

Questions

Dwain Smith of AIAA to Maurice Line:

You made the comment that interlibrary lending does not necessarily increase as acquisitions decrease. Could you amplify on this point?

Maurice Line: In our experience, when acquisition budgets in British libraries first began to erode, interlending increased for two years then decreased. There are two reasons for this: one is that, as library budgets are cut, acquisitions are affected, as is interlibrary borrowing—which costs money. Secondly, as the economic crisis hits harder, it also affects research and the amount of research being done. Thus, the actual users decline in number and their use declines somewhat because not as much research is being done.

Richard Trumbull to Walter Rosenblith:

I've known Walt for a number of years. We've shared many symposia together and they have always been multidisciplinary, interdisciplinary, systems analysis, or some other context of that nature. So it doesn't surprise me to hear him tell us this is a bigger problem than we think it is. He also recognizes a problem unique to biology and I would remind him of an analysis I once did, asking some biologists in a small society what their speciality was. I found their self-described specialities numbered more than fifty-two. Today, BIOSIS is doing a good job of handling the outputs of all those different societies, and it can handle more information with present equipment. The question, and one of your points, is how do we pull it back together again? Where are the scientists who are going to see the bigger picture, put the pieces back together again and provide the synthesis needed?

Walter Rosenblith: I think we live in a period in which biology—obviously having been most successful in the last three decades—hasn't had time to consolidate the terrain. The problem before us is exemplified by the Society of Neuroscience, which within the last decade has been joined by about 10,000 members. The number of various disciplines represented in the Society is rather considerable, and the technologies they use are diverse. In general, our scientific culture has failed to support scientists who saw their task as one of integration. Foundations decided to get out of the business when government support for biomedical research grew in such massive proportions. But there is an opportunity today for foundations to support the right kind of people. At all levels, the kind of integrative task before us is one that can no longer be delayed. Society is not going to support fifty-two—or for that matter fifty-seven—varieties; we have to give them something that can be more easily grasped. And that holds true not only for the Third World. In the Offices of Management and Budget of the

industrialized nations, they ask questions like the following: "How does this come together? What does that mosaic spell for us? How will this new knowledge contribute to productivity?" As Vannevar Bush said, this is one of the crucial tasks of our age.

Philip Grant, University of Oregon, to each of the speakers:

If you were given the task today of designing a university library, how would you do it? In other words, where would you identify your priorities? Where would you put your money, besides the building, of course, in terms of the information that you would store in the library?

Joseph Becker: I don't see any reason why the same principles which were used in creating the research libraries in our academic community in the past would not continue to apply. However, in the process of creating a new library, one would have to take into account the influence of technology in a more exact way than in the past. There will continue to be a need to support faculty and students, the curriculum, and the local need. But there will also be an opportunity to reach out more broadly to other universities and other parts of the world and bring knowledge to that same group which has not existed before.

E.J.W. Barrington: I think it's not only a problem of designing a library: it's a problem of designing a library staff. The two things go together. On your library staff, there should be a group of people who understand what scientists are doing, who will help them in what they're doing, and who will help them to train students in the use of the library, the abstracts, the technological issues which are going to develop, and—by some means—discourage them from thinking that they have used their library to the full when they've studied a very small segment of information which is within their immediate speciality. I cannot dissociate the staff of the library from the design of the building itself.

Maurice Line: I wouldn't design a university library; I'd design a university information service. The only reason a library has books is because books contain information, but this is an oversimplification because many books are beautiful and rare in their own right. However, such books are only a small fraction of most libraries' holdings. I'd want to look at the university's future and where higher education will be going. How inward-looking will it be versus becoming more outward looking? Will it serve wider communities; will it serve a function of self-education as well as teaching? User ergonomics and psychology are neglected. For example, we don't know yet how new forms of communications may affect users or how acceptable they'll be. There is also a great danger we may try to mold users to technology because technology is available and certain things can be done, rather than finding out what human beings are, what they want and how to use technology to serve them. I'd obviously want to look at trends in technology and how they can be adapted to serve users. I'd also want to look at future trends in publication and the forms in which information is stored and transmitted. But I would start and finish with the user; I would design an information service not just a library.

Willis Ware: The question that should have been asked is, if one is going to

design an information infrastructure to support the affairs of the university, how do you do it?

Walter Rosenblith: Dr. Line's comment focuses on two issues. One is that we know very little about the cognitive behavior of users of information. We are really just beginning to understand it. Unless we invest a sufficient amount of effort in studying cognitive behavior, we are going to design information systems that will require continual substantial change. The second point is equally basic: The problems we face today whenever we design any institution, require that we be fully conscious not only of the intrinsic trends but also what the changing extrinsic constraints are, i.e. of society's expectations for the institution. Too often we design simply for a future we view as differing little from the status quo. Paul Valery said it beautifully: "The future isn't what it used to be."

Dale Baker, Chemical Abstracts Service, to Professor Barrington:

Did I understand you to say that biology was easier to index and abstract because it was a more non-restrictive science than chemistry?

E.J.W. Barrington: That it was easier to index? No, certainly not. I said because it was an unrestricted science, its periodical structure was much more complex. It is, if anything, correspondingly more in need of the indexing and abstracting which is being provided for it.

Dale Baker to Mr. Line:

I noted the absence of A&I services in your transfer chain. Was this purposely so or don't you see a future for A&I services in your transfer chain?

Maurice Line: I do indeed. I was talking about the future of libraries, and obviously I had to be highly selective. Clearly there is a role for abstracting and indexing services. Furthermore, there are other levels to be explored. There's the synopsis, which is halfway between the abstract and the full text. We may be moving towards a multilevel information system where you can get just the title of an article, its abstract, its synopsis, or its full text. You can have a sort of scanning and zooming process. Certainly, the library, if it exists in anything like its present form, will have a role in providing access to abstracting and indexing and other intermediary services.

Dale Baker to Dr. Ware:

Beyond the computer, what? What are the alternatives? Don't you see something that's going to take its place? Are there not other technological mechanisms that we have to face, beyond what you've cited?

Willis Ware: I don't see them if we are talking about the technologies relevant to the business of CAS and BIOSIS.

Dale Baker: No alternatives?

Willis Ware: Like what?

Dale Baker: Other than the memory of the computer? Transferred knowledge?

Willis Ware: I'm not talking about the computer only as a memory; I'm talking

about its ability to manipulate information in very general ways, ones far beyond the mundane things that the CAS and BIOSIS machines do today.

Dale Baker to Joseph Becker:

Do you see the A&I services serving the users directly in your bright new future, electronically? Rather than going through the vendors and other third parties?

Joseph Becker: Yes, I certainly do. It seems to me that's the trend. Only the users themselves can communicate the fine points of their own search strategies.

Kenneth Thimann to Walter Rosenblith:

You said there are over 300,000 foreign students in the USA. A lot of those are Europeans. But let's say a fraction of them are from undeveloped countries. Is this an appreciable fraction? Is it our responsibility to organize the science in the undeveloped countries? We have heard quotations to the effect that these people must develop their own science. Is it really up to the USA and maybe a few European countries to bring an organization of science to being in undeveloped countries or is there some way in which this responsibility can be much more widely shared with those few that they have?

Walter Rosenblith: I'm very happy that you asked this question. It is a topic I dropped because of limited time. In my opinion, we are not going to be able to shoulder these responsibilities, and we ought not consider our institutional models as necessarily the right kind of models for developing countries. In January, 1982 I had the opportunity to attend the National Colloquium on Research and Technology, which the French Government organized under the leadership of their Minister for Research, M. Chevenement. There were 4,000 French scientists, engineers, educators, politicians, etc. in attendance, and representatives from about forty countries, of which thirty were developing countries. I belonged to a working group that dealt with the international stakes and, obviously, there were quite a few political slogans in the air. A prepared statement affirmed that, at the present time, foreign students can acquire the necessary information in the needed disciplines. But that will hardly be sufficient. Most leaders of the developing countries do not have enough financial or human resources to build their scientific, technical, and related institutions for what they consider a desirable development agenda.

This is a rather tough task, as the Chinese example has driven home to us. The first few delegations in the early seventies were eager to learn what was new in their field. Not too long thereafter they wanted to know about computers and how they could be used in managing technology and society. Still later on they were most concerned with the kind of institutions they needed to build. Most scientists are not, and do not want to play the role of, missionaries. The World Bank is, at present, undertaking a most difficult job. They are putting at the disposal of twenty-five leading Chinese universities something like \$250,000,000 to allow them to design their new curricula and facilities with the aid of a first-class, multinational consortium of consultants from appropriate fields. One

has only to see what havoc the Cultural Revolution has wrought to be aware of the fact that there is a 'lost generation' of scientists in China. This means that we must communicate with our Chinese colleagues on the basis of a map of the sciences that is—particularly in the area which BIOSIS covers—quite a bit changed from what it used to be. Obviously we cannot say you have to do it yourself, and, yet, there is only so much we can do, beyond remaining in a dialogue from which all parties will learn. While institutions in any given society are almost idiosyncratic, science is truly global.

Philip Grant:

I was reassured by our first four speakers that the book will survive for perhaps several decades. But then Dr. Ware's talk made me wonder. At the same time electrical delivery systems are developing and expanding, something is happening to our education, to the way our children are being educated. There, too, electrical delivery is having a strong impact. Given that kind of impact, to what extent will the next generations be prepared to look to the printed book as a source of their information?

Willis Ware: One point of view is that it's only a technology issue. What is a book after all? It's just a compact way to carry around a bundle of information, and the day that electronic technology reaches the point where you can carry around the same amount of information, equally conveniently for equal amounts of power, and browse through it, books will be dead. So I can argue, from one point of view, that it's a technology shortfall today that permits books to continue to exist. They're a historical heritage from a past of different technology.

As a matter of fact, so are abstracts. I might argue the hypothesis with some confidence, that the days of abstracts are numbered. An abstract is an artifact of a technology shortfall; namely, we didn't have a convenient way to do full-text search plus convenient access to full search. So we invented abstracts as a solution to a problem existing at that time. One could also argue that the days of books are numbered, at least in the technologically advanced countries.

Margaret Foti:

Relevant to the concentric circles analogy that Professor Barrington made, I would like to ask him whether he thinks professionals are being trained adequately to handle the high level technology, particularly to interface with users so that they can get information out of the system. Specifically, do they need different training?

E.J.W. Barrington: Would you clarify your question?

Margaret Foti: I'm asking about the information science people, particularly at the library line, who have to interface with users to help them get information out of the system and often are ill-trained to do so.

E.J.W. Barrington: In a sense they need special training. My own experience is that they are prepared to develop that themselves, within the limits that are necessary. By establishing contact with post-graduate and undergraduate students of the library, they can discover what is needed. They can consult with the staff

and build up an interface by collaboration of the staff of the departments concerned and of the library staff. That seems to be the essence in the present state of libraries. The issue of fundamental importance is the relationship between the staff of the library, the staff of the department and the library users at the undergraduate and post-graduate level. It is desirable to have in a library staff someone with scientific training who can direct operations. It is not necessary that all members should have had that. It's a matter of general knowledge and common sense.