

THE ROLE OF COMPUTERS

Daniel Melcher

Several years ago, in 1963 to be exact, I drafted an advertisement in which Bowker announced that any of its book information could be had in any form, including punched cards, punched paper tape, magnetic tape, or any other machinable form, including over-the-wire service. The advertisement was repeated once or twice. I think it will come as no surprise, however, that the only responses were received from branches of the IBM company. The offer was bona fide. We were already using punched cards and punched paper tape in various ways and were fully prepared to deliver whatever anyone might want at a nominal rate, just to lend a hand with any experiments.

Four years have passed since that announcement and I must confess that the future is still where it always was, although various experiments have been tried. We were at one point supplying the data on Forthcoming Books to the Library of Congress for magnetic tape conversion. The idea was to help LC know when to expect books announced for publication but not yet received for cataloging, but any actual use of the data in this way by the Library of Congress is still in the future. In another experiment we started supplying inventory control data to forty college stores, covering Paperbound Books in Print. Some of the data went out as punched cards, some in other forms. It was and remains an "interesting experiment," if I may use the conventional euphemism for "unsuccessful experiment."

I do not want to give the impression that we are disillusioned about the ultimate potential of the new technologies—but I do think it would be awfully easy to read the literature and the conference agendas and get the idea that things are further along than they are. I could say, for instance, that we now have the capability of creating cross references from author-title input; but in a spirit of somewhat greater candor, I could recount that our computer for reasons best known to itself tucked in a cross-reference reading "Pathology of the Patient—See Much Ado About Nothing," or that on one run it assigned each subject heading to the preceding title, thus misclassifying 44,000 titles on a single pass.

I ought not to say this, of course. The rules of the computer game are that you talk only about what you are going to do, never

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about how it turned out. This is a science in which you publish the results of your experiments before you make them. I have tried to get and publish stories of the sad aftermath of many noble experiments, but the trouble is that the victims will not talk. And more's the pity, because in failure there is much wisdom.

Let me take the narrow view, leaving to McLuhan the consideration of what things will be like in 1984. Let me try to review how things are right now, with respect to the use of computers in the publishing process.

Most large publishers now have computers, and many small ones use computers. They use computers for the most part, however, in exactly the same way that other industries use them—for billing, accounting, inventory control, and sales analysis. Very few report any net savings resulting from conversion to computer, and most went through agonies in the conversion process. They all hope for tangible economies in the future, although it is a bit puzzling to note that the \$5 million companies seem to expect those economies when they reach \$10 million, and the \$10 million dollar companies think there might be economies when they reach \$20 million, and so on upward.

The tangible results of computerization as they affect the publishers' customers and authors are easier to identify. Computers have unmistakably lengthened the time it takes to fill an order, and have made it almost impossible to understand a royalty statement or get an intelligent answer to a complaint or query. The following experience is only too true. A librarian received a piece of promotion for a set of art books and ordered them. When they did not come she sent a tracer. Pretty soon one set arrived with bill. A bit later another set arrived, without bill. She reported the arrival of the extra set whereupon came a form letter indicating that if she was dissatisfied with her purchase in any way she could return it for a refund. She returned it with a note explaining that no refund was due. Of course, she received a refund. She returned the refund with further explanation—and received another set of the art books.

The biggest advantage always cited in support of this business department automation is that it will provide management with far more extensive operating information, more promptly. To the extent that this becomes effective, presumably publishers will be out of stock less often. Unhappily, the near-term result often seems to be that information formerly available by means of a telephone call to the order department is reported as unknowable until the computer makes its next periodic report.

Of more interest really than the automation of clerical procedures is the automation of functions peculiar to publishing, notably type composition, indexing, directory compilation, SDI (selective dissemination of information), and machine translation.

So far the computer has made only modest contributions to the economics of typesetting. Quite a few printers are using small computers to relieve human compositors of their so-called "end of the line" decisions, that is, where to break the lines, whether to hyphenate, and so forth. I think it is fair to say, however, that thus far there has been no big breakthrough. Somebody must still keyboard the manuscript at some point. And this will be so for some time to come as regards most books. Only in certain kinds of directories and cumulations does the computer offer a means of getting multiple outputs from a single input—as, for example, in the case of Books in Print where a computer can itself make the title index by inverting and resequencing the author entries.

A firm of systems analysts recently claimed that they had found a way to cut typesetting costs by 80 percent. Careful study revealed, however, that the promised composition savings depended on getting the author to do the work of the compositor and further, of getting him not to make corrections in proof. Any publisher who could achieve those things could make spectacular savings with or without computers.

It is true that some spectacularly high-speed type composing machines are becoming available, starting with the Photon Zip first used for the Index Medicus, and now including even faster machines such as RCA Videocomp, the Linotron, the Harris-Intertype and Alphanumeric's Photocomposition System APS-2. These promise a radical improvement in the quality of computer composition, although no breakthrough in the general run of book composition. They may help keep down the costs of such cumulations as Books in Print, and perhaps enable corrections to be made in a late stage of the publication process. Automatic indexing is another way of using computers in the publishing process. Some progress has been made, and more will be made, but anyone who has ever tried to use a KWIK index, knows that computers have much to learn about indexing. Machine translation of (say) Russian into English has been explored rather thoroughly. The results have been interesting, but to date the human brain still scores an easy win over the computer in this area.

There is no doubt computers are here to stay. They are creatures of their time, and they come because they are needed. To my mind four factors are working together to put a computer in your future or mine, even if their full promise is yet to be realized.

The first factor is the steady rise in the cost of human time. Not so long ago, anyone who wanted a card file of the advance book reviews in Library Journal would type up or paste up his own. More recently, given the cost of clerical help, he became glad to pay \$100 just to have Library Journal duplicate on cards what he was already getting separately in the journal itself. Where once a library had only a single set of Books in Print in a central place, it may now have

multiple sets in several places. Where once a library bought card sets at 10 cents, it now prefers complete book processing kits at 29 cents, because of the saving in labor. With each upward boost in salaries and fringe benefits, new labor-saving services become more practical and former luxuries become present economies.

The second basic kind of change is the declining cost of machine time. Computers cost less, or do more. Other machines also cost less or do more. The cost of offset printing plates drops from \$1.50 a page to \$1 a page to 50 cents a page to 10 cents a page, even to 5 cents a page—in an almost unbelievable series of technical break-throughs.

The third big change as I see it, after the rise in the cost of human time, and the decline in the cost of machine time, is the enlargement of the market. Where once only the biggest reference libraries would have bought certain kinds of new reference tools, now even high schools become prospects. There are more users among whom to divide costs.

A fourth change is in our attitude toward time. We have become impatient with abstracting services that are two years behind, and national bibliographies that are up to five years behind. We want to learn more promptly about what is coming or is now ready, and to get it more promptly once we learn of it, and then to get it into service more promptly once it arrives. The pace is quickening.

Out of these changes emerge many opportunities for improving information services, not all of which have been exploited by any means. In effect, in today's world, name it and you can probably have it. Out of these changes has come the reprint revolution under which long out of print items are coming back into print in droves: the count for the latest Books in Print is up from 190,000 to 240,000. Out of them has come the possibility of reprinting not merely editions of 1,000 or more, but even editions of 100, or 25, or even editions of one. Out of it all has come new interest in microforms, although there is precious little in either the reprint, mini- or micro-technology that was not rather clearly set forth thirty years ago in Robert C. Binkley's classic Manual on Methods of Reproducing Research Materials.¹ Out of the changes have come time-saving services like the enlarged new Forthcoming Books which not only looks five months ahead, but will now begin to provide cumulative information on everything published since the latest revision of Books in Print.

It must be noted, however, that as yet the utilization of computers to meet these changing needs has been massively disappointing. When an eminent Australian librarian came here in late 1965, filled with enthusiasm by the rosy projections of library automation which he found throughout our library literature, he was forced to go back reporting that almost nothing of the promise had come to pass,

or even seemed imminent.² He found just one seemingly effective automated system for claiming missing serials, and just one example of reasonably efficient over-all library automation, although even this depended on punched card technology more than on computers.

Let's face it. The glamor is in the computers, but the breakthroughs are elsewhere. It ought to be news, big news, when one publisher bucks the trend, and provides same-day shipment on all orders received before 3 p.m.³ It would be if he had used a computer to do it, but he did not.

The computer is a marvelous machine, and it does some things marvelously well, like handling airline reservations. But all too often we find ourselves invited to applaud computer applications that are pretty much in a class with the dog who played the violin—not because it was done well, but rather because it was done at all. A shining exception is the brief news item in a recent Library Journal⁴ which reports the candid recommendation, in a recent study, that a three-months experiment with a telefacsimile link between two South Carolina libraries be discontinued because of “excessive cost” and “infrequent use.”

One may hear that a certain encyclopedia is to be indexed by computer. Later one finds that it was, indeed, tried, but given up. It is reported that one of the book wholesalers has automated. Of course, his service goes into a tailspin, but ultimately straightens out. Did he get the bugs finally out of the system? Not a bit of it, he finally threw out the system. I talked to one wholesaler who had really made his automation work, but wound up with costs a good deal higher than a competitor's. I asked whether he really thought he could get his costs down; he said, “No, but I think his costs will rise—he's automating too.” Then there is the story that was told about the 3-M Corporation. Back in the days when a big corporation could not hold its head up without a computer, they went right along with the rest. But they were unusually well-advised on procedure and they recruited and trained an inside team of systems analysts and gave them a full two years to prepare the way for the computer. At the end of that time the company was able to report that the computerization program had already shown greater savings than anticipated, even though the computer itself had not yet arrived.

In our own case, we began quite early to inquire about the possibility of computerizing our bibliographies. Ordinarily the computer people would announce almost before looking around that their equipment was ideal for our needs and could save us much time and money. After study they would report that they could produce Books in Print in so many months for so much a page. Then I would have to break it to them that just using our old-fashioned methods we were already producing it in half that time and at half that cost, with greater legibility to boot.

Times change of course. I keep inquiring every year or so to see whether the rising hourly cost of people has yet crossed the descending unit cost of computers with respect to any of our projects.

It is interesting to watch the action at the interface between the computer world and the printing world. I have a gambit I like to use on hardware people when they brag about how fast their machines can go: I say, "Yes, but your output is so slow." They bridle a bit and point out that even the least of their impact printers can knock out 600 lines a minute. I look sorrowful and say that we have a printer who can turn out better than two million lines a minute. They do not believe me, of course, but they ask what kind of printer that is, and I tell them it is a printer with a printing press. It's true. The web offset press which does Books in Print delivers 20,000 signatures an hour, each containing 32 pages, and 100 lines to the column.

Now I know perfectly well that is not a fair comparison, but I think there is a grain of wisdom in it. You can, if you like, produce 250 book catalogs covering holdings of 50,000 titles, for an annual expenditure of something like \$50,000. If, however, you are willing to settle for a book catalog covering not only your 50,000 books, but 190,000 others as well (namely Books in Print), you can get the same number of sets of these far more all-embracing book catalogs for as little as one-tenth as much.

This possibility invites thought. Suppose the Dewey or LC class numbers, or both, were to be added to Books in Print itself—might this not offer most of the advantages of a custom-made book catalog—plus substantial additional advantages?*

The real glamor of the computer is at its chromium-plated best, however, when talking about real-time access to central data banks, from which an inquirer can get answers almost instantly either on a television screen, or in the form of hard copy made from the image on the television screen. This is a fascinating concept. I wonder, however, what proportion of our patrons are going to value this kind of speed enough to be willing to pay its cost. I have the impression that the man who is vaguely resolved to take out a copy of War and Peace, if he can ever find one on the shelf, is getting lumped in with the surgeon who has a patient hanging between life and death and needs quick advice from the National Library of Medicine.

*With the successful computerization of the Books in Print data base itself, embracing Forthcoming Books and most fully demonstrated in the November, 1967, issue of Paperbound Books in Print, the Bowker Company is now prepared to offer also a custom "book catalog" service tailored to any desired specifications and benefiting to any desired degree from the daily maintenance done on the Books in Print data base itself.

Some time ago, attending a seminar on technological progress in publishing, I found myself eating breakfast with one of the speakers who was in charge of research at General Electric. He had told us the evening before that he thought books would be obsolete within a decade. I told him I suspected he did not really believe it himself but was simply trying to needle us. With an absolutely straight face he said that he did indeed mean it. I tried to kid him out of it. I said it seemed likely to me that ten years hence, or twenty years hence, or fifty years hence if my wife got up in the morning and felt like making a batch of raisin bran muffins she would still feel that the simplest approach to the matter was to reach for her trusty copy of Rombauer's Joy of Cooking.

He implied that while there might be some problem about re-training my generation, he felt that the generations coming up would have learned to present not just some problems, but any and all problems directly to the household's communications console. I asked him to give me a rough idea of how he saw this working in the case of the raisin bran muffins.

He said I would go to the console and tap out the word "muffin." I asked him if perhaps keyboarding itself was not already obsolete and he apologized for overlooking this point and agreed that it was. He started afresh by saying that I would go to the console and simply say in words, "It's muffins that I want to talk to you about." He said the screen of the console would promptly flash a legend such as, "I have information on muffins-history, muffins-nutrition, and muffins-recipes. Which aspect of muffins did you have in mind?"

I reminded him that he had told us the night before that reading itself might be obsolete, thus making it impractical for a future generation to read anything off a screen unless pictorialized. He conceded the point and amended his example to presuppose that the choices would be pictorialized or verbalized. He forgot about this a moment later though, when he had the screen showing me the table of contents of a cookbook and then any selected page from the cookbook.

Well, I do not know. I have a feeling that ten years from now not only will my wife still have a copy of Rombauer in the kitchen, but so will my son, and so will my son's son. If nothing else it would surely be cheaper, even if interrogations of the console came as cheap as phone calls (which seems unlikely—cost is a problem that is often glossed over).

I see no reason to doubt that all of the promised electronic miracles are technologically possible. I have, however, the greatest doubts about how soon they are going to be really practical or desirable except in very special circumstances. In a very high proportion of current library inquiries, even our old-fashioned library methods provide fast and satisfactory answers. Of the remainder,

some would probably go unsatisfied anyway, and the residue might well survive modest delays rather than warrant involvement of heavy hardware.

Consider if you will the number of librarians who are right now talking in dead earnest about real-time, on-line access to the holdings of other libraries, while at the same time accepting substantial delays on access to their own holdings. Consider the libraries which are right now cumulating orders for weeks instead of placing them daily and which are accepting four-week delays in delivery of the books by the wholesaler, six-week delays in processing, and twelve-week delays in binding serials, while trying for real-time access to data in other libraries where similar backlogs exist.

I do not want to sound pessimistic because I am not. One can cite many nice little breakthroughs. At Bowker we began by just putting our information about Forthcoming Books on punched cards, using one not-very-terrifying keypunch. We then started re-shuffling the cards to get better statistics. Then we got a second keypunch. But we were still sending out the cards to a service bureau for listing. Then one day we discovered to our delight that we were, technically speaking, computerized—that is to say the service bureau put our cards through its computer instead of through the far simpler card lister formerly used. The result was no different and they charged us three times as much, but it made us feel big league.

Then we decided something had to be done about the horrid ALL CAP type you get out of computers. It was about 20 cents a page for ALL CAP, and \$5 a page for taking the same computer output and feeding it through a linotype, or Photon. However, we made a few more calculations and concluded that if we operated our own Justowriters we could get a really legible page for under \$1 with real bookface type. So we plunged. We bought two Justowriters (they could just as well have been President Model Flexowriters) that would take punched tape from the computer and give us book pages ready for offset.

It was one of the happiest experiments we ever tried. The whole staff was infatuated with those busy little machines, and lined up to watch them work. You could see what was happening; it was going on out in the open, not inside some black box. You could watch the machines fill in the running heads, and page numbers, and work their way around spaces for advertisements, and write both columns at once. On those machines we not only did Forthcoming Books but also two catalogs of children's books. We got the hang of inputting by Flexowriter and proofing from computer listings. We marvelled at how we could put in material in scrambled sequence and have it come back neatly sorted by author, title, subject and publisher, sometimes with impersonal little reproving messages from the computer like "You goofed—price omitted."

Our next step up is to the Photon Zip; it was either that or buy 20 Justowriters. From this many other dividends may come. If you want any of this data in any kind of machinable form just say the word. We are tooled up to give you six months advance notice on books to come, changes of publication date, changes of price, books out-of-print, and so on, as often as daily if you should be interested. On call you could have it by subject, year, publisher, and so on.

To be candid about it, however, I rather think that we could have done all this if anybody had wanted it, even before the invention of the computer. There are cases where you can do things with a computer that you could not otherwise have done at all. But there are many more cases where the computer represents only a small step forward in speed, economy or any other advantage, if that. And there are probably even more cases where the most efficient way of doing something by computer conversion would show no gain at all unless the comparison was with some former method that was hopelessly inefficient by old-fashioned standards.

This should not sound negative. The computer enthusiasts can point with pride to Index Medicus and Chemical Abstracts, and Science Citation Index. Publishing is going to be revolutionized by the computer without a doubt, although to date it has certainly been even more affected by such other revolutionary developments as cold-type, lowered offset costs, Xerox copying, microtechniques, wire transmission, and the spread of library service itself.

One tangible and very imminent development is the use of Standard Book Numbers. This has already made real progress in West Germany and Great Britain, and been adopted in principle by U.S. publishers, wholesalers, librarians and booksellers. Within the year, Standard Book Numbers (or SBN's as they are called) will begin to replace the LC card numbers, and appear in even more places—in almost every kind of listing, review, catalog, or advertisement. Their use will be optional, but increasingly useful in speeding book ordering, reporting on unobtainable items, checking of invoices, central processing and procurement, inventory control, and so on and on.

Although Bowker's ventures into the world of computers have thus far been few and unsophisticated, we have still made our full share of mistakes, and taken our quota of punishment. Tuition in this school comes high. If I think back over things I wish I had known sooner, several points come to mind.

In the first place, I have long since ceased to ask any computer man whether a thing can be done. The answer is always "Yes." Anything can be done, I guess. But that is not the issue. What matters is whether anyone in his right mind would choose that way of doing it. If I had not been through it, I would not have believed the idiotic advice you can get from systems analysts who should know better. One man,

after extended discussion of whether certain data could be got in two lines instead of three, came out in dead seriousness with the idea of leaving out the space between words. One man brushed aside a problem involving incompatible formats by saying that you could convert anything to anything. I guess you can, if you can find the equipment, or if cost and delay are no object. But it can easily cost more to convert than to re-keyboard.

My second piece of burnt-child cynicism has to do with reliance on outside consultants. It goes almost without saying that no reliance whatever is to be placed on any advice you get from a hardware salesman. In this situation, as in others, advice that is free of charge, but not free of motivation, is worth about what you pay for it. But the situation is nearly as bad when it comes to independent outside consultants, nor can they really be blamed for it. The fact is, they do not, and could not know your problems, and they are no more likely to be able to pick up what they need to know about your problems in a series of interviews, than you are likely to pick up what you need to know of their expertise in the same brief exposure. There is no substitute for inside expertise, and developing it is inevitably going to be a slow process whether you try to find it inside or outside the staff.

My third lesson comes from watching others fall on their faces. I am glad that I have avoided thus far any really big pratfalls. For the most part I have done my pratfalling in private; the temptations to try and fly before you can crawl are legion, but they must be resisted.

Another lesson, which I feel I am just beginning to appreciate the importance of, is this: do not try to clean up an inefficient manual situation by a direct jump to automated methods. Clean up the manual methods first. It may seem double work, but without it, there is grave danger of blanketing waste motion into the automated plan. I know one big school system which uses five times as much time, money and paper to place an order as is remotely necessary. But instead of eliminating the red tape they are automating it.

The worst pitfall in computerizing, to my mind, is batch processing. You do not hear about it in the beginning. Only later do you find that while your computer could do what you want done, it vastly prefers to do things its own way, with delays all along the line. It can delay your orders, delay your deliveries, delay your payments, and cut you off from ready access to your own data.

Books are not obsolete. Not all inquiry is for easily tagged, isolated facts. Much is for browsing, review, enlightenment, inspiration, entertainment, and for most of these uses the book is a supremely efficient package.

Nor is reading obsolete. Reading as a means of input to the mind is several times as fast as listening. The interaction between

mind and book is "on line" and "random access." For best use of computers we are told to avoid situations where the computer's capacity to process data is bottle-necked by its capacity to take in the data to be processed. The same logic can be applied to the mind. In a vast variety of situations only the book can provide input to the mind fast enough to stretch the mind.

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