*"I know it's around here somewhere,
but I'll be damned if I know where!"*

Personal Information Systems:
the Library Role

By Elizabeth H. Dow

A CONVINCING argument for the need for a new paradigm for information handling was presented by Glenn C. Bacon, director of development liaison for the Rolm Corporation, in his 1985 Lazerow Lecture at the University of Pittsburgh.[1] Bacon argued that we have been working out of an industrial model for creating information systems and contended that it is time to become more sensitive to the function of information. This paper uses his concepts to examine a phenomenon.

Information status

Bacon observed that our model for dealing with information today is an industrial concept of information as a commodity, a material that is frequently measurable and plastic enough to be processed in many ways for marketing to a wide variety of consumers within and outside the organization that generated and/or collected it. Within an organization how much and what type of information one has is a measure of status, confirming the very real connection between information and power.

Elizabeth H. Dow
is a doctoral
candidate, School
of Library and
Information
Science, University
of Pittsburgh

Typically, the powerful, i.e., information rich, seek to control the flow of information to individuals or departments. Consequently an information system tends to pattern the organization it serves and one can accurately describe the power structure by describing the flow of information.

Bacon further notes that organizations and their information systems have become so complex that an increasing number of institutions have created the role of "chief information officer," the factory manager of information. He points out, however, that information cannot be managed like material resources because 1) one can distribute information and retain it at the same time, and 2) the process of information distribution can be invisible.

Consequently, as information gathering and management through desktop workstations becomes increasingly an end user function, information officers cannot effectively serve either as shepherds of information or as engineers of the channels for information flow.

Maslow: levels of information need

Bacon contends that, while the industrial model was useful in its time, its time has passed. We must stop thinking of our information systems in terms of their use as conduits for a commodity and differentiate among them according to the function of the information they carry.

To start that process, Bacon suggests we consider Maslow's model of the stages of self-actualization.[2] It seems to be a particularly useful model, for it not only casts information systems in a new conceptual perspective, but it also contributes to our understanding of why people react to them as they do.

Maslow postulates that individuals' needs tend to present themselves in ways that can be thought of as layers. The first layer, i.e., the most basic needs, focus on survival issues—food, shelter, etc. Bacon suggests that survival-level information is basic financial and resource data used to keep the institution alive, therefore the system that manages it is a survival-level, Level One, system.

After survival, says Maslow, comes the need for unstressed survival—security and safety. Safety level, Level Two, information supports management functions. It is at this level that institutions act on the desire to increase efficiency and productivity in their endeavors and to become sensitive and responsive to their market(s). It is at this level that each institution's uniquely perceived mission is defined and enabled, and Level Two information systems, usually traditional management information systems, support the institutional needs just defined.

Level Three, according to Maslow, has to do with belonging and establishing a sense of role and status within a family or group. Within an organization, Level Three systems are the integration technologies that promise to make the institution operate as an efficient organism in which needed information moves rapidly and specifically from one place to another to keep all systems healthy and working in concert with all other parts of the institution.

These first three are the lower levels in Maslow's model and, according to Bacon, systems to support them have comprised the bulk of the efforts of the information industry to date: systems that are institution based and usually managed by specific departments, frequently with the aid of a mainframe or minicomputer. Historically their information, collected or generated, has fit within the industrial model for resource management.

this level requires that the lower levels, institutionally developed and controlled information systems, integrate with personal systems so that individual needs and institutional needs are both met in a personally unique and highly autonomous fashion of each individual involved.

Libraries and personal info

Within Bacon's paradigm, libraries have been part of both the Level

such that, intuitively, researchers have known that they really need Level Four systems—systems that supply information where and when they need it.

In response, scholars in all disciplines create and maintain Level Four personal collections of materials. These collections contain a wide variety of information sources and types—from books to stacks of computer punched cards—and range from a few dozen to tens of thousands of items. Significantly, Soper also found a direct relationship between the size of scientists' personal collections and the size of the institutional library the researcher was associated with, confirming that their function is not to supplement an inadequate library but to circumvent the inconvenience and stress of library use.

Scholars keep personal collections for the reasons Maslow suggests—the desire to control and integrate one's environment and life.[6] Such control and integration are not easily achieved. Whatever the size of the personal collection, the most vexing part of maintaining a personal information system is the problem of organizing and managing it.[7]

For all the concern librarians have lavished over management and automation of institutional collections and for all the expertise they have gained as a result, library literature reflects very little interest in the problems and needs created by personal collections maintained by patrons. Occasionally a special librarian has been confronted by the problems and has assisted in the development of an institutional system to support the individual systems.[8] As a result, the essential nature of these collections has been recognized as "eclectic, idiosyncratic, and labile."[9]

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The advent of the microcomputer puts the end user at the beginning of a higher level of needs, and a level that is, in terms of organization and management, significantly different from the lower levels.

Information for autonomy

Maslow argues that once people have a secure sense of belonging to a family and a group, they then become concerned about their own egos and their sense of self-esteem. Then, the need is to obtain a unique and more autonomous position within the group. The individual's use of information systems targets these needs. With the basic systems of information needed for survival and function within the institution provided, the end user seeks Level Four, personal information systems that work at the office and also relate to activities at home and in the external world.

They want a cohesive information environment, not just from the point of view of the institution, but also from that of their individuality. With that need, says Bacon, we move beyond the factory model of information overseen by the information officer.

Maslow's final level is self-actualization, in which the individual functions within the group or institution with personal ego needs and institutional needs in harmony. Translated to an information environment

Two and Level Three systems supporting the educational, recreational, and/or research needs of the patronage they were established to serve. Within Level Two, the library has been the warehouse in which information was stored. As part of Level Three it has been the combination of people and guides that facilitate the commingling of patron and information.

Although libraries have a long and venerable tradition, they are not where patrons look first for information. A 1985 survey by the American Council of Learned Societies revealed that academics in all fields except classics regard their personal libraries as more important than the institutional libraries they use.[3]

Northrup et al. found that medical doctors, residents, and students in an academic health sciences center all rely on their personal libraries more than any other source of information.[4] Soper found that, regardless of discipline area, academic researchers prefer to use their personal collections because they are 1) more conveniently located than libraries, 2) arranged to suit the researchers' idiosyncrasies, and 3) always available when wanted—not subject to other borrowers.[5]

Clearly academic and academic health center libraries have been better as Level Two systems than Level Three. And the nature of research is

Personal collection management

Medical literature, on the other hand, since 1967 has regularly carried articles, mostly written by doctors, describing personal collection management techniques. Manual techniques have ranged in sophistication from merely expanding a dismantled textbook[10] to sorting items into cardboard boxes that have been broadly subject divided[11] to elaborate card catalog systems offering multiple access points based on detailed controlled vocabularies.[12]

As computers have become increasingly available, computer-aided indexing and retrieval systems have been included in the battle for personal collection control.[13] At least one medical journal is expressly

organized to facilitate its destruction for filing in the personal collection.[14]

Beginning in the late 1960s, scholars outside the field of medicine developed programs that enabled mainframe and minicomputers to store and index the catalogs of their personal collections.[15] Burton[16] and Hubbard[17] note that personal collection management is becoming increasingly a computer-based endeavor enhanced by: 1) private file services offered by several of the online utilities; 2) off-the-shelf microcomputer software that enables both downloading from online databases and personal file management; and 3) integrated institutional systems that embellish the features mentioned above with conveniences like electronic mail.

In the very near future, CD-ROM systems will undoubtedly take their place among the arsenal of weapons aimed at controlling personal collections.

From Memex to Matheson

A "perfect" personal information system—called Memex—was longingly described by Bush in 1945. Memex was primarily a bibliographic storage and retrieval system with a word processor.[18] Today Memex is less charmingly labeled a workstation and is based on a microcomputer with a modem. Bush's dream, although still not fully realized, no longer seems as futuristic as it once did.

The long-range needs and implications of the new technologies and information management in the academic health science center generally and personal information systems specifically were addressed at length by Matheson and Cooper in their seminal paper.[19] They predict the routine inclusion of training in information management as part of the medical education process.

Their report, which was partially co-sponsored by and enjoys the official backing of the National Library of Medicine, promotes a vision of changes to come in the handling of information in an academic health science center between now and the early 21st Century. The vision is given lifelike modeling by Stearns[20] and Lorenzi,[21] and much money and effort are being invested in its materialization.[22] Matheson and Cooper may prove to be less than perfect prophets, but their prophecy seems destined for at least partial fulfillment.

A follow-up on Matheson and Cooper was issued in 1984 by the Association of American Medical Colleges, the other co-sponsor of their report.[23] Called *Physicians for the Twenty-First Century*, it specifically recommends that every institution providing medical education include a unit on the application of computer technology to medical needs. In response, libraries in academic health science centers across the country are creating courses offering instruction in information retrieval and management.[24]

Personal collections today

Today, most personal collections are not the full Level Four personal information systems described by Bacon; they support the professional without integrating the personal and the professional. But as workstation technology grows, people will want to structure their personal information environments for that level of integration (Maslow suggests that after the attainment of one layer the drive for the next higher is inevitable).

Lundeen notes that librarians are likely to receive requests for advice in designing personal information systems,[25] and others have suggested that librarians ought to be used for just that purpose.[26] Indeed there is evidence that librarians outside the medical world are beginning to respond to the Level Four systems their patrons are creating.

The University of California at Berkeley has established a highly successful program as part of its faculty seminar series.[27]

with the Level Three interfacing function of the professional staff makes librarianship an appropriate profession to offer support for the Level Four systems of the library patrons.

One of the hallmarks of a profession is a unique expertise, and librarianship possesses that. But that expertise is not evident to patrons who only experience its applications and give little thought to its creation and maintenance. Not only have patrons not thought about the conceptual basis for librarianship, but they have found frequently its application to be impersonal, slow, and frustrating. Unfortunately, that is the nature of Level Two and Level Three systems and it is only human to prefer Levels Four and Five (haven't the automobile and trucking industries nearly destroyed the railroads?).

Naturally, researchers prefer their own collections, and within Bacon's model there is no inherent conflict between the library system and the personal information system. As Soper[29] confirms, without the Level Two and Level Three missions of the library, the Level Four function of the personal collection would not be nearly as effective.

As the desktop workstation comes closer to bringing Memex to life, scholars and researchers will be increasingly in need of help in organizing and managing the information their Memex makes available so

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Irrelevancy, threat, or opportunity?

Within librarianship as a whole, however, the inclusion of personal information systems as a professionally appropriate activity has been subject to question.[28] Until now, there has been no model to create the rationale for such a service. Bacon's model suggests that the Level Two function of the library collection and technical services as the source for what is in the personal collections combined

magically (even in Memex: garbage in, garbage out). Librarians can provide that help. Though organizing a personal system is different from organizing an institutional system, the principles are the same. As Bacon noted, since management of the bibliographic environment is something the librarian knows well, "the role of the librarian could extend from being the provider of an information service to that of a profes-

sional counselor on personal information management."[30]

Librarianship can look on the whole phenomenon of personal information systems as irrelevant and ignore it, as a threat and fight it, or as an opportunity to affirm our professional credentials and expand our horizons.

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