Problems of Local Authorities in Data Processing

by C. W. Mallinson

INTRODUCTION

In local government, individual local authorities vary widely in size, both in terms of area and population, as well as in the duties they are required to perform.

There are authorities known as county borough councils, 83 in number, who provide all local government services within their area—generally that of the larger cities and towns. The remainder of the country outside London is divided into administrative counties in each of which there is a county council responsible for such major services as education, health, roads, fire, police, care of the aged, and several others. Within the area of each administrative county there are other local authorities, borough councils, urban and rural district councils, who provide environmental health services, housing, and other local services.

Considerable variation in size exists today between the various types of authority and within types. For example, county councils range in terms of population from 20,000 to over 2 million.

PROBLEMS

This question of size brings me to the first problem of local authorities in connection with the application of data processing. It is, I think, obvious that, for the smaller authorities, the sole use of a computer of medium size, on financial work alone, can hardly be justified at the present time.

How then can smaller authorities obtain the benefits of electronic data processing? They can, I suggest, do so by joining with a larger neighbouring authority in a computer installation—for example, a county council could sell time on its installation to other local authorities within its area. The programming of such work could, and should in my view, be the responsibility of the borough or district council, subject only to a co-ordination of effort by the county council where similar work is involved for a number of authorities. In that way, those authorities would still retain control of work for which they are statutorily responsible.

Another way in which smaller authorities can use a computer is to set up jointly such an installation and share in its costs. This method is, I understand, likely to be operated in London by a number of metropolitan boroughs through the agency of the Metropolitan Boroughs (O. & M.) Committee.

I prefaced my earlier remarks on this question of justification, by the words "on financial work alone." It is, I think, true to say that all local government computer applications today have a financial bias—probably because it is better to start with the devil you know! Financial applications, however, are not necessarily the most economically rewarding because often the processes are already highly mechanized on conventional equipment. There are in my view other non-financial applications in local government worthy of close study—for example, in the fields of education and health where considerable quantities of data have to be handled.

DATA TRANSMISSION

Linked, in a way, with the last problem of size is the next problem with which I would like to deal—that of data transmission. Here local authorities are faced with problems differing from those of some commercial undertakings. My own authority, for example, covers an area of 1,000 square miles, and this is by no means unique for a county council, with its schools, clinics, children's and old people's homes, fire stations, and other establishments spread over the whole area. Cities, too, whilst naturally more concentrated, have problems of data transmission. Certainly in my own county, it takes far longer for data to reach the computer centre from outlying parts, and for the results to be returned, than does the encoding and processing of the data itself. Because of postal difficulties, time-sheets posted 40 or 50 miles away from the centre may not reach it until 36 hours later; the position is similar with the despatch of output such as payslips.

I have, therefore, been examining certain data-transmission equipment of the type using telegraph, private and public telephone lines for transmission of characters suitable as computer input. I find it relatively expensive if it contains checks for accuracy—up to £2,000 per year for one outstation with a central link. On the other hand, there is G.P.O. equipment available which is considerably cheaper, such as Telex, using punched paper tape as well as a printed document, but the ordinary Telex standard of accuracy may not be adequate for computer use. I understand that considerable research is now being undertaken by the G.P.O. on this subject so that new and more accurate equipment may be available in the future.

PREPARATION OF MASTER DATA

Passing on now to more specific problems not by any means confined to local government, I would like to refer to a particular problem we have had. On the inception of any new computer system much work is involved in the preparation of file information, for storage on punched cards, magnetic tape or film. This

may well not be available for automatic reproduction from existing records and therefore involves considerable staff time. Because the accuracy of the new record is vital, the staff now engaged on the existing system are often the only ones capable of ensuring complete accuracy in the preparation of the new form of record. In my experience, this factor, which caused considerable overtime for the staff concerned, slowed up the process of work transfer to the new computer system. It is certainly a problem which should be carefully considered at the planning stage.

Linked closely to this problem is that of parallel running. This places similar strains on the staff who are generally involved in the preparation of input for the new system and keeping the old system going at the same time. Furthermore, they may also be required to compare the results of parallel running and ascertain the causes of differences. Parallel running should therefore be kept to the absolute minimum.

STAFF TRAINING AND REORGANIZATION

Other problems requiring considerable thought at a very early stage include those of staff training and redundancy.

In Cheshire, we have selected and trained all our programmers and computer operators from existing staff. We used our computer manufacturer's programming aptitude tests to assist in the selection of suitable persons, and we have proved the value of these tests by subsequent results. Our computer operators have all passed through a programming course, and in addition reserves of trained programmers have been built up. Our internal audit staff now includes members trained in writing and understanding computer programs. More senior staff have attended computer appreciation courses, and our general endeavour has been to give as many staff members as possible at least a background of electronics by demonstrations, films and other means.

The design of new systems has been a team effort in which all staff members concerned in any way have been given the opportunity to criticize proposals and assist in the final determination of schemes; for this purpose frequent staff conferences were held.

By these various means the staff have always been kept fully informed of progress and developments. In addition, and at the outset, the Council's policy on redundancy was explained. This briefly was that staff reduction would be achieved by halting recruitment and allowing retirements and resignations to effect the necessary staff reduction.

FULLY INTEGRATED FINANCIAL SYSTEMS

In considering the application of a computer to a fully integrated financial system, a number of particular problems arise because of the diversity of local authority work, and the statutory and other requirements relating to accounting, costing and financial control. A few examples may illustrate the diversity of work associated with local government financial administration. A large county or city council may have an annual turnover, income and expenditure combined, of upwards of £40 million, and a payroll of 20,000 or more, covering diverse occupations, with thirty or forty different negotiating bodies concerned in their rates of pay and conditions of service. Its capital expenditure would run into millions of pounds a year demanding financing from, perhaps, thousands of lenders. Its revenue expenditure must be divided over several thousand analysis heads and controlled against a detailed annual budget. Much of the expenditure must also be expressed in terms of unit or job costing for adequate control, and for comparison on a national basis. In addition, a large city council would have to levy and collect rates on some 200,000 properties, some by instalments.

To do all this with a unified computer system demands careful planning and a phased programme of assimilation, and, of course, a computer with an appropriate specification.

Such a unified system is our aim in Cheshire. Our computer was delivered just over a year ago, and so far we have transferred our total payroll of some 19,000 employees and pensioners using a system which covers both calculation, maintenance of personal records, and accounting and cost analysis. We have also covered our loans accounting problems with an appropriate computer system. Our highways service dealing with the maintenance and improvement of 2,000 miles of road has an integrated electronic system of fortnightly costing and accounting, giving both job and unit costs, as well as average-price stores accounting for eleven stores, and job costing for a large central repair depot. Other work, including the payment of creditors and bank reconciliation, has been dealt with by systems so designed as to fall into the overall plan of integration. A complete revenue accounting and budgetary control procedure using the computer and linking together what has already been done is now being programmed for operation in the late summer, and this will be followed by a similar program for our capital expenditure. As an aside, I should perhaps add that, after 9 months' working, staff savings had equalled the additional annual cost of the computer with an average 60% usage of one shift.

CONCLUSION

Finally, let us look at the ideal computer for local government work. Basically, local government functions for each class of authority are the same, but the volume of work varies, mainly on account of differences in size.

I suggest that the following features are what are required in a computer for local government work.

1. Construction on a building-block principle so that different sizes and classes of authority can be provided for according to their requirements, and also so that an authority can start in a small way and build up its computer capacity as its experience and confidence in the new equipment grows.

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2. Relatively small calculation capacity at medium speed, but large input and output availability.

3. Because of the diversity of local authority work, the ability to store a large program—at least 2,000 operations and preferably more.

4. For larger authorities, magnetic tape or film storage for record keeping, and a random-access store for items of information required frequently by the staff for reference purposes. The ability to obtain this information, either independently of the computer or automatically through the computer centre, with a minimum disturbance of computer working time.

5. Reliability—this is very important during initial program testing and when jobs with an absolute deadline such as payroll are subsequently performed.

6. Inbuilt checking circuitry making programming easier, and control of the system more simple.

7. So designed as to make programming as simple and quick as possible.

8. Minimum installation cost, which means the use of the latest techniques to reduce heat emission and also power supply costs. It also means that equipment susceptible to dust conditions such as magnetic-tape units should have inbuilt filtration, thus avoiding the necessity for complete air filtration of a whole machine room.

9. Finally, a reasonable price, commensurate with these requirements, and one which would enable an average local authority to show savings within a reasonable time.

I cannot claim that this is a comprehensive list, but I think that it embodies the main features for which local government is and increasingly will be looking for from computer manufacturers. Supported by a growing interest in this new field of aids to management, I am sure that the manufacturers in the years ahead will do their best to meet local government's needs.

Symposium on the Selection and Training of Programmers—
1 : A Business User's Approach

by H. W. Gearing

INTRODUCTION

We had been interested in following the development of electronic computers since 1949–50, when we discussed the matter informally with representatives of N.P.L. and N.R.D.C. At earlier dates, the Company had been faced with various problems of selecting and training staff to operate specialized automatic equipment: we have an Education and Training Division which supervises the selection and training of apprentices for the various skills required in our factories, and special attention is given also to the selection of management trainees from those leaving the universities. For office work, we have encouraged junior staff to take continuation courses; where it was a question of operating complicated office machinery, as we knew it up to 1950, we found little difficulty in training young people of normal intelligence to use the available equipment to the best advantage. A particular example arose in 1940–41 when we began our Powers 65-column installation in an area well removed from the normal channels of office equipment training: we were then obliged to fall back on the local grammar and senior schools, who provided girls which we trained to deal with all aspects of the work. Some of these girls became demonstrators and instructors for the manufacturers, when they married and moved away from Worcester.

COMPUTERS

In 1954 we began to consider the possible applications of computers to business and we received interesting reports from the American Management Association on what companies were proposing to do in that country (A.M.A., 1954, 1955, 1956). Subsequently we also received the report of a conference held at Wayne University in June 1954 (Jacobsen, Ed., 1955), which stressed the educational problems introduced or enlarged by the arrival of computers. Dr. Householder, who is with us today, was a contributor to this. It seemed to us that the best appreciation of what these machines might do, having regard for our background of experience with other office equipment, would be obtained partly from reading the reports of business applications, and partly by making a closer study of a scientific computer; in the autumn of 1955, two of us therefore attended an introductory programming course on the EDSAC computer. The lecturers on that course were Mr. E. N. Mutch and Mr. M. Bridger; most of the other members of the course were working on problems in pure and applied mathematics; their disclosure of what the machine could do opened our eyes very widely; this course gave us such an appreciation of what the machine *might* do, that on occasion we were led to disbelieve some of the proposals in the papers which we had read!