Automation, or Russian Roulette?

I feel somewhat like Daniel must have felt in the lions' den, and if I respond in something like an ominous roar, let me make clear that I address myself primarily to card-carrying, dogmatically convinced computerators who have wrapped themselves in the security blanket of the computer, and do not dare to think about the basic problem that it presents to librarianship. If this kind of computerator gets mad at some of the things I say, it is because his ego is involved in the computer, the worst form of slavery for man; if he does not, it indicates he is still capable of independent thought about the basic problems, and there is some hope.

When I was first invited to speak at this clinic because my point of view was "controversial," I thought that, despite the cliché, this would open discussion on the merits of computerizing library operations. After seeing the preliminary program, it was clear there would be no discussion. Rather, I was to be the clinic's token Black. This impression of rank discrimination is reinforced by the fact that I am the last of nine speakers, a kind of soft-shoe shuffle act after the play is over to ease the stir of the audience as it begins to depart.

We Blacks realize what a powerful "establishment" computerators are. One reply to my May 1971 College & Research Libraries article pointed out that the public relations apparatus of computerators is second only to that of the Pentagon. And on the whole, library computerization still wears a jaunty mantle, like that of Superman, which cloaks it from rules that govern every other aspect of librarianship. But it is no longer new, and the cloak is wearing threadbare. Ellipses of fat are seen jouncing through the shredded cloth. As Tennyson once said, "The old order changeth, yielding place to new," and the endless hoard of gold flowing from the cornucopia has dwindled to a trickle of sand. We are all bankrupt.
Let me therefore touch lightly on the financial conditions of some of the universities whose prime public relations pieces have been polished up for exhibition during this clinic.

Two years ago, when I viewed the new Northwestern University Library, I learned from the director that his book budget for the center campus library, where the bulk of demands from a very broad, richly developed program of graduate studies is registered, was less than ours at Hofstra, which is still emerging and has small commitments to a graduate program. When I visited the University of California at Los Angeles Library in 1970, there was severe understaffing in its branch libraries, and its lack of funds for collection development has now become notorious in the profession. In the last two years it has cut its faculty by 200 positions. Stanford University had discontinued significant academic programs, and its president is among the most honest in his forthright declaration that they are unable to afford what they are now doing, despite a mountainous endowment. What university is not in a condition of financial restriction? Yet for the past two days we have been hearing of on-line systems, the most expensive condition of computerization. Under these financial conditions, which are not temporary, how long can we go on spending money for playthings? In my estimation, library computerization has about three years left, during which either joint-sharing or mini-computers will prove beyond a doubt the economic necessity of the computer, or it will go.

When speaking to theologians, one should speak from Holy Script. I, therefore, take as my text Forrester's Law, which states that in complicated situations, efforts to improve things often tend to make them worse, sometimes much worse, and on occasion calamitous. According to Forrester, in complicated situations the obvious thing to do is often dead wrong. With the slides greased in advance by Vannevar Bush and Buckminster Fuller, and oiled by John Kemeny of Dartmouth, librarians slipped into the assumption that the obvious answer to the complexities of radically expanding libraries was computerization of operations. This assumption is dead wrong in general, and I have been exploring for some time to determine whether it is wrong in every particular as well, with no clear indication as yet that it is not. This, briefly, is my central text. I will attempt to bring computerators to realize the depth of their sins, and to lead them to a glimpse of a better world, where the reward is honest living.

Perhaps I should begin with the basic heresy, which I did not invent but did reassert in my earlier article, that the computer poses a managerial problem no different than any other aspect of the library, whether staff, materials or other machines. One must think about the reasons for using it and justify its costs. The responses to that article were varied. One group wanted me to launch a Moslem holy war, a Jiddah, against the Christian dogs. Four computer specialists, two teaching in graduate library school and two in
charge of library computer operations of some consequence agreed that the whole field was a farce, and ought to be wiped out.

Within a month of my article, Daniel Melcher's article appeared in *American Libraries*, stating essentially the same things about library computerization, although we had never met or corresponded. When I wrote to him objecting that his optimistic conclusions about the future of computers in libraries were not justified by either his view or the substance of his article, he replied that I had misread him, that he did not really believe that computers would ultimately be economically justified in libraries. Since Melcher had applied the computer extensively in his own publishing operations, he cannot be viewed as lacking in practical knowledge.

There followed an ad hoc evening session of LARC at the Dallas ALA meeting chaired by William Axford, with Allen Veaner as speaker discussing my article, and with much audience participation. This resulted in a pamphlet by Veaner published by LARC. Veaner gave a good, reasonable discussion of my paper. However, only a few asked themselves the question, "Is Mason really talking about me?" Everyone seems to have assumed that my article referred to computer projects other than theirs.

There have emerged since then, in letters and in print, some sharp differences among library computerators about some very basic issues, with eminent practitioners standing firmly on both sides. Is it possible to control with any degree of sensitivity the quality of programming in a system? I am told by one eminent computerator in Los Angeles that it is not possible, and by another in New York that it is. Is it possible to transfer generally systems of programs from one computer to another? I am informed from Arizona that it is done all the time, and from California that it is possible under rare, optimal conditions to transfer limited programs, but that the chances of transferring a system without accepting totally the same computer machinery are virtually nil. I can add from recent experience on the Hofstra campus that transferring a series of comparatively simple housekeeping programs from an IBM 1130 to a Spectra 7046 has been agonizing, and for a large number of programs impossible, with much reprogramming necessary.

Does multiplying computerized operations by stringing them together in a system make them economical? From California, I hear claims that the systems approach automatically makes everything economical, from Massachusetts, that there is no evidence it does. Is it economical to computerize circulation? From many places I am told this is one of the best operations in which to achieve economy; from New York, the word comes that no one can beat eight to ten cents a manual circulation with computers. And so it goes, vocal opinions on both sides about the economical feasibility of computerizing acquisitions, serials, etc. From these contrapuntal choruses of computer experts I conclude that the field does not really know what it can do successfully, and in what terms, and for what aims. In a very real sense, the
entire field of library computerization is a floating world. This condition by no means warrants the divine conviction that descends, like the Holy Dove, on librarians who computerize operations.

This floating-world mentality is apparent in many responses to my article. While my central point was that the computer could not be justified on the grounds of cost, answers like the following were forthcoming: “It’s successful.” Whether successful in operational, public relations, or economic terms is not mentioned. This is the kind of floating nonthought that angers me because it indicates a total disregard of aims and economics. “Undergraduates like it.” Undergraduates like sex, too; are we therefore to provide it in libraries? “Everyone is pleased with it.” This makes it sound like a rose garden, emphasizing the charm of the computer. In his Dallas speech, Allen Veaner states the following:

There are numerous successful applications that he [Mason] failed to mention or ignored completely. The Ohio College Library Center has a very successful card production system based on MARC tapes. Another, is the New York Times Information Bank that is about to become operational. There is the Ohio State University circulation and book information systems that represent a notable extension to traditional library services, and would not have been possible without the computer. What about Northwestern University’s self-service book charging system? The Harvard University circulation system and the Harvard shelflist conversion project have been in progress for many years, as has the University of California Union Catalog Supplement project.

Now, my central argument was that the computer costs too much, but Veaner does not even mention costs. The Ohio College Library Center at that time was still in a batch system of card production that was 50 percent more expensive than reasonably good MT/ST card production. The New York Times Information Bank was not running in June 1971, is not running yet in April 1972 (after an expenditure of from three to four million dollars), and according to recent reports there is no certainty that it ever will run successfully in the terms it was originally conceived, and almost certainly will not be economically justifiable. (Note that Veaner, a highly intelligent man, scolds me for ignoring a successful computer application that does not even exist. This is the kind of dislocation of brains that occurs among computerators. It must have something to do with machine vibrations.)

Ohio State University Library’s circulation system interests me very much, but Veaner does not mention its staggering development costs or its operational costs of approximately $300,000 a year. Northwestern University’s charging system is a prime example of an operation that was computerized as a public realtions piece, and the 50-page report of this system makes no mention of costs other than the costs of punching book cards. Is this not fraud, that a totally detailed analytical account of a library operation makes no mention of operational costs? If we are to defend Harvard’s and Cali-
fornia’s systems on the grounds that they “have been in progress for many years,” and with no reference to costs, then most library operations can be defended on exactly the grounds on which computerators have attacked them.

What Veaner means by calling these operations successful is that they are running, and I return once more to my basic point: when you are running you are in a race, you are competing. The question is: What can these computerized operations compete with, and in what terms? It is precisely to this question that I am urging the entire field of library computerization. But, as I have tried to indicate, one of the characteristics of this field is a highly visible floating mentality that refuses to ask precise questions in a detailed manner about the aims and intentions of computerization—about why it is being done at all.

This mentality has been encouraged by an elaborate smoke screen that has sheltered the entire field from the probes of reality. From the beginning, and as late as Henriette Avram’s speech with me to the New York Technical Services Librarians in November 1971, it has demanded “a privileged sanctuary not accessible to any other library operation, freedom from cost challenge.”

The first component in this smoke screen was the assumption that librarianship was behind the times, that the times were represented by industry, and that industry should be copied. To one who grew up during the Depression amidst stark evidence that industry did not know what it was doing, the notion that all is right with the industrial world is curiously perverse. Be that as it may, the argument proceeded on economic grounds, replete with graphs and diagrams, to indicate that operating expenditures in academic libraries were increasing so fast that they were likely to ruin the entire economy. Fig. 1 is a graph from a report by Mathematica entitled *On the Economics of Library Operations*, submitted to the National Advisory Commission on Libraries in 1967. The Wholesale Price Index, the cost of goods produced in our economy, is fairly stable from 1951-1966. Included is a comparison of the increase in the amount spent for library salaries per student enrolled (****), and the amount spent for library materials per student enrolled (*****). These comparisons are made on the assumption that universities are factories producing students as commodities. If this assumption is accepted, then it follows that the costs of library salaries and library books have increased faster for each unit of commodity manufactured by universities, than have the costs of commodities in the economy as a whole. But this is both ignorant and ridiculous!

First of all, it assumes that the books bought each year and the staff services each year serve only the students enrolled during that year. Some of libraries’ services such as circulation, are indeed consumed on the spot, but the books remain, and all the services that shape finding tools and the location of books in the collection are permanent additions. A large part of these costs is capital investment, not operating costs.
Fig. 1. Operating Expenditures per Student Enrolled for Libraries of Institutions of Higher Education vs. Wholesale Price Index (1950-51=100)
Beyond this ignorance lies the basic fallacy of comparing the cost of commodities with the costs of operating a library, which is basically a service industry. There is little comprehensive information about trends in the costs of services in our economy, but we do know that each year a larger and larger proportion of the gross national product goes into services and that their costs are escalating rapidly. If the graph in fig.1 had compared the costs of instructional salaries and equipment per student enrolled, it would undoubtedly have shown that they had gone up even faster than library costs; both together would have indicated what we all know—that a greater portion of the gross national product went into higher education after 1951 than ever before. The sharpest increases in staff salaries and book purchases per student begin in 1960, a short time after Sputnik, when the American public decided that education was the answer to everything. To compare the costs of producing commodities with the costs of services tells absolutely nothing about either of them.

Nevertheless, continuing along the lines of pseudo-economics, a group of librarians proceeded to argue that libraries must come into line with industry, that industrial productivity increases about 3 percent a year, while library productivity remains relatively the same. Industrial productivity increases, the argument goes, by application of machinery—especially the computer. The computer must therefore be applied to the library to bring its costs in line with those of the overall economy.

Once again we are comparing the production of commodities with a service industry, but this time we are on unfirm factual grounds. Unfortunately, the figures on which our analysts have leaned so heavily (Kilgour revived this red herring in *American Libraries* for February 1972) end with 1966. In the meantime, we have learned things about our economy. Since 1967, and at a time when industry has been technologized as never before, and when perhaps 80,000 computers were being used in industry, the increase in productivity ground nearly to a halt. In 1969, which was a boom year, and 1970, productivity in output per man hour increased less the 1 percent each year.

This fact has been pointed up sharply by Kenneth Boulding, a high ranking economist, in a speech delivered at Wright State University, in January 1972. He pointed out that while productivity in our economy has been increasing 2 to 4 percent a year for the past century, it has hardly increased at all in recent years. He concluded, "Automation seems to be a total fraud. There is not the slightest evidence of greatly increasing productivity in manufacturing processes."

The absence of a surge in productivity as we increased the use of computers in industry over the past twenty-five years does not seem to support claims for the machine by library computerators. Skepticism about computerization is not confined to me and Kenneth Boulding. Last August,
the annual conference of the Association for Computing Machinery, meeting on the twenty-fifth anniversary of the invention of the electronic computer, was a highly critical, self-lacerating session. A significant paper by Harvey Golub, a principal in McKinsey & Company, an important New York computer consulting firm, described the life cycle of a systems development project as follows: Phase I—Wild enthusiasm, Phase II—Disillusionment, Phase III—Total confusion, Phase IV—Search for the guilty, Phase V—Punishment of the innocents, and Phase VI—Promotion of nonparticipants.\textsuperscript{12}

Beyond this note of humor, Golub cited a survey he had recently made of 100 companies in eleven industry groups, which showed conclusively that investment in computers did not give a company any significant competitive advantage. In fact, four of the industry groups “exhibited essentially a negative correlation between investment in computers and results.”\textsuperscript{13} That is, the more the investment in computers, the less the results. He concludes, “The companies that do well today are not those with lots of computers but rather those with able management in depth.”\textsuperscript{14} This may account for a recent report of a large library with a computerized circulation system that takes a week to reshelve books after they are discharged.

These views from nonlibrarians do not support the view that application of the computer to library operations will automatically increase productivity; indeed, if it costs more to do essentially the same things, productivity will decrease. I think that the get-with-industry smoke screen has by now been demolished.

Two other reasons advanced by computerators for absolving themselves of cost accountability were that collection growth was escalating at an angle of 85 degrees, and that there was a severe shortage of librarians. With the onset of a realistic economy in the academic world, and radical cuts in book budgets during the past two years which will continue, if not increase, in the future, we find that the escalation curve in processing has leveled off or declined. At the present time, the demand for library school graduates precariously meets the supply. In 1973 there will be a surplus of graduates.

I will devote the rest of my talk to the cost of both conventional operations and computer operations. It is clear to me that librarians will have to defend every nickle they spend in terms of effectiveness in the very near future, or have it taken away from them. So let us see what cost problems are, and how to go about establishing whether or not it is justifiable to apply the computer to any library operation.

There are four basic problems related to costs in computerizing library operations: (1) the open-ended cost of development, with no ceiling on costs at all; (2) the unpredictability of operational costs after the system is developed and stabilized; (3) the lack of easily available information on costs of competitive manual or manual-machine methods (i.e., what is a reasonable circulation unit cost) to tell us whether what is being done by computer is
extravagant or economical; and (4) the unwillingness of computerators to approach the real complexities of determining the cost of their operations, and set cost components in a list of priorities by their impact on unit costs.

The first problem has long ago been met by industry, which was so badly burned in converting to second generation computers to the extent that it has held off applying third generation computers because of programming costs.\(^1\)\(^5\) In librarianship, it is clear that the do-it-yourself phase is over. No one can really afford a programming staff, and the future will depend on the feasibility of large group combination efforts, or easy transferability of programs, with local adjustments made by the central university computer staff, or a single mop-up programmer. The other alternative is one which libraries should have insisted on from the beginning—that the computer industry take the library's specifications and bring back a program ready to do exactly what is wanted done, debugged, at a reasonable cost. This is likely to happen, since no longer can a slick IBM salesman charm his bug-eyed, ignorant client into believing that all he has to do is buy a 360/91 and gold will start showering down on him in savings.

For the second problem, the unpredictability of operation costs, industry is turning to outside service companies which either run the house computer on the property, or perform the operations on an outside machine. In either case, specified services are contracted at a known price, and can be dropped if they prove unsatisfactory. As one executive said, "I would like someone to take the cow away and start delivering the milk."\(^1\)\(^6\) The closest librarianship has come to this is with card production services, and I have seen none that can begin to compete with conventional production costs.

The third problem is not as difficult as it seems, since good cost analyses of "conventional" operations are being done all around the country. The task of gathering and assembling them into a manual should be undertaken. All that is needed is one thorough, reasonable cost analysis of a well-run manual circulation operation to establish a target cost for comparison, and the figures for such an analysis do exist, although they are diffused.

In the fourth problem, computerators are hesitating because they insist on the possibility of a perfect cost accounting before they will try any. That is, if it is not possible to determine to the fraction of a cent the assignable costs to one operation of a systems group that is doing three things at once, they do nothing. This feeling is unreasonable, since it is easy to obtain valid estimates for purposes of comparison, which is the main purpose of costing at this point in history.

The other difficulty is that few computerators understand what a valid cost analysis is. During the past year, I have searched in vain for a thorough, honest, reasonable and accurate cost analysis of any computerized library operation. I had been told that a number existed, but upon investigation I found there were really no cost figures available at all.
About a month ago, a professor of library computerization in a graduate library school, with whom I have had a good-natured running dispute about these matters for a long time, wrote me that a noted recently computerized circulation system in an eastern state had figures that "beyond a shadow of a doubt show money saved."\(^1\) I wrote for the figures, and had a call from the head systems analyst who informed me that he did not have any figures that proved beyond a doubt anything. The only figures he had were for consumables, and for machine run-time—no figures for systems salaries, no figures for desk costs. That is to say, he did not even have a general idea of what his unit circulation costs or total costs were. Yet this system is in the process of being adopted intact by ten or more other universities who have no idea what it is going to cost.

If you hired a librarian without setting his or her salary; if you bought a collection of books without setting a price and asked the seller just to send you a bill, denomination unknown, you would be fired on the spot. But you can install a computerized circulation system under the same irrational conditions and get a hero's medal. Is this librarianship?

There are three important reasons why careful cost control of everything in libraries is needed at this time: (1) to be able to defend and maintain, in a fiscal squeeze, those things that we most want; (2) to know what effects budget cuts will have; and (3) to evaluate new changes as they come along.

Let me tell you what I have been sent as cost analyses for computerized operations. The first group is from one of the most highly regarded library computerized operations, a system which has been adopted by all libraries in its state university system, and transferred to three other university libraries. Figs. 2 and 3 comprise the cost analysis sent by its originator to convince me of its cost effectiveness. The figures (fig. 2) for the circulation system indicate numbers of transactions, machine run-time, and the machines required. The figures for acquisitions (fig. 3) show the number of transactions, machine run-time, machines used, and machine language used. Fig. 4 shows total machine run-time for the two systems above plus a documents processing system, and details of development times. In addition, there is a paragraph in an accompanying letter about computer machine costs (fig. 5).

I find it appalling that this is all the information I was given. These machine times are interesting, but one can tell nothing about total costs of the operation from them. There is no list of what steps in any operation are performed, and therefore we cannot tell what collateral steps are performed manually to complete the system. There are no systems salary costs. There are no costs of collecting and preparing data for the computer. We do not know what happens after the computer prepares its reports. In fact, this is no more than 10 percent of the information needed to judge whether the system is cost effective. This is not a cost analysis by any means, yet one of librarianship's outstanding computerators considers it convincing.
Circulation System

Loads

Period 7-1-68 to 6-30-69

1. Transactions 80,000
2. Computer Hours (clock)* 125
   IBM 360 E40
   System 2-2415 (M2 15KB)
   Hardware 1-1403 (600 Lines/minute)
   1-2540
   1-2311
3. Approximate processing time per transaction .1 minute = 6 sec.
4. CPU Hours = about .4 clock hours (or less) for this system.
   CPU Hours = 50

* Includes all support processing and special runs.

Fig. 2. Proof of Cost Effectiveness—Circulation System

Library Acquisitions Information System

System Hardware Requirements

CPU System 360 with 32k bytes core.
   Model 25 or larger.
TAPES Two drives. Any Model.
DISK Total 7.25 Million bytes maximum,
   all work files.
PRINTER Any Model. 1403 best.
CARD READER Any Model. 2540 best.

System Software

99% Cobol "F", 1% 360 Assembler

System Loads (Computer Usage)

Period 7-1-68 to 6-30-69

1. Transactions (new titles) 40,000
2. Computer Hours (clock) 50.5
   Using: IBM 360 E40
   2-2415 M2
   1-1403 (600 L/M)
   1-2540
   1-2311
3. Approximate processing time per title .075 minute
4. CPU Hours = about .4 clock hours

Fig. 3. Proof of Cost Effectiveness—Acquisition System
ANALYSIS OF COMPUTER USAGE BY LIBRARY SYSTEMS AT UNIVERSITY

<table>
<thead>
<tr>
<th>Period Covered</th>
<th>7-1-68 thru 6-30-69</th>
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<tr>
<td>Hours used (clock)</td>
<td>Production</td>
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<tr>
<td>Library Circulation</td>
<td>111</td>
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<td>Library Acquisitions</td>
<td>50.5</td>
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<tr>
<td>Documents</td>
<td>20</td>
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ANALYSIS OF DEVELOPMENT OF SYSTEMS FOR THE UNIVERSITY LIBRARY

This analysis covers the following three systems presently in use at the library.

1. Library Circulation
2. Acquisitions
3. State Document Processing

<table>
<thead>
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<th>System No.</th>
<th>1</th>
<th>2</th>
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<tr>
<td>A. Starting Development Date</td>
<td>1-1967</td>
<td>1-1968</td>
<td>1-1969</td>
</tr>
<tr>
<td>B. Number of Man Hours in Development</td>
<td>720</td>
<td>500</td>
<td>400</td>
</tr>
<tr>
<td>C. Number of Programs</td>
<td>17</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>D. Implementation Date</td>
<td>9-1967</td>
<td>7-1968</td>
<td>6-1969</td>
</tr>
<tr>
<td>E. Support Hours/Month</td>
<td>10</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>F. Total Hours Devoted (Development and Support) Since Development Date</td>
<td>1360</td>
<td>1400</td>
<td>700</td>
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</table>

Fig. 4. Proof of Cost Effectiveness—Machine Run-Time
Several points need to be noted in interpreting the above data.

(1) The hourly rate charged for the system hardware at the time was $80.00 for a commercial user and $40.00 for an internal department. The equipment was as follows:

IBM 360-E40
   two 2415 (M2 15 KB tape drives)
   one 1403 Printer (600 lines a minute)
   one 2540 Card Reader
   one 2311

At the institutional rate of $40.00 an hour, our computer charges for the year's operation (210.5 clock hours) was $8420, or $16,820 if you use the commercial rate. To this has to be added $3084 per year for the IBM 357 data gathering device for the circulation system and $2016 per year for three IBM 026 key punch machines which supported all three systems.

Fig. 5. Description of Machine Costs

The next figure (fig. 6) is an analysis of the costs of a midwestern computerized circulation system. This is a detailed summary of costs by their larger components, which contrasts unit costs of the manual system in the first column with unit costs of the computerized system which replaced it. Note that three disastrous years followed the manual system's removal because of faulty programming. If we assume an annual increase of 5 percent in the manual cost, which is more than it would have been during the three years 1967/68 through 1969/70, the computerized system cost the library $115,000 more than the manual system would have cost. This should have cost someone his head.

In 1970/71 they reprogrammed and cut unit costs, and the economies seem to be increasing in 1971/72 to a unit cost of $0.38 compared to a manual cost of $0.37 five years previously, which surely would have been more than $0.38 by now. This seems to be worthwhile until compared with a manual system (fig. 7). Fig. 6 showed costs for charge-out, discharge, and related functions. Fig. 7 shows the total cost of circulation in another library from charge-out to shelf return, including all costs of stack maintenance, and certain other activities centered in the circulation department. The total cost is nearly $0.10 below the previous out-and-in circulation costs, which in the system represented in fig. 7 are probably less than $0.15. This is not a very efficient manual system; it is my own, and we are revising all aspects of it this year. What does the computerized circulation system provide that the manual system does not? Nothing for which there is a demonstrable need.
**Fig. 6. Cost Analysis of a Computerized Circulation System**

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<td>$750</td>
<td>$1,520</td>
<td>$767</td>
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<td>$674</td>
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<td>1,261</td>
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<td>5,130</td>
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<td>122</td>
<td>4,729</td>
<td>255</td>
<td>2,797</td>
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<td>June</td>
<td>1,518</td>
<td>20</td>
<td>2,555</td>
<td>-</td>
<td>767</td>
<td>2,863</td>
</tr>
<tr>
<td>Sub-total</td>
<td>$28,155</td>
<td>$3,312</td>
<td>$24,850</td>
<td>$9,195</td>
<td>$59,021</td>
<td>$8213</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>$10,767</td>
<td>$14,124</td>
<td>$9,295</td>
<td>$30,021</td>
<td>$8213</td>
</tr>
</tbody>
</table>

**Total re-programmed** 1970/71

**Cost per Loan**: 58¢
Circulation Costs - 1970/71, Main Desk

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>$47,350</td>
</tr>
<tr>
<td>Staff</td>
<td></td>
</tr>
<tr>
<td>Students</td>
<td>$18,257</td>
</tr>
<tr>
<td>Student assistants &amp; tempo</td>
<td>$2,431</td>
</tr>
<tr>
<td><strong>Total Salaries</strong></td>
<td><strong>$68,038</strong></td>
</tr>
<tr>
<td>Sysdac rental</td>
<td>360</td>
</tr>
<tr>
<td>Supplies (tape, ribbons, etc.)</td>
<td>950</td>
</tr>
<tr>
<td><strong>Total costs</strong></td>
<td><strong>$69,388</strong></td>
</tr>
<tr>
<td><strong>Total Main Desk Circulations</strong></td>
<td>198,902</td>
</tr>
<tr>
<td><strong>Cost Per Circulation</strong></td>
<td>28.6¢ each</td>
</tr>
</tbody>
</table>

This cost includes the following procedures:

**Circulation**
- Charging
- Discharging
- Placing "holds" and notification
- Recalling overdues
- Billing fines and lost books
- Collecting fines

**Stack Maintenance**
- Reshelving circulating books
- Reshelving stack-used books
- Exhibiting new books
- Shelving new books
- Reading shelves for accuracy
- Maintaining faculty studies
- Maintaining book lockers

**Searching**
- Searching misplaced books

**Miscellaneous**
- Holding duplicate book sales
- Forwarding orders for lost books
- Forwarding books for repair and binding
- Making change for photocopy machines
- Servicing paper in photocopy machines (nights & weekends)

Fig. 7. Cost Analysis of a Manual Circulation System
From the report of a computerized library operation in Australia which in 1971 had 60,000 volumes in its collection, ten doctoral programs, and was 1,500 miles from the nearest substantial library comes this quote:

**COSTS**

Computer time is free, so the main cost is salaries (approximately $11,000 Aust.) which is absorbed into the total library budget. [They say “absorbed into the total library budget” as though some magic made the cost disappear.] In addition there is a budget component to cover equipment and stationery costs. In 1971 this was $2,000, most of which was spent on 1 disk pack ($600) and DEC Tapes ($600).

This is the only account of costs of the following current operations: an on-line listing of reserve books, a batch acquisitions system, a batch subject catalog of the collection, an on-line circulation system, and a browsing collection index. How casual can a library afford to be about computer costs in a university library that is running ten Ph.D programs on a junior college collection?

The one good cost analysis that has come in the various replies to my article was from Robert L. Taylor, library systems analyst at the University of Wisconsin at Green Bay, who wrote saying that he agreed with much of what I said, but had a COM catalog production system of great interest. I wrote back asking for cost analyses and got, in two sequential letters the best cost analysis I have seen. Most of the costs are not for computer production, unless you consider the MT/ST a computerized machine.

The first sheet of information (fig. 8) begins where one must begin, with a list of all of the steps in the process of the system. Total costs for cataloging, from acquisitions to shelf, are $2.35. I was particularly interested in his costs on steps nine to thirteen, card production by MT/ST, and again he sent me an impeccable cost account (fig. 9). Figs. 8 and 9 contain all the components of a cost analysis that are required to compare one system with another, taking into account differences in staff salaries: (1) a complete list of the detailed steps performed; (2) unit costs of each step, over a considerable span of time, backed by statistics of production, and average salaries per hour; (3) a description of all machinery used; and (4) a report of all applicable costs—everything that is required to produce the end product. If we would begin to publish cost analyses in these terms, and with this degree of precision, within a year we would be able to make the best processes visible.

This paper is in a sense my third generation attack on the central problem the computer has presented for libraries, that is, whether the machine is going to do libraries any good. The question has been twisted beyond any recognition by an army of pitchmen, public relations grimmickers, self-servers, and
The processing steps are:
1. Title from acquisitions searched for MF copy.
3. Typist removes copy and alphabetizes it.
4. Copy is searched in authority and catalog files.
5. Copy in pack and truck of books go to cataloger.
6. Book is cataloged.
8. Book goes to labeling then shelf.
9. Catalog copy goes to MT/ST operator.
10. MT/ST edit copy is produced (28-32 titles per cartridge).
11. Edit copy checked for errors.
12. Edit used in playback to correct tape.
13. Cards are played out and tape is corrected at the same time.
14. Corrected tape is sent for conversion to computer tape (about $1.50/cartridge)
15. Cards are separated for filing.
16. Computer tape is cleaned and compacted and formatted on a 360/40 system.
17. Records will be sorted by LC call no.
18. Data base will be indexed and run through a computer Output Microfilm unit (COM) to produce an MF catalog of our collection. (We also hope to do this on an interlibrary basis).

Fig. 8. Processing Steps

Input (Items 9, 10)

Typist (2.71/hr. average) 13.100 cents/title
MTST (280/mon. average) 6.500 cents/title
Proof cards (2) .014 cents/title

Input subtotal 19.614

Edit (Item 11)

Typist (2.69/hr. average) 5.000 cents/title

Input and edit subtotal 24.614 cents/title

Output (Items 12, 13, 15)

Typist (2.25/hr.-operates 2 machines at once) 7.893 cents/title
MTST 6.500 cents/title
Cards (7.2/set average) 0.050 cents/title

Output subtotal 14.443

Input and output and edit total 39.057 cents/title

All figures are based on monthly average title production of 3,020 (for first 9 months of 1971).

Fig. 9. Cost per Title
self-deceivers both outside and inside the library profession. Many library experts recognize this army and are highly critical of its members when I talk with them personally. But public repudiation is never made even though many librarians know they are doing irreparable damage to any sensible consideration of the place of computers in the spectrum of library services.

Michael Barnett, director of research and development at the H. W. Wilson Company, wrote a very good letter in reply to my article, which indicated, among other things, that he had seen far greater horrors in computerization than any I had witnessed: "I have been appalled by the intellectual corruption and the waste of funds that I have seen in ill-conceived and disarmally mismanaged automation projects in a variety of fields; and by the drivel that has been promulgated as so-called computer science." And, later:

It is possible for a crew of systems programmers to keep an installation in a state of constant upheaval quite unnecessarily, and in particular without the slightest change of hardware or software by the manufacturer. I have seen computer center staffs force users out of compatibility with other installations in matters that are completely standard for reasons that seem to range from downright incompetence, to an arrogant desire to exert control over other people's work, to regarding the computer as a toy for their personal amusement and a vehicle for practical jokes that verge on the malicious. Yet when I wrote him asking why you experts did not cleanse your own Augean Stables, he did not reply.

Until the computer is placed in the same condition as every other component in a library—of being considered useless unless it can be proved otherwise—until we can look at operational cost analyses with confidence in their validity, until we can see precisely what can be obtained at what costs, we are not going to get very far with the use of computers in library operations.

REFERENCES


17. Undated letter received March 10, 1972. I think the writer might not like to be identified in this context.
