

## MACHINES AND THE HUMANIZATION OF LIBRARY SERVICE

by Doralyn J. Hickey

Among the problems which teachers face is that of distinguishing, in their own lectures, between instruction and sermonizing. The difficulty of maintaining this distinction is significantly increased if the teacher—as in the present case—comes out of a background of religious studies. In sum, the difference between preaching and teaching may be characterized as one of objectivity: in the classroom the commitment is to a fair presentation of all reasonable points of view without “pushing” any one of them, while the pulpit calls for the promulgation of “the truth” as understood within the context of religious faith and experience. Preaching, however, has the distinctly negative connotation of dogmatism, a kind of moral indoctrination which brooks no challenge. In one sense, the discussion to follow *is* dogmatic, for it is based upon one assumption which will not be subjected to question during the course of the argument. The assumption is that humanization is good, and further that mechanization which results in dehumanization is bad.

Any normal sermon begins with a text, usually from the scriptures. For this discussion, however, the “text” could perhaps be drawn from a sign displayed over a Houston establishment: “One-day Dry Cleaning—When Needed.” The legend at first appeared innocuous enough; the company was advertising a service. Yet the final abbreviated clause changed an impersonal promise to a matter of human negotiation and decision. In effect, the staff of this dry-cleaning store had accepted responsibility for making judgments about “need.” If a customer announced that he wanted one-day service, presumably the counterman would inquire about the seriousness of the need in relation to the amount of dry-cleaning to be processed; then the request would be accepted or rejected depending upon the evaluation of the circumstances related to that particular case. The genius of *human* service is that it is personalized, individualized, and perhaps unique. The human

response to a human request may vary with respect to the conditions which surround the request; a mechanical response, with few exceptions, is based upon the reduction of particularities to universals, so that the answers given become categorical rather than unique.

In attempting to distinguish between the human and the mechanical response, a difficulty immediately comes to the fore in the guise of the electronic computer. There are those who argue that the computer is a "thinking machine" and thus bridges the gap between man and mechanism. It may well be that future computers will appear to become more "human" in their behavior; however, the present generation of computers does not "think." The electronic machine of today behaves according to predetermined patterns; it is limited in its responses in that it depends upon the programmer's skill and foresight to anticipate general or majority needs. Used even for CAI (Computer-Assisted Instruction), the machine is conditioned by its program to respond in predetermined fashion. Those who view man from a deterministic standpoint may argue that each human being is also conditioned to behave according to restricted patterns. Allowing, however, for the element of human freedom, man establishes his humanity in terms of his ability to respond in unique ways to individual problems.

Specifically, then, what distinguishes man from his machines in ordinary life? For one thing, man can select *shortcuts*. To be sure, computers rely upon random access storage devices to avoid the slow and awkward processes associated with searching via the serial mode; but computers do not—when operating properly—jump quixotically from one data bank to another on the basis of a "hunch." Every good reference librarian looks for shortcuts, however; and many of them can relate numerous stories of "serendipity": the finding of information in a completely unlikely place. It is common for library users to expect the reference staff to produce such shortcuts to relieve the user of tedious "mechanical" searches through hundreds of indexes and bibliographies.

For another thing, the human being *transfers* research strategy from one field to another. Again, the reference librarian, for example, must be prepared to recognize organizational patterns in disciplines which display little logic in their printed records.

Finally—for the purpose of this discussion—man has the ability to *empathize*—to think and feel his way into the context of another. Empathy should not, of course, be confused with "sympathy," for

empathy avoids deep emotional involvement, lest it become so identified with the person being aided that objective help is made impossible. Not all human beings display empathy—witness, the common library situation :

Library user : "I've got to have this book by tomorrow."

Desk attendant : "Why?"

Library user : "I've got a paper due the next day."

Desk attendant : "That's too bad. You should have started working on it earlier."

Despite the fact that not all people empathize, they are *able* to do so, while the machine is not (barring, of course, the infamous HAL computer of "2001: A Space Odyssey," whose response might be better described as perverted sympathy).

These enumerated characteristics of humanity can perhaps be summarized in the term "creativity." The human, as opposed to the mechanical, response draws its fodder from many areas, understands the psychological aspects of the situation, and offers a creative approach to the problem rather than a routine one.

Having argued that machines are incapable of performing distinctively "human" tasks, recognition must be accorded the fact that many human beings imitate machines in their behavior. In other words, substitution of a computer for a man, when the man is already functioning mechanically, does not dehumanize the service rendered. Indeed, the machine may actually improve such service in that it is far more reliable and consistent than its human imitator.

The systems most ripe for mechanization in libraries are those in which the staff is being urged to perform routinely. These systems can often be identified simply by observing staff behavior. If one person continually repeats essentially the same action, which in turn forms the basis for another repetitive action, then "automation" may be possible. People whose tasks are of this type have usually developed a set pattern of operation and are frequently highly resistant to changes in that operation. They understand, perhaps instinctively, that any small change in one routine may destroy the automatic character of the system, for it upsets the balance and alters the pattern. Further, the system as established resists intervention in that it cannot tolerate the interjection of a unique case. Even an experienced supervisor—who may well have devised the system initially—cannot break into its sequence without encountering firm staff resistance.

In library catalog departments, such routines are frequently

constructed for purposes of economy and efficiency. They do not, however, absorb individual requests with ease. For example, it is not uncommon for a cataloger to receive from the acquisitions department a reel of microfilm on which is recorded a group of quite distinct publications. Preparing cards for each of these bibliographically-separate items is time consuming. To reduce this time element, the established system requires that printed cards be ordered for each item for which such cards are available. The remaining items will be cataloged locally after the printed cards arrive. In the meantime, the film is identified by only minimal bibliographic information, normally the author and title of the first item appearing on the reel. Now suppose that a library user wants to see an item which is in third place on the reel. Under the worst of circumstances, he will never know that the library has this work because the system does not provide for listing it until the printed cards have arrived. In such a case, the system defeats the user without his ever being aware of his loss. Suppose, however, that the user is the person who requested that the film be ordered in the first place; he learns from the acquisitions department that the film has arrived and that it has been sent to the catalog department. There he is informed that the reel is being held pending receipt of printed cards and, further, that the system does not permit the lending of uncataloged materials. (Why? Because if the cards arrive before the material is returned, another phase of the system is disturbed.) The hapless user may protest that the department ought to go ahead and catalog the item which he wants; but here again the system would have to be interrupted because it is awkward to catalog only one title out of several on a single reel.

There is value, obviously, in preserving the integrity of the system. If materials are to be processed in an orderly and effective manner, the routines cannot be overturned by the possibly conflicting whims of dozens of disparate users. If the goal of the system is, nevertheless, effective service to *individuals*, then it could be argued that the machine-like behavior of the staff involved has actually prevented one such individual from being adequately served.

The problem just described is not atypical, nor are solutions easily devised. Sometimes the users themselves are sufficiently canny to discover ways to override the system, for example, marking all their order requests "Rush" so that their books will get special attention, or simply prowling through the catalog depart-

ment at night to find what they want when the staff is not around to object. Such solutions, however, have a way of destroying the system in time. A better scheme, the librarians argue, is to mechanize the basic routines, thus freeing the professional staff from systematic tasks to offer individualized, customized service. Whether such freedom actually appears within a machine-oriented operation remains to be discussed.

In passing, it should be noted that a mere increase in the size and scope of the system, mechanized or not, does not assure its efficiency and economy. Some interesting studies have been done by Ralph R. Shaw and others with reference to the optimum size of library operations, but there is little agreement about the maximum amount of efficient centralization which can be structured. Large systems do, nonetheless, offer an impetus toward standardization, which in turn makes possible more mechanization. From the user's standpoint, the large system may represent simply a greater barrier to individual service in that he now must go up against a better established and stronger set of operations, and more subtly, in that the people serving him may be even more remote from his interests than they were before. The industrial assembly lines have encountered the latter problem and have tried to counteract it by encouraging the workers to explore the meaning of their tasks, so that they will realize the potentially devastating effect, for example, of an untightened bolt on a new automobile.

The training of workers for participation in "automatic" systems reinforces the idea of conformity and discourages staff from devising new routines, perhaps even from thinking. While standardized procedures are easier to "teach" (in the sense of "instill"), they do not normally stimulate the imagination. Questions about the validity of the system will usually be turned aside with the comment, "That's just the way it's done. It's part of the routine."

To some degree, even that bastion of individualized service, the library reference department, has succumbed to the temptation to routinize. Students of library science often envision the reference department as creative and imaginative, trying to match materials with readers in a very personal sense. In actuality, however, the number of users to be served, in contrast with the few reference librarians available, often precludes more than perfunctory interviewing at the reference desk. For example, suppose a freshman student approaches the desk and asks, "Where can I

find the *Readers' Guide to Periodical Literature*?" In perhaps 90 percent of the cases, he will be mechanically directed to the index table. But what does he really need? Further questioning might reveal that he wants to find material from which to prepare a class report on the status of nuclear disarmament negotiations. His request for directions came because he had learned about the *Readers' Guide* in high school; it is the only source he knows, but it may certainly not be the best source for his purposes. An empathetic, creative reference librarian would ask him why he wants the *RG* and probe a bit to determine whether he has selected a wise point of departure. A lighted board giving printed directions to the index table could serve the user as well as could a perfunctory answer from the reference librarian in such a case.

Perhaps the ultimate in the human simulation of machine behavior has been reported by a young Canadian librarian. She noted that, during her summer experience as a library assistant in a reserve reading room at a university, the "stock" answer for all questions was, "Have you looked in the card catalog?" Since a cardinal rule in the reading room was silence, the whispered questions from users were not always audible to the staff. One unintelligible question from a gentleman received the usual "Have you looked in the card catalog?" query. The gentleman drew back, somewhat disturbed, and repeated in clearly audible tones, "I asked, 'Where is the *men's* room?'"

A further deterrent to effective reference work in a large library is the fact that the public service staff is often unaware of the way in which technical systems function. It is not uncommon to hear inventive reference librarians devise incredible explanations for the failure of a card to appear in the catalog or for the delay in receipt or cataloging of a new book. Complete removal from the origin of the system and lack of understanding of its development can result not only in frustrated users but also in ineffective library staff members.

Oddly enough, it is not the senior members of the technical services staff who have been the champions of standardization and systematization. Older and more experienced catalogers, for example, sometimes reject standard procedures because they feel that they are impersonal and therefore less useful. Younger librarians, schooled in management techniques, are far more likely to sacrifice personal attention to economy of operation. Ironically, the older librarians—while defending individualization—may discover that the users will align themselves with those who advocate

mechanization; for, unfortunately, the individualized services of the past often had little to do with the true needs of library users. Personal attention was all too often accorded the elite, in aristocratic rather than democratic ways.

The fact that humans can behave like machines does not offer an excuse for eliminating attempts to provide truly human service. It merely serves as a warning that the actual mechanization of what is now being done by "human machines" may intensify rather than rectify the situation. The often cited point of mechanization is to free human beings to perform creatively. The danger is, however, that a machine-controlled system may be even less susceptible to individualization than are the present machine-like manual systems. This danger can perhaps be illuminated by considering the demands which the machine imposes upon the data that it manipulates.

A machine functions efficiently only when its input is consistent and predictable in type and format. Any "exception" must be anticipated, identified, and reduced to a known case. If the ranges of expected information cannot be specified, then the machine either becomes more costly than its manual counterpart or ceases to function at all. Neophyte programmers are well aware of this problem, for it is not unusual for a new program to "bomb out" on its first run through the computer. Why? Because the programmer failed to anticipate data variations that exceeded the ranges initially established. Whereas a human worker might be able to accommodate an unexpected variation, the computers of today cannot; machines will either process the exception in incorrect fashion or stop.

In addition to having a predictable input, a machine must be designed to produce a known type of output. If data manipulations are to be recorded permanently, then a computer must, for example, be linked with the proper printing devices. If the output is to be on perforated sheets today, but tomorrow it is to be on offset masters, this adjustment must be anticipated and appropriate equipment secured. The human ability to change output media almost instantaneously is not so easily duplicated by a machine. The *order* in which the output is recorded must also be predetermined. If programs for alphabetical processing have been written, while programs for chronological sequencing do not exist, the machine will generate alphabetical lists, not lists arranged by date. No amount of human objection will alter this output until suitable programs are developed. Thus, for example, when a library user

wants his bibliography arranged by publication date and the computer is set up to produce alphabetical bibliographies, the user will very likely be told that he cannot have what he wants.

Objections might be raised that a computer can be "taught" to deal with new cases and to compensate for output design limitations. To a degree, these objections are well taken in that appropriate adjustments can be made to overcome limited machine capability. Some print chains, for example, contain fewer symbols than are required for library output. A "new" symbol, such as the Scandinavian "ø" can be produced by combining the "o" with the "/"; however, no creative action was thereby required of the machine—merely that its human master recognize the composite and simulate it on the machine. Thus a unique case can be reduced to two nonunique ones. A similar solution is to redesign the machine to accommodate a new category; in this instance, a unique case is transformed into the first of a new class. The easiest solution, of course, is to ignore variations which have not been anticipated—a recourse which seems to be regularly followed by companies issuing credit cards.

A compromise has also been suggested as a way of overcoming machine restrictions, namely, to process unusual or one-of-a-kind cases by hand. The resultant problem is a familiar one, however, in that it involves greater costs and slows the operation.

Closely related to the difficulties associated with handling unique requirements is the question of error detection. Once an inaccurate bit of information is introduced into a machine system, it will be retained, manipulated, and perpetuated until it is destroyed. A computer can be programmed to detect certain basic types of error, e.g., transposed digits, misspelled words. Some programs for syntactic analysis are able to discover contextual errors, e.g., the substitution of the word "countries" for "companies" in the lead sentence of a recent periodical article—an error which even relatively careful human proofreaders missed but which the author recognized immediately.

One type of mistake which the computer is ill designed to discover, except in very rudimentary form, is the lack of utility of the system itself or of its output. Once initiated, a computer program can run indefinitely so long as the money lasts, but its value can diminish perceptibly so far as the user is concerned without affecting the efficiency of the program or causing any changes to be introduced. This type of error is the most difficult to detect and demands human creativity to correct. The Library of Congress'

MARC (Machine-Readable Cataloging) program was plagued in its early history by typographical errors resulting from a lack of congruence between hard-copy and punched tape produced by the same machine from a single typing. These errors were easily discovered and could be corrected by utilizing appropriate machine procedures. To evaluate the MARC system, however, the staffs of numerous libraries were consulted; no computer could report on MARC's effectiveness as a bibliographic aid.

Presumably a truly automated system—one untouched by human hands—would have to build in certain types of evaluative mechanisms. A user of an automatic bibliographic system would, under such a plan, respond electronically to the data received, indicating its satisfactory or unsatisfactory nature. The system would then adjust itself to adhere more closely to his needs. The parameters in the design and development of such a responsive operation, however, stagger the imagination, especially in view of the tremendous variety of user needs already known to exist. Further, the redesign of an automated sequence is expensive and tedious—an undertaking not to be accepted without being assured that the need for alteration is critical. The days of "stopping the presses" for insertion of a new front page for the "home edition" of the newspaper are probably at an end.

Experiments will of course continue toward the development of user-responsive systems. Probably the best known of these in the library and information science fields is INTREX (Information Transfer Experiment) at the Massachusetts Institute of Technology. Its data base is, as yet, quite small and its user group relatively circumscribed. Hopefully such experiments which rely on tests involving a man-machine interface will point the way toward systems embodying some of the values which are called "human." In the meantime, however, automatic procedures as they are presently designed give evidence of becoming less responsive to individual human needs. And the mere programming of a computer to "talk" and to bid its user "good-bye" will not overcome the trend toward depersonalization.

What can be done by libraries to counteract the emphasis upon impersonal yet economical mechanized procedures, without losing the benefits of such systems? In the first place, members of the professional library staff can serve as *amici curiae*—friends of the court—for their patrons. Put in another way, library "customers" need a personal representative to interpret their needs to the automated system. Although many experiments focus upon a man-

machine interface, it is unlikely that conversation with a computer will be a truly comfortable mode of exchange for many library users. The librarian will find himself in the role of communicator between the machine-based information system and the person who seeks information stored therein. As such, he must understand the query posed by the potential user, translate it into terms which are machine processable, and explain the results to the questioner. In addition, the librarian must be prepared to reinterpret the query in the light of user dissatisfaction and to explain any limitations occasioned by the employment of machine techniques.

In the second place, the librarian can establish or maintain supplementary systems to assist those users whose requirements do not mesh with the services obtainable through a machine-based operation. An example of this may be observed in the development of computer-controlled systems for the circulation of library materials. An eye-legible file is still utilized to supply answers to questions which are not quickly or easily handled by the machine which is operating in a batch-processing mode. The "on line" requests continue to be serviced by manual reference to a card file. The problem of devising a computer-based, on-line procedure at a reasonable cost with maximum flexibility persists and will eventually be solved; in the meantime, a supplementary manual operation performs satisfactorily.

In the third place, the librarian—anticipating automated information systems—can proceed "with all deliberate speed" to conduct user studies and analyses which will provide a sound basis for systems design. Such studies, further, serve to identify the "majority" and "minority" needs so that the minority will not be ignored in developing machine-based bibliographic and technical services. Again, user analyses can suggest the economic breakpoint between manual and mechanized procedures by determining what percentage of the library population can be effectively served through routine operations. These studies will of necessity be conducted scientifically, not by "psychoanalyzing the reader *in absentia*" as is often presently done. The librarian must learn to understand the degree of generality or individuality which his patrons require under a variety of circumstances and to plan both personal and machine systems in accordance with this understanding.

The promise of the future in terms of increased library efficiency and the development of personalized services is great. Current trends indicate, nevertheless, that depersonalization is a formidable danger as mechanization increases. In large organizations there is

already a frightening gap between the computer operator and the district salesman, both of whom are affected by each other's decisions but neither of whom communicates directly with the other. There is little doubt that, left to its own devices, mechanization will continue to treat persons as numbers and struggle to reduce their characteristics to statistical, predictive formulas. The point is that librarians are obligated to counteract this tendency by moving positively to reintroduce human values where their loss is imminent or has already occurred.

Ben H. Bagdikian, a researcher in the field of communications, has strikingly summarized the potential promise and danger of computerization, writing on "How Communications May Shape Our Future Environment" in the *AAUW Journal* (LXII, No. 3 [March, 1969], 123-126.) He notes:

It is ironic that, given the growing population of the world, what we call mass communications might—not necessarily will—but *might* permit us to see ourselves as individuals beyond anything possible since the growth of urban man. If it does not permit this, if all we get is a more efficient impersonality, then we shall have received a very bad bargain.

In Thornton Wilder's *Our Town*, Emily Webb goes to heaven where she sees all of life spread before her, and chooses to go back to earth for one day, on her 12th birthday, 14 years earlier. To her mother and father this is just another day in their lives, but to Emily it is the only day she has, and to the distracted, matter-of-fact manner of her mother she cries out:

"Oh, Mama, just look at me one minute as though you really saw me . . . just for a moment now we're all together. . . . Let's look at one another."

We can hardly characterize our time today as heaven. But we know just enough about the working of our society to be able to see our past and vaguely what seems to be our future. What remains to be seen is whether we are wise enough to arrange a future world in which we can, like Emily Webb, in Grover's Corners, New Hampshire, "look at one another."