's-le-Grand. A Sunday, no doubt. Traffic conditions on a weekday would have interfered. One of the units being cradled for hoisting to the third floor.

G.P.O. LEAPS

by Derek Whipp

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The largest centralised computer payroll system in the world will begin to operate at the General Post Office Headquarters this spring.

In terms of immediate public benefit this means little because the LEAPS Project—the name derives from the initials of the words London Electronic Agency for Pay and Statistics—is designed to control the payroll and accounting for no fewer than 112,000 employees in London and to produce subsidiary statistics which might otherwise surface only after colossal clerical effort; but in terms of greater internal efficiency the advantages will be incalculable. Even those directly concerned find it difficult to predict the total benefits.

Occasional news items in the national and trade Press have referred briefly to the LEAPS Project. The full story behind the vast amount of planning and work which has been going on since 1955, not only by the Engineering and Organisation and Methods Departments but also among those responsible for management/employment liaison, has still to be told.

One National-Elliott 405 arrived at St. Martin's-le-Grand, London, in December; another will follow soon; a LEAPS Standing Joint Committee was set up more

than twelve months ago to keep the staff side and the official side—to use Civil Service parlance—acquainted with developments; and courses have been running since May, attended jointly by executives of the Post Office administration and of trade unions so that every aspect of the new system might be discussed as fully and as helpfully as possible.

Rather audaciously the writer of these words, hearing about the courses, asked if he might attend one to watch the G.P.O. internal administration operating. He was agreeably surprised when the request was favourably received, and at the end of the third day one forceful impression remained in his mind: that in the matter of big thinking and absolute thoroughness it must be difficult to find a parallel with the British Post Office.

Happy Management/Staff Relations

Automation and Automatic Equipment News for last July mentioned briefly the happy management/staff relations at the G.P.O., and an observer's seat at the last of these three-day courses only tended to show how inadequately this view had been expressed then.

To a non-Civil Servant—or rather, to one who is not Civil Servant—by far the most impressive feature was the genuine urge by both sides to understand operational, administrative, staff, demarcation and many more problems and misgivings which the adoption of A.D.P. might seem to precipitate.

Almost as significant was the presence in the same room, for the identical purpose of getting to know something about LEAPS of Mr. C. R. Smith, recently-appointed head of the Central Organisation and Methods Branch (C.O.M.B.) of the G.P.O., and Mr. Ron Smith, General Secretary of the Union of Post Office Workers, the giant among P.O. unions. With them were a balanced representation from the L.P.R., A.G.D., P.D./T.W.B., P.D./A.B., E.O.D./E.B.C.A. and M.B.D./C.O.M.B. on the official side, and S.C.S., U.P.W. and C.S.C.A. on the staff side. Three delegates from the P.O.E.U. could not attend because of other commitments, but a telephone inquiry after the course ended made it clear that they were disappointed and confirmed that their organisation was as happy about liaison as those who attended.

All these initials may sound frightening, but when broken down into London Postal Region, Accountant-General's Department, Personnel Department/Training and Welfare Branch, Personnel Department/Appointments Branch, Establishment and Organisation Department/Establishments Branch Clerical and Allied, and Mechanisation and Building/Central Organisation and Methods Branch, (phew !) it is not long before shots at the remainder produce such interpretations as Society of Civil Servants, Union of Post Office Workers, Civil Service Clerical Association, and Post Office Engineering Union.

In any case, initials may confuse even newcomers to LEAPS, as Mr. N. O. Johnson, Head of A.D.P./C.O.M.B., pointed out in his introduction, when he said he told a previous audience of the wealth of jargon used and advised them to interrupt if there was any of it they did not understand. When he sat down a staff representative asked in a stage whisper : "What's A.D.P.?"

Mr. Johnson thought his hearers shared the view expressed by government ministers who had stressed that the human problems of A.D.P. were as important as the technical.

"Staff and official sides of the Post Office," he mentioned, "have good reason to be proud of the pattern of co-operation they have developed. The friendly spirit that makes it seem natural for us to meet together to learn about A.D.P. may well set an example for others to follow. If it does, it won't be the first time the Post Office have blazed a new trail."

A computer was built by Post Office engineers at Dollis Hill shortly after the war. It is still in use at a Ministry of Supply research establishment, he said.

Apprehension had been created by the popular Press and glossy magazines about redundancy, but this seemed needless. "There was probably much more cause for

alarm thirty years ago when the automation of the telephone service was begun," he continued. "It is a fact that telephone operating can be mechanised to a much greater degree than office work" (an obvious reference to Subscriber Trunk Dialling which will be commonplace in most large towns before long) "but it is history that there are more telephonists now than in the 'twenties.

"There has been a facetious suggestion that if we had retained a wholly manual telephone service, by 1970 one school-leaver in three would have become a telephonist. May I add that without office mechanisation the other two might have become clerks."

If our expanding economy was to double our standard of living within 25 years, as had been prophesied, it could be done only by relieving human beings of what is humdrum in their work and applying their God-given powers of intellect to greater advantage. Computers have helped to eliminate drudgery in office work in the U.S. and have created more interesting and rewarding jobs.

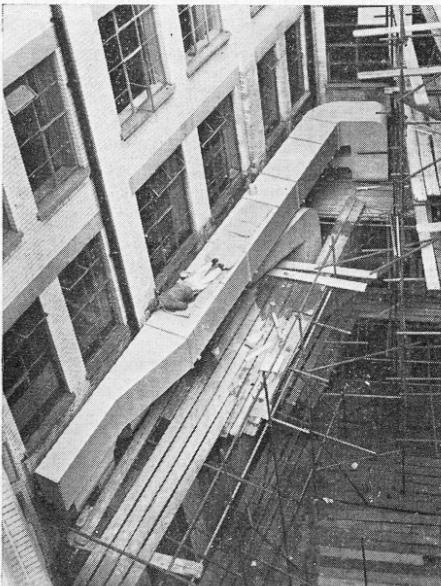
The official side hoped by later courses at local offices to spread understanding of computers and their application to office processes. "We shall need the goodwill of the staff to make this development successful," Mr. Johnson concluded. "Co-operation and goodwill can only arise through a proper appreciation of the many problems associated with the development of A.D.P., and we regard these courses as a useful first step along the road."

From this and from what was said subsequently, it is patent that Post Office administrators are acutely conscious of "humanics"—to coin a word.

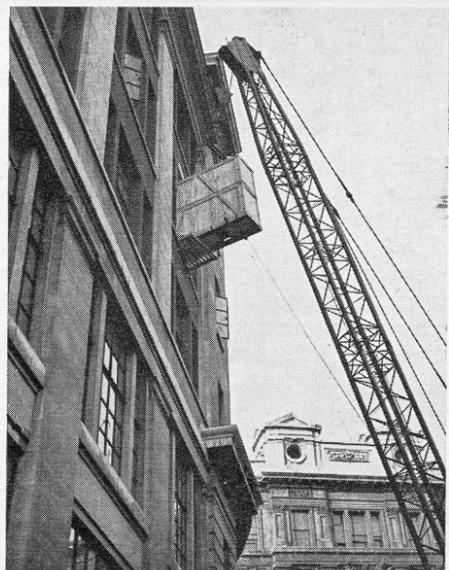
As for the capacity to absorb the new technique, it was equally clear that few industrial organisations are so completely equipped as the G.P.O. with its wealth of engineering brainpower and mountainous volumes of paper work performed daily to absorb A.D.P. without any serious indigestion. As for promotion prospects—and that is one point which is watched as keenly by one side as by the other—these are likely to be even greater than before.

Historical Sketch

An historical sketch of computers leading to present-day electronic productions was given by Mr. F. J. M. Laver, of the Engineer-in-Chief's Department. He surprised some of his listeners with the information that as long ago as 3400 B.C. Babylonians were counting in tens and twelves, and later in the convenient sixty, which was a multiple of both. Coming to modern times, Mr. Laver showed how data stored on magnetic film could be fed with newer data into the computer to produce current information for immediate action and for subsequent use. Though obviously possessing a most comprehensive knowledge of his subject, he presented what technical facts were required with impressive clarity.



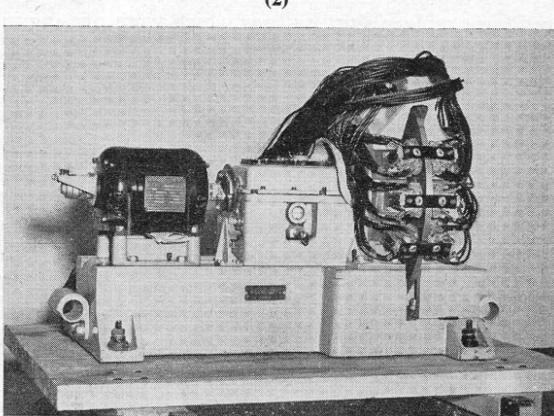
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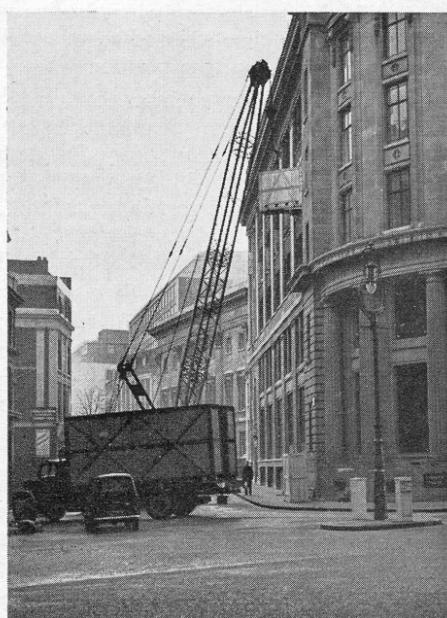
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(4), and below (5)



(2)



He mentioned that the main storage facility of the National-Elliott 405 equipment was conventional 35 mm. film coated with magnetisable spots and having a storage capacity of 300,000 "words" per reel of 10 in. diameter. Fast access was provided by the magnetic disc, sometimes referred to as the machine's "memory", and during the actual operation a series of nickel delay stores were used for immediate access.

Mr. Laver's survey of computers generally and of the 405 was followed by a talk with slide illustrations presented by Mr. Barry Davis, of the National Cash Register Co., Ltd., showing a typical installation. The slides were accompanied by a spoken commentary by Mr. Frank Phillips, the broadcaster, who admitted after the recording that the script was one of the most difficult he had ever had to deliver.

Mr. C. B. Davis, of C.O.M.B., dealt at greater length with the computer's "memory" and drew an analogy with the human memory. The conscious memory was like a temporary working store in the computer—a bank of nickel delay lines. The less conscious memory was the intermediate store—in the 405, a magnetic disc. Lastly, the film or reference store he compared with a reference library where the human mind could seek knowledge and where information was limited only by the amount of film used or the number of books consulted.

Reliability

During a general discussion, Mr. Ron Smith, the U.P.W. General Secretary, raised the matter of reliability. He quoted lecturers' phrases : "Substantially free from error," "Serving very well," and "The delay was small and stoppages few." Thinking of his members, he asked : "Is this satisfactory when dealing with payroll ? There may be a time when somebody will go without his pay. What is the true position ?"

Mr. Laver, answering as an engineer, said that the machine was reliable although there might be an occasional—a very occasional—error. For a few months the computer would run parallel with the manual system to iron out such possibilities as errors in payment. Mr. A. H. Martin Smith, of T.W.B., observed that the standing joint committee was concerned with studying P.O. requirements and to look for such points.

Mr. Laver added that the P.O. had bought two medium computers in preference to one large machine to overcome the problematical difficulties Mr. Ron Smith had posed. Two 405s would do as much as could be foreseen to handle such a situation. If the power or the computer failed a short section of work would be done again, and all the data lost would be regenerated from that stored on magnetic tape. "If you have a fault lasting thirty minutes then you have to go back. It is convenient to have two machines to do the work. If one went we could get by on the other by multi-shift working."

"Is there the possibility of this machine breaking down or not being accurate ?" asked Mr. Ron Smith, thinking in terms of probable underpayment of overtime.

"There is still the possibility of direct personal contact," replied Mr. Laver. "The man handing over the pay packet is still there to be approached." But he believed the standard of accuracy would be at least as high as at present.

Opening the second day with a talk on the wider applications of A.D.P., Mr. R. J. Boggis, of C.O.M.B., emphasised the value of the variety of data available on a computer system : the production of exceptions reports, for example, which was known nowadays as Management by Exception. Computers minimised the human handling of documents in and out and also made the most of data.

Illustrating the way punched holes in cards could provide data for later analysis, he showed a garment tag attached by manufacturers at the factory and removed at the time of sale. This contained all the information required by the accounts section and minimised clerical work at the point of sale.

A firm of multiple chemists are working on these lines with their cash register rolls. The Solartron Electronic Reading Automaton illustrated the case of a machine taking over a clerical task. At the moment it could read only certain kinds of typeface, but these methods have one snag—the problem of verification.

The incorporation of punched card and scanning techniques dispenses with the volume of paper work.

Mr. Boggis showed how maximum use could be made of data. "Having got the data from the card and with it the amount of money which changed hands," said the lecturer, "you then have enough information in coded form from which you work out quite a lot of things : the salesman's current commission, stock control information, departmental accounts, and much more." But computers were expensive and there were advantages in centralisation and standardisation. The computer worked as an agency—like a laundry taking in washing, processing it and sending it back regularly on time. But it could not replace shirt buttons which were missing in the first place.

Early Problems

Mr. Boggis told of the problems they met during early researches into the project. Originally the systems analysts made a flow chart but the snag was that they were telling the programmer how to write his programme and the sequence of events was not the best. Consequently, the flow chart was dropped and a detailed statement of the requirements was prepared, recording what the programme had to do. "We are now tending to draw charts after the programme has been written," Mr. Boggis concluded.

Discussion time prompted Mr. Ron Smith to refer to the laundry analogy. Though shirts did sometimes go to the laundry without buttons, he thought that more often the buttons were separated during the laundry process. The same thing might happen with a computer handling pay. If a man's overtime got lost in the wash, he would have a very real grievance.

Mr. Boggis replied that the system would be organised so that if some important information was there but could not be handled due to equipment fault, then that fact was brought out as an exception and those particulars would be treated manually.

From the official-side front bench, Mr. C. R. Smith, newly-appointed head of C.O.M.B., offered this suggestion :

"Our friends on the other side are naturally concerned with shortcomings. In an office you rely on some kind of self-checking routine, such as cross-totals. The machine is continually making out what in the manual example is a sort of cross total. We haven't heard much about that but it might relieve our friends' minds."

"All the time you are doing calculations you are doing cross addition," Mr. Boggis agreed. "You are checking for parity. You will hear more about that this afternoon with programming. Practically every time information is read it is checked."

Mr. G. H. Jamieson, of the Civil Service Clerical Association, wondered whether there was any likelihood of the mark sensing machines misreading the cards; whether there was sufficient tolerance to allow for the variations in pencil marks made by the operator. He was reassured by Mr. Boggis that little difficulty had been met there and tolerance was pretty wide. All reading from and writing to magnetic film was fully checked.

Mr. F. G. Phillips, of C.O.M.B., filled in many details required by the staff side. It was the first major computer project in the G.P.O. or the Civil Service, he said, and was designed to compute pay and prepare payroll documents for all P.O. staffs in the London area—about 112,000. These staffs are in the inner area of the London Postal Region and in the London Telephone Region and Headquarters Departments.

"When the system is fully in operation," he forecast, "it will be the largest centralised computer payroll system in the world and one of which we hope the Post Office can be justly proud."

The computers would be maintained by P.O. engineering staff. Delivery of the first 405 was expected in December 1958 and with the ancillary equipment and allowing a period for installation and testing it was hoped to be ready for service around March or April, 1959. Transference of L.P.R. offices would be done over a period of 18 months during 1959-60, followed gradually by others out of the 42 offices in London, and altogether it would take about three years to complete.

"The cost of the project is about half a million pounds," said Mr. Phillips. "This includes about £300,000 for equipment and the remainder is for accom-



Preparing input data in the temporary punch room

modation, planning and staff training. This is a very high rate for one project but it is equivalent to no more than the present annual expenditure on the manual payroll system in London.

"LEAPS ought to have money and manpower on what is essentially a housekeeping task."

The present pay system comprised three broad divisions of work : (1) examination of a whole mass of data which goes to vary the basic pay of individuals—overtime, tax, sickness, holidays and other things ; (2) calculation of net pay, preparation of payroll and a balancing operation designed to trace and eliminate errors ; and (3) the collection and disbursement of credits.

"The timetable is fairly tight. All staffs have to be paid on a Friday. Allowing a day for the first item and a day at the end of the week to collect and distribute cash, only two or three days are available to pay clerks to compute pay and prepare all the necessary documents.

"LEAPS will accept information from local offices. This information which will be on handwritten documents has to be converted into machine language—paper tape—from which the computer will compute the gross and net pay for individuals and prepare variable summaries and totals of items of information on payroll. Pay advices, postal drafts and pay statistics will be printed and simultaneously pay records will be kept up to date.

"It may be thought," remarked Mr. Phillips, "that the timetable on the computer system will be much easier than on the present manual system. In the field of computing and printing, the LEAPS system is the equal of several hundred clerks but it is necessary to convert the original information into punched paper tape. This is a job which is not done now so that the time saved in computing and printing is roughly eaten up by the time spent in converting the data into machine language form.

"It was decided in 1955 to proceed with this project and a survey was prepared setting out the requirements

of the P.O. computer payroll system and was sent to 14 manufacturers calling for tenders. These were received in the middle of 1956 and comprised the manufacturers' idea of what sort of system we should have and not merely the machine they were trying to sell us, together with a technical description. After adjudication it was considered that the 405 was the most advanced and most suitable for the job.

"The order was placed in July, 1957. About this time, too, a joint C.O.M.B./A.G.D. planning team was set up comprising 14 people to plan and programme the LEAPS job. The team was given a period of intensive training and planning work commenced last January. It was estimated that some 50 man years would be needed to complete the whole job."

Series of Courses

Mr. Phillips continued with much information about the standardisation of forms and procedures, and there was no doubt that the greater the number of people served by an electronically computed system the more exacting it became for those concerned with its planning.

"Training and Welfare Branch have arranged a series of courses," Mr. Phillips said, "and the first of the series commenced last May and this course is the last of that series. They will continue in a shorter form for the next two years, and altogether a thousand managers, staff and staff representatives will attend them. These courses are important in helping to remove misconceptions and exaggerated ideas which tended to be created by ill-informed Press articles on automation. They help specialists to transmit some of their enthusiasm, stimulate a sense of corporate responsibility, and help to prepare people's minds for changes in payroll practice and persuade them of the desirability of such changes."

A period of parallel running of computer and manual systems would be arranged in advance of the transfer to the new system of the first office. Every error found would be traced to its source and only when the Department were satisfied that the bugs were out of the LEAPS system would the changeover be effected. There would be no question of any whitewashing.

"To facilitate the change L.P.R. are being asked to recruit a special implementation team—we have called it a task force. They will be given a course of training and will visit each office in turn. This will enable local office staffs to be released for training, and assist them in gaining proficiency after their period of training is over and they start to take up the job. Staffing arrangements will be worked out office by office to decide what reductions of establishment should be made when LEAPS takes over.

"These proposals are being fully discussed with the staff side. Reductions of staff will occur through normal wastage and we have already had consultations with U.P.W. and A.C.O. on this matter. We have done our best to keep them informed of the planning of LEAPS

Almost all staff associations are affected and a standing joint committee was formed last December to act as a committee for discussion.

"The staff have visited accommodation at Armour House and have commented on layout and decor schemes. They have also been asked for recommendations on training and we are now discussing with them proposals for rearranging duties and arrangements for redeployment of displaced staffs. The exchanges on the standing joint committee have been extremely friendly and much good work has been done by it and we hope that very soon discussions can begin at the local offices level with the staffs.

"Many inquiries have been made about the project from this country and abroad and we can expect many more."

Mr. C. C. Baillie, of the Society of Civil Servants, thought it might have been better to have started with salaries instead of wages since the former tended less to variability—no overtime, or very little—and "if you had begun with salaries you could have got over the initial difficulties present in any new system."

"Salaries are not such a problem as weekly-paid staffs," replied Mr. Phillips. "A computer prefers to be kept turning over. They are gluttons for work and to make sure they do work hard we shall give them the bigger job first."

Members of the course were shown a standard 405 in operation during the afternoon by Mr. J. E. Cookson, of National Cash Register Co., Ltd. They saw a small payroll job put in and printed out and then 2,048 random numbers sorted into progressive sequence.

Lecture on Programming

Then followed a lecture on programming by Mr. J. L. Howells, of C.O.M.B. Having emphasised that the computer was incapable of thinking, he described the programmer's job as telling it everything it had to do and giving each section its appropriate instruction. The LEAPS payroll job takes about fifteen thousand instructions and it was progressing very well, though there was still much to be done.

The course participants learned a great deal about the preliminaries of programming through Mr. Howell's lucid explanation, and were taken through the coding of instructions for copying, adding, exchanging, subtracting, transferring and testing. The basic form is common to programming generally and does not concern LEAPS individually, so to dwell on the subject here is unnecessary.

Hearing about the length of time it takes to plan the programme, Mr. Jamieson, C.S.C.A., asked "Isn't the manual system much easier?"

"I agree," conceded Mr. Howells, "that programming involves a lot of work. But once this has been done, the computer can do the actual job at electronic speed." Similarly, to another questioner he said that once the

programme had been written it would be relatively easy to modify it to meet changing conditions.

On the third morning, Mr. W. S. Ryan, C.O.M.B., indicated future computer possibilities in the P.O. and emphasised that though it was not a comprehensive survey and was concerned with only some of the cases C.O.M.B had explored, a wide field was nevertheless covered.

Eight or nine years could pass between the inception of the idea for a computer project and complete realisation. The project broke down into three stages : preliminary appraisal (commonly referred to as Pathfinding or less politely as "Star-gazing") ; a Feasibility Study ; and a Project Team. These stages might take respectively three man-months, three man-years and 57-70 man-years.

Arithmetic

The essential fact about a computer is that it can do arithmetic rapidly and accurately. The complexity of the process was not important so long as each detail was covered by clearly defined rules. Much P.O. clerical work came into that category.

The Stock Branches which maintain the registers and records of certain government stocks and bonds carry out a great deal of essential checking. An A.D.P. system might be expected to reduce the amount of checking, by using a punched card, prepared early in the passage of a transaction through the Stock Branches, for the preparation and maintenance of all records. The main records would be set up and processed on a computer which would look after all accounting processes, including the issue of dividends, with a very high standard of accuracy. The Stock Branches are located at Harrogate and, said Mr. Ryan, it was tempting to give the system (quite unofficially) the name H.O.R.A.C.E.—the Harrogate Office for Registering, Accounting and Calculating Electronically. Finding names sometimes led to complications. At an early stage in the LEAPS Project an attempt was made to combine part of "Post Office" with "Computer"—and somebody landed up with "COMPOST".

The Pensions Branch pays some 65,000 P.O. pensioners. LEAPS was at the project team stage. Pensions data is similar to pay data and the LEAPS team would have done much of the ground work necessary to put pensioners' work on a computer.

Clerical work frequently involves reference on a random basis to large files or records. Special computers have been designed for this work. The P.O. could apply these in two directions at least : (1) for registered telegraphic addresses, where the computer could refer to all the instructions while the telegram was still coming in ; and (2) for Premium Savings Bonds monthly draws, where there are some 20 million documents to refer to, many of them ineligible for prizes. In this case, eligibility could be declared almost immediately.

In the statistical field, it seemed that computers could prepare staff records as a by-product of pay work, mail analyses, telephone line costing and performance, telephone and telegraph statistics and broadcast receiving licence statistics.

A feasibility study recently concluded for Savings Certificates repayments had drawn attention to the need for reconciling documents automatically. "We have been attracted by the possibility of identifying a document automatically by the use of coded marks or character recognition," said Mr. Ryan. "We are already using mark recognition at Canterbury and Edinburgh in connection with the preparation of telephone tickets. The telephone operator makes pencil marks indicating the number of the calling subscriber on the ticket. The ticket goes into a mark-scanning machine which converts the marks to standard punched card holes."

The P.O. sorts about 100 million encashed postal orders a year, and there are inquiries concerning about one in a thousand. Existing machines require that each postal order passes several times through the equipment. "We think magnetic ink may be useful here," Mr. Ryan declared. "Postal order numbers could be printed in magnetic ink and, after encashment, they would go through the reading machine only once. A record would be made on magnetic tape which could be processed in a computer to sort the data into postal order number order. This is a good illustration of the technique of sorting data, not paper."

Developments in the Savings Bank are also promised. There are 40 million accounts and roughly one hundred million transactions a year, and all the accounts are kept centrally, with a tremendous amount of sorting work necessary.

"It would be possible," Mr. Ryan told his audience, "to install a computer in the Bank to take over the central accounting processes without affecting the present counter processes or documentation. We believe we could improve this basic scheme by the use of embossed plastic plates. One of these would be issued to each account holder and would show his account number and name (possibly also his address) in arabic with the account number also in code mark form. Such plates would be used at P.O. counters to produce accurate documents with the essential data in code form. The documents could be used to feed data into a central computer. We think this technique has very wide possibilities."

Mr. E. C. Villis, C.S.C.A., thought that costs would be increased enormously without increasing service to the public.

Mr. Ryan replied that it would save counter clerks time and effort. Transactions would be speeded up and the service to the public thereby improved. He had no hesitation in saying that.

Mr. Jamieson, C.S.C.A., thought the machine would have to prove its worth. They would be sold on the idea that automation was a good idea if it improved the service to customers—in this case the staff. The

machine had to prove itself and it could do so only by showing itself superior to the present system.

Mr. Phillips, C.O.M.B., returned to talk further about the overall project. The staff side naturally wondered "What is in this for us?" By way of answer, he said:

"I think we are only on the fringe of computer working, and it would be a bit premature for me to say very much about this. We are conscious of the need for giving some benefit to the staff in return for the contribution they are making in order to cut down the costs of what is essentially a domestic job. The staff will be able to be given a much better pay advice and there may be other savings about which I am not qualified to speak at the moment but which I am sure will emerge as planning for the job progresses."

Introducing A.D.P. into Government Departments

Mr. G. H. S. Jordan, of the O. and M. Division of the Treasury, concluded the lectures with a general review of the progress in introducing A.D.P. into government departments. There were in existence, he said, six installations in government service. (Readers of this magazine will be aware of these installations through the Pedder Survey, which appears at regular intervals.) All these systems, however, were based on simple computers forming part of large punched card installations and the Service had no practical experience yet of office automation on a large scale. This would begin to come when the LEAPS Project ushered in a new stage. In this stage, after LEAPS, Ministry of Pensions and National Insurance would acquire a LEO system for payroll, statistics and other more complicated applications and, on an even bigger scale, the Royal Army Pay Corps would be installing an American designed computer which would maintain on magnetic tape detailed records of soldiers' pay. Some idea of the difference between a large system of this sort and the smaller systems installed at present could be gained from the price differential—about three-quarters of a million pounds, as against forty thousand or so. Other applications would be in the Ministry of Agriculture, Fisheries and Food, Ministry of Labour and National Service, Air Ministry and the Royal Army Ordnance Corps.

The bigger system would bring bigger problems in their train. Mr. Jordan mentioned a particular problem that was much in mind at the present time: that of ensuring full use of these expensive machines. It would obviously be wrong to leave them lying idle for three-quarters of each week, and shift working would therefore be necessary. The number of staff required to work shifts would, however, be very small, probably not more than six to eight people on each shift. Never-

theless, even if few people were concerned, it was important that staffing difficulties should be resolved sympathetically and some discussions had already taken place.

A related problem was to provide sufficient work to keep the machines in operation around the clock. The Post Office could undoubtedly find more than enough work for the largest installation which could be envisaged at present, but this might not be so in smaller departments. Inter-departmental sharing of installations would, therefore, certainly be necessary and it was interesting to note that one of the machines already installed was undertaking payroll work for both Ministry of Supply and National Assistance Board. There would be further examples in the future of sharing arrangements of this sort.

"What benefits do we expect to get from all this activity in introducing A.D.P.?" Mr. Jordan asked. The most obvious benefit, he thought, was the expectation of saving money and, incidentally, easing recruiting problems, by a reduction of staff numbers. Although this was in many cases an important object, however, it was probable that even greater benefits would result from the greater efficiency which A.D.P. would bring about in many areas of government work: in stores work, for example, it was hoped that A.D.P. would facilitate more efficient distribution of smaller stocks with consequent substantial economies in capital investment in stocks lying idle on storehouse shelves.

In conclusion, Mr. Jordan said that it would be wrong to think that A.D.P. could be applied only to the somewhat mundane work of pay calculation and similar straightforward accounting jobs. He was sure that the future would see A.D.P. being increasingly applied to more complex work which had not been susceptible to earlier forms of mechanisation and he mentioned a number of departments that were actively studying longer term possibilities of this nature.

During discussion, Mr. Ron Smith, U.P.W., asked in connection with shift working: "Are we going to be conditioned by the demands of the machine?"

Mr. N. O. Johnson, C.O.M.B., thought the LEAPS Payroll job might involve asking a few people to come in early, say on Mondays—at 8 instead of 9.

Mr. Jordan added: "Nothing will be done without the fullest consultation. All these problems are going to be discussed and agreed so that things can be settled to the satisfaction of everybody."

Selling Automation

Later Mr. Baillie, S.C.S., said, "The Department has to sell automation to the staff and the staff side has to answer members who ask 'what is in it for me?' I haven't heard much about the selling point for our members. Is there something that we can hold out and say 'This is of benefit to the staff?'"

Mr. Johnson: "This is an important point. When tariffs were increased last time in the Telephone Service there was a very large number of cancellations. The rate of increase was very seriously arrested. More recently, demand has begun to rise again. The staff side want regular increases in pay but these can be granted only by increasing tariffs. We have seen in I think at least one of the nationalised industries—the Coal Board—the effect of constantly increasing prices. Anything that saves the P.O. money makes it easier to find the money to meet demands for extra pay."

"Is there any saving?" asked Mr. Villis, of the C.S.C.A. "I have not been convinced. There may be small monthly savings and staff savings. We still haven't had any proof in any form."

Mr. Johnson replied "We hope to make moderate saving. The exact figure is difficult to decide. We believe it is about £70,000 a year . . . that is on pay only. At the moment I think we are looking at the picture where we are using the equipment for part of the time on a job that for the moment will do little better than break even."

Discussion continued for a considerable time with trade union executives anxious to safeguard the interests of their members and to ensure that the G.P.O. executives were made aware of the way employees were reacting. The official side, for their part, were as frank as facts allowed them to be and at times admitted with equal frankness when the answers sought were just not available because of the originality of the question.

The course was an object lesson in democracy at work; and it was obvious to the observer that there is not the slightest intention of introducing the new system without first gaining the complete confidence of those people who are to be directly affected.

ELECTRONICS—the key to Automation

"Electronics—the Key to Automation" will be the theme of the Electrical Development Association's exhibit at the Electrical Engineers' Exhibition at Earls Court from March 17—21.

The exhibit will mainly illustrate the advantages to industry arising from the greater use of electronic control, and the introduction of automation. Examples of automatic equipment, which will be seen working, will include an electronically controlled conveyor, and a model of a driverless electrically-powered works truck which follows a pre-determined route. Also on show will be equipment for the automatic assembly and soldering of printed wiring circuits.

The conveyor will be of the type which selects various items and unloads them at pre-determined points in the factory. Operating through a punched tape, it will incorporate an electronic weigher. The truck, which will be powered by its own self-contained batteries, will be directed along a set route by signals from a radio frequency oscillator picked up from a metallic tape laid on the floor. The route can be quickly altered by removing and relaying the tape.

The printed circuit exhibit will consist of an example of a machine which inserts the components into a printed wiring board, which is then placed on a conveyor and passed across a wave soldering bath. This exhibit will be of particular interest to manufacturers of radio and television receivers, electronic computers, deaf aids and similar appliances.



Members of the Euratom Commission on a visit to Berkeley Nuclear Power station. Two years after commencement, most of the heavy civil engineering work has been completed.

Electronic Computer unique in this country installed by British Railways

British Railways have installed in the Physics Division of their Research Department at Derby a new electronic digital computer which is unique in this country.

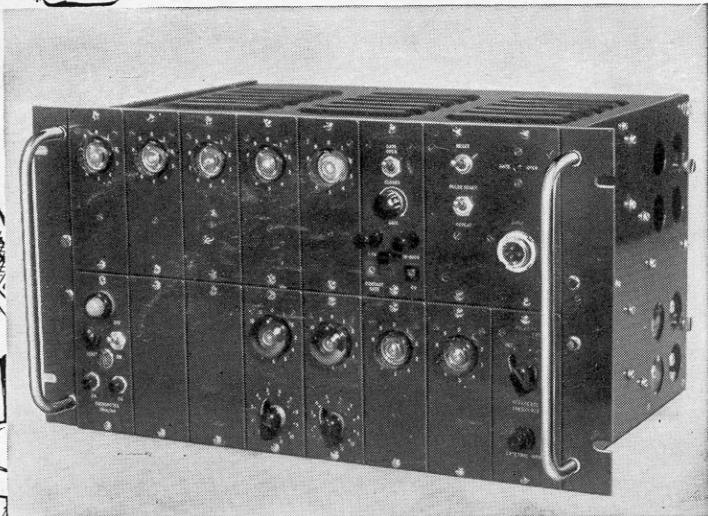
This machine, an Elliott 402F computer which is one of only two such machines in Europe, is a general purpose, automatic binary computer, designed primarily to tackle scientific and engineering problems in which the mathematics are either too complex or too lengthy to be performed by desk machines. Its use also considerably reduces the time taken in the comparatively straightforward computational work which is a feature of research.

The computer has a medium size memory which enables it to store and perform operations on over 4,000 numbers simultaneously, the input and output of data being by paper tape. An additional feature has been provided in that floating point arithmetic can be used; this permits greater accuracy in a far bigger range of numbers. The speed of the computer is such that pairs of numbers, each of nine digits, can be multiplied at the rate of 300 in one second.

It is intended that numerical calculations will be made on vibration problems, including, for instance, those concerned with the improvement of passenger coach comfort, the analysis of stresses in structures and bridges, and problems relating to the development of continuous braking for freight trains, to assist engineers in design and testing. A further field is that of linear programming, which is of interest in statistical enquiries, such as those involving the determination of optimum conditions where many variable factors are concerned, e.g., the most economic way of carrying out a complex set of wagon movements.



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