A computer in insurance

By J. F. Milburn, D. J. Fearnley and C. G. Myers*

An account of the manner in which The Yorkshire Insurance Company Limited planned for and installed an IBM 1401 computer. It is purposely written in harsh business terms with the accent on the practical difficulties which arose, in the hope that the comments may be of help to others, in avoiding or overcoming their own problems.

This article deliberately concentrates on the black side, and implies a "worse before you are better" attitude. We hope that this will not depress the reader, for there should be a silver lining for all to enjoy, including the Computer Manager with his grey hair and ulcers! Much of what follows has been said by other users of computers, but we think that it needs repeating.

The Yorkshire Insurance Co. Ltd., after over two years' preparation and planning, installed an IBM 1401 card system computer in January 1962. After more than two years' practical experience, and having in that time more than achieved the initial target, it is hoped that its experience may be of value to others who are still in the earlier stages.

Readers who are not familiar with insurance work are asked to bear in mind two features which make it different from many other applications. Firstly, *permanent* records of a very substantial number of policies, etc., in a form acceptable to the computer, are a prerequisite of any application; if punched cards are used, these permanent files require millions of cards. Secondly, a vast quantity of printed output is required in respect of its major applications (e.g. Policy Renewals and Agency Accounts), to the point where, with an on-line printer, the computer speeds of production can be severely limited by the speed of the printer.

There are still people (not readers of this *Journal*, of course!) who think that all that needs to be done is to buy a computer, throw in the office records, sit back, and by pressing buttons obtain all the required results —this is indeed the picture which the Press so often gives to the public. Such persons are becoming fewer, but they still exist, if not in that extreme form, then with various degrees of this belief.

Computer manufacturers' representatives these days are competent people, and they explain what can be done. In fact limiting factors are practically non-existent, provided you are prepared to pay the price of the necessary equipment.

What is not stressed sufficiently at this stage, or if it is, not uncommonly underestimated by the customer, is that all these things can be done *when* a master plan has been worked out in minute detail; *when* all existing clerical, or other, records have been set up accurately in computer form; *when* personnel have been appointed and trained as computer programmers and have written, tested and "debugged" a multitude of programs; *when* all clerical departments and Branch Offices have been investigated, reorganized and trained to operate the master plan; and *when* a complicated changeover plan has been worked out and brought in over several years.

Let us consider the three main stages in the order in which they arise.

1. Choosing a computer

It is not at all easy for the Management of a Company to decide which computer—make, size, and configuration —will best suit its needs. Many aspects have to be considered, and avenues explored in detail, before a decision can be taken. The computer is merely a machine at the end of a line, which starts with the insuring public, and it should not be considered as a separate entity. The build-up to the computer is by far the most important aspect with Insurance Companies. There is little use buying a computer which will give certain benefits if, later, it is found impracticable, or very expensive, for the raw material to reach the computer.

We suggest that a logical approach would be:

(i) Get to know as much as possible about computers in general.
(ii) Visualize what work is to be done (*a*) immediately, and (*b*) later on.
(iii) Concentrate on the practical side of the work before it reaches the computer.
(iv) Decide in broad outline your programme of work, and in some detail how to accomplish it.
(v) Find out which computer will best do this work.

If in the process you change some of your details, go back to (ii) and start again.

When ordering a computer, be wary if the model has not yet been operated "in the field." Often this cannot be avoided, in which case do not rush to be the first to take delivery of the new model. Pioneers with new models are very necessary and are to be admired for their public spirit, but the history to date of many of them has been one of delays in delivery, additional expense, and disappointments of many kinds. It can be very expensive to try to put yourself (temporarily) "ahead of the Joneses."

Usually the order will be placed when it can be reasonably demonstrated that there will be increased efficiency coupled with a saving in expenses. With Insurance Companies, where such benefits may take

* *The Yorkshire Insurance Company Ltd., St. Helen's Square, York.*

time to come to fruition, a little faith in the future does not come amiss.

The best advice to Management is that it should have an investigation made by a small team, consisting of the most suitable "experts" in their organization. In our Company, a Sub-Committee of three was appointed, the Deputy Secretary, Deputy Actuary, and Mechanization Manager.

The advice and help of the computer manufacturers is essential, and freely given, but it would be a grave mistake to accept their recommendations blindly. They are first and foremost experts on computers—not experts in *your* business.

Having placed an order, it should only be necessary for top management to keep an eye on developments, and give their backing to the project. Our top management allowed the Sub-Committee to get on with the job without detailed supervision, progress reports being submitted periodically. We think it would be a mistake to do otherwise as too much interference might be disastrous.

Press articles are often misleading. Quite naturally they tend to deal with spectacular applications of computers, and the remarkable ability of the equipment. Far too often the articles describe ambitious projects which are being planned for the future; much less often do they describe work which is actually being done successfully. This can make the more prosaic plans of one's own company seem a little behind the times. Do not be put off by this; remember it is dangerous to dive off the high board before you have learned to swim. We think it wiser *to do* first, and talk about it afterwards.

It is difficult for the general public to wax enthusiastic over a new way of producing invoices, payroll, or insurance renewals (and therefore, poor copy), but to commercial firms these functions are their life blood, and infinitely more relevant than doing abstruse calculations on a moon rocket, or teaching a mechanical mouse to find its own way out of a maze.

2. Planning the applications

In our experience it is much easier, safer, quicker and cheaper to teach one's own staff to understand computers, than it is to teach an outside computer expert your business. Therefore, the necessary planning and programming staff should, as far as possible, be recruited internally. Our *initial* yardstick was the aptitude tests provided by the manufacturer, which we have found a most reliable guide.

To arrive at a decision on which computer to use, it will have been necessary to establish fairly accurately how and in what manner the computer is to tackle the work. These ideas have to be broken down to the smallest detail. Forms have to be designed and ordered, detailed instructions drawn up for the guidance of clerical departments, computer programs have to be written and tested, accommodation arranged, and the Computer Dept. built up and trained ready for the great day.

If this were all, it might take two years. Any user will be lucky indeed, however, if there are not setbacks due to negotiation with Departmental Managers taking longer than expected, or unforeseen happenings. Then again there may be developments in the business which upset previous calculations.

All your major difficulties will arise in settling the system details before the computer stage is reached; repeat—*all your major difficulties will arise in settling the system details before the computer stage is reached.*

The danger is to be too ambitious at the outset. When studying what the computer can do, it is easy to be carried away by its remarkable potentialities. The result can be a faultless scheme on paper, which does not work in practice.

Simplicity at the outset is the keynote of a workable system. Leave the trimmings to be added later, and concentrate on the main work. The success of the computer operation depends on the people who write the programs, but the success of the *system* depends on young girl punch-operators, your clerical staffs, and everyone concerned with data preparation.

There is such a thing as "know-how" and there are still far too few people with the necessary experience to launch an *ambitious* scheme.

The raw materials on which the computer works come from clerical departments and/or Branch Offices. By far and away the greatest problem is to ensure that these raw materials are accurate. If, in the process, a clerk has to copy information from one form to another it is not only uneconomic, but decidedly error prone. A better method is a copy of an original document, but immediately one is confronted with the problem of redesigning documents, so that details are arranged in a suitable order for the Computer Dept. to copy, as well as a suitable order for their original purpose. This alone can take many months to bring into effect, and in our case a compromise was often necessary.

Modern thought on this problem centres round the capture of the information at source, on (say) punched paper tape. This is certainly sound, and recent developments make it a reasonable proposition. With us, this method was ruled out on the expense of providing paper-tape machines and operators at our many Branches. We found it considerably more economic to retain carbon-copy methods for the time being.

Optical scanning apparatus looks attractive, but it has very serious limitations when it comes to insurance policy records, mainly because of its present restricted ability to read alphabetical characters. Future developments should be awaited. Meanwhile, if the volume is sufficient, it could be used for cancelled cheques or similar lesser work, to gain working experience.

3. Conversion to the computer system

If an Insurance Company already has details of its existing policies on punched cards which "fit" the computer, and if these details are sufficient for all

computer requirements, it is indeed fortunate. Most companies have punched cards which always seem to be the wrong type for the computer and/or they record only part of the information required.

Each company's problems will vary, but the common message is *do not underestimate the magnitude of the work necessary to reconstitute a large card file*, the more so if, at the same time, you wish to add additional information to each case.

Arrangements can be made with Punching Bureaux to do some or all of this work, and some companies have tackled the job successfully in this way. Our experience in this direction has been disappointing, largely for reasons for which we cannot blame the Bureau. If you can present copying media to the Bureau which is clear and in a satisfactory sequence, you should get satisfaction. Unfortunately some of our office records were far from satisfactory for this purpose.

Troubles may arise from unexpected sources, and for trivial reasons. For example, certain blocks of our old punched-card files were mechanically reproduced into the new form. The results of our first computer runs of these produced peculiar errors most difficult to diagnose and trace. The reason was that in the original cards, odd holes existed, often because of ingenuity on the old machines, but sometimes for long-forgotten reasons (or for no reason at all). These had caused no trouble on the tabulators, but produced more obscure results on the computer.

Programmers should assume that there will be mistakes in the input, and incorporate checks throughout their programs to catch faulty data. This is one point where a programmer, who knows and understands the business, will score over an outside expert.

Another factor which is often overlooked, is that the printed output of continuous stationery is produced at a very much quicker rate than previously. The forms probably need de-collating, trimming, and bursting before despatch. Machines are available for this work, but in our opinion *when part-sets are used*, there is much to be desired in this direction from the manufacturers of the machinery. Careful planning is required to avoid this stage becoming a bottleneck in the system and this includes the provision of adequate space and shelving to hold the forms during these processes.

Insurance Companies have a further complication in that whilst a punched-card file is being converted, or set up, it has to be "frozen". Immediately, alterations of many kinds mount up at an alarming rate, and can easily get out of hand. For this reason conversion has to be tackled a block at a time, starting with a relatively small quantity and building up to larger bites when the teething troubles have been overcome and staff have become more experienced.

If you are continuing to use punched cards, consider very carefully the number of punching and verifying machines required. An underestimate may take a year or more to put right. First one has to wait 4–12 months for delivery, then new operators have to be trained. When estimating for this purpose, it is not always prudent to base your calculations on *proficient* Punch Room staff. In our work an average operator takes 2 years to become really useful, and during the first year the volume of work completed by a group of girls learning from scratch is surprisingly small. Not every firm is in an area where trained operators can be readily obtained.

Conclusions

Having "cut our teeth" on a computer of modest size while retaining punched cards which we understand, we now feel more confident in tackling a more sophisticated scheme using more modern devices. We can recommend this process of learning to walk before you try to run.

The picture of how a computer can best be used in our organization is very much clearer now than it was four years ago when we ordered our present machine. In addition, we now have a trained staff to make use of the knowledge gained. The work being done is summarized in the Appendix to this paper.

Some may think this is an over-cautious approach, but it has worked and paid off in our case, moreover according to plan. What is probably most important, the computer is now doing the work intended. If we had to repeat the whole operation we would again adopt this same approach. The alternative is to plunge straight into what is thought to be the ultimate, and risk severe indigestion, delays and substantial unforeseen expense.

Appendix

The work now being done

(1) *All Classes of Fire, Accident, Motor, Engineering and Live Stock in a composite scheme comprising:*

Renewals.

Agency Accounts (excluding Cash and Reconcilement).

Claims Analysis for accounting purposes.

Fire Department Treaty Reinsurance figures.

Comprehensive statistics—statutory, tariff, and internal, including a complete yearly Agents' experience.

Programs written 59, of which 23 are used once a year only.

(2) *Life and Annuity Policies (excluding Group)*
Complete Valuation requirements produced on four bases.
Mortality statistics and miscellaneous requirements.
New business, Claims and Surrenders, Accounting statements, statistics, and analysis of surplus.
Bonus Certificates and ancillary work.
Programs written 21, of which 12 are used once a year only.

(3) *Share Registration and Dividend Warrants.* From Share Transfer to Certificate.
Programs written 13.

(4) *Annuity Payments.* Includes printing of cheques and Tax Deduction vouchers.
Programs written 4.

(5) *Mortgage and Loan Interest Collections.* Renewals, yearly statement of loans in various categories. Calculation of accrued interest to 31st December.
Programs written 10.

(6) *The Company's Monthly Payroll.* With various extra requirements.
Programs written 9.

(7) *Stock Exchange Securities.* Yearly Valuation and Statistics.
Programs written 6.

(8) *Marine Hull Statistics and Reinsurance.* This application is thought to be unique and is being extended to other spheres of Marine business.
Programs written 9.

Book Review

Digital Magnetic Recording, by A. S. HOAGLAND, 1964; 154 pages. (New York and London: *John Wiley and Sons Ltd.*, 60s.)

As Mr. Hoagland points out, this book is intended for the person just entering the field of digital magnetic recording, or for someone wishing to acquire some knowledge of the techniques and problems involved. Judged from this point of view the book is an excellent one and one which companies concerned with data processing would find a useful addition to their libraries.

The desire for very high packing-densities without loss of pulse resolution and with short access time has created the need for research into the subject to take a specialized form. This specialization means investigation into the possibilities of thinner magnetic coatings on various substrates, the problems of head and transport design, and improvements in the design of reading and writing electronics. Mr Hoagland has written a book which shows how the need for this specialization arose, the problems which have confronted the research engineers in the past and how some of them have been overcome, and what problems will face them in the future.

In the introductory chapter, the author describes the various methods of digital magnetic recording and the different circumstances in which each would be used. The second chapter gives a brief history of the recording process and the form this process will take in the future, including the prophecy that the magnetic strip wound on a bobbin, with random-access bobbin selection, will provide the answer to the need for mass storage with shorter access time for on-line working.

Chapter 3 explains the theory of electromagnetics, and since this is a subject forgotten by many engineers as soon as their studying for qualifications is complete, this chapter is useful as a refresher, particularly as the author translates the magnetic field problem into an equivalent electrical circuit one. The fourth chapter is concerned with the theory of digital magnetic recording showing, by comparison with an idealized ring head, the effects of head gap, head-to-surface spacing and surface thickness on output pulse resolution and amplitude. A chapter on magnetic heads and storage media follows, and this gives an insight into the problem of magnetic head design, including the steps taken to reduce cross-talk between heads on a multi-head stack and the effect of using tapered pole tips. The last chapter deals with the different methods of presenting data on the individual tracks such as RZ (return to zero), NRZ (non-return to zero), phase modulation etc., together with an explanation of how higher packing densities leads to pulse crowding with consequent signal distortion. Chapter 6 also explains the means employed to read the data by peak sensing and amplitude sensing.

Since the book is intended partly for the engineer just beginning in the field of magnetic recording, I think a description of different data formats for magnetic tape would have been useful, together with an evaluation of them, but this is not to be taken as a criticism of the information in the book which is presented in a very pleasing readable form with excellent illustrations. I particularly commend the author's decision to include sub-titles in each chapter.

R. S. PIGGOTT.