

Program performance

The program successfully read and processed a batch of several hundred test transactions; no transactions were given an incorrect account number, and a surprising variety of mistypings were successfully processed, only a small proportion having to be rejected for retyping. The time to edit a name of 20–80 characters was between 150 and 200 milliseconds, and to look up an account number was between 50 and 300 milliseconds, depending on its position in the table. Thus the processing speed is quite fast enough to justify considering this technique in a commercial application.

Conclusion

With the growth in the use of by-product paper tape from accounting machines and typewriters, and the

introduction of optical character-reading machines in the near future, many applications will face this type of problem. In particular, to gain the full advantage of optical reading machines, any manual operations such as encoding reference numbers must be avoided, and thus it is anticipated that the field of application for the techniques described in this paper will enlarge significantly.

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Book review: Data processing

Data Processing Yearbook 1963-64; 306 pages. *American Data Processing Inc.*, 22nd Floor Book Tower, Detroit 26, Michigan, \$15.00.

This is the 13th volume of the publication that started as *The Punched-Card Annual*, the first U.S. nationally-circulated non-manufacturer publication dealing with punched cards and computer systems. It is an interesting publication for the U.K. business user, who wishes to maintain contact with the way business computer users in U.S.A. are thinking, without going there to see: we get so little about business applications in the publications of ACM, or for that matter in our BCS publications.

The *Yearbook* is published by Mr. Frank H. Gille, assisted by ten other individuals, named in the frontispiece, who form an Editorial panel independent of any manufacturer: there are only ten pages of advertisements, none of them for computer systems, mainly for business forms and computer accessories. No claim is made for completeness, which would be very difficult.

The first article is a ten-page survey of company approaches and results by McKinsey and Company Inc., of Park Avenue, New York, enquiring what American industry has gained or learned from its heavy investment in computers. Twenty-seven companies with 4–8 years' experience in computer systems were surveyed. Several companies claimed to have made major gains, but for most companies the effort is still

costly and has so far produced only minor benefits. Company systems are always very individualistic, but the authors have devised a classification scheme for the inquiry, from which summary charts are presented. Of the 27 companies in the survey, ten reported administrative cost reductions and 11 had operating cost savings. Intangible benefits were also reported, 10 companies claiming increased speed and 15 that they were getting new information. In 21 companies, the computer manager was not more than two levels below the company's chief executive, and the survey concludes that where top management plays its essential role, important consequences can follow.

This survey is followed by brief biographical notes on the 28 participating authors.

The remainder of the volume is divided into four sections: *Tools* (70 pp), *Techniques* (58 pp), *Tactics* (56 pp), and a reference section (87 pp) on courses, associations, users organizations and data-processing centres. Where the reference section lists organizations outside North America, there are a number of omissions, due no doubt to the difficulties of data collection; for example, Northampton College (London) is omitted from a list of English Colleges running courses. The University Grants Committee in the United Kingdom might note that in 1963 there were 518 digital computers installed, (varying in size from 47 LGP30's to 16 IBM7090 systems), plus 24 on order, in North American

Universities. There were apparently only 24 analogue computers in the reporting Universities. Some of the large and small computers included in the 518, include machines, such as the Ford Motor Company's Engineering Division three IBM systems, to which access is granted for the Community College at Dearborn (150 students).

The *Tools* section comprises surveys of hardware additions announced during the year, input/output equipment (in which magnetic tape is included—considerable room for reductions in cost!) and an authoritative review of memory systems (omitting nickel-delay lines!) by J. Presper Eckert. These chapters are followed by articles on trends in design, real-time data accumulation, progress in data communications, character recognition, and teaching machines and programmed learning.

In the reviewer's opinion, it is a great pity that the only article on software, by Howard Masters and Geraldine Bowen of Univac, is on "FORTRAN—Formula for Business", which might have been written several years ago. Did we not have Dr Grace Hopper herself with us in London four years ago, hinting at further developments, which by now should have resulted in effective use of COBOL, FACT, etc., in U.S.A? (Give us a few months and we may yet overtake them?) If this *Yearbook* is really to keep management informed, more than four pages should be given to software in future editions, without which the engineering skill of the builders and the systems experience or mathematical ability of the problem-experienced user cannot quickly be brought together.

The section on *Techniques* includes business-manager oriented papers on new microfilm systems, CPM and PERT (well illustrated with figures), operations research, decision processes research, and single information-flow philosophy. Arthur F. Anderson writes on "Protecting Magnetic Tape," and recommends a "safe within vault" system for important tapes.

Dr. Herbert W. Robinson (CEIR) engages attention to the influence of computers and computer technology as "amplifiers of intellectual powers of reasoning and computation." His organization probably employs more mathematical statisticians, and has access to more large computer systems, than any other non-government, non-manufacturer organisation in the world. It would appear that financial controllers are now looking hard at their data-processing costs: hardware

manufacturers produce faster and faster machines, quicker than Americans can learn how to apply them. The really big challenges, for statistical analysis, in his opinion, go unanswered. He ventures to predict that if a company's costs for computer facilities, software and personnel are £36,000 per month after startup, the work could be done by professionally staffed data-processing centres at half the cost. But what about large volumes of data-preparation and knowledge of the company's problems, advantages from company programmers *knowing* from experience what they are trying to do; and what of confidentiality aspects? If this argument is true, why haven't large companies also sacked their accountants and employed professional firms to prepare their monthly accounts? Why has not a standardized service-bureau procedure already been adopted for insurance companies in U.S.A? This argument if true must apply to bread and butter work, as well as to more elegant O.R. applications.

This is a very stimulating paper, from many viewpoints. His concluding paragraphs sum up the argument that computer people haven't yet started on their real task, that of *Strategos*—the leader, uniting all the arts and sciences under one system to solve the "total" problems of man. "To this end a world symposium should be held." These are serious and stimulating ambitions. Many of us in U.K. will be happy, if, before our retirement, we can bring together the various arts and sciences (not to mention personalities) to solve one company's problems! What we would appreciate from U.S.A. business experts is a few more papers on what has been *done* and *how*, not long-range predictions of what *might* be done.

The section on *Tactics* goes some way to answer this need. There are papers on applications to advertising (e.g. linear programming of media mix), cheque handling within the Federal Reserve system, Local Government and Tax Administration (Survey of 185 reports), legal applications (e.g. patent search, indexing of statutes, etc), manufacturing and publishing (computer assisted composing). All these papers are well illustrated with tables and charts, or references to original papers elsewhere.

The reviewer found this *Yearbook* stimulating reading, for a weekend free from failure in the air-conditioning system, while awaiting delivery of a second-generation computer. The book is nearly as stimulating as a visit to U.S.A.

H. W. GEARING.