

requests that must currently be filled by lending.

The DSMS also provides information about certain characteristics of the documents being requested. For example, 74.7% of the requests are for journal articles, 18.6% for conference papers, 4.5% for patents, and the remaining 2.2% for technical reports, dissertations, and books. Documents published during the past 3 years account for 63.7% of the requested documents, while those published during the past 5 years constitute 83.9% of the requests. Of the requests, 67% are for documents ranging from 1 to 10 pages in length, 25% for documents of 11-25 pages, and 6% for 26-50 pages. Only 2% of the requests are for documents of over 50 pages. An analysis of the filled requests by country of document publication revealed the findings shown in Table VI.

During the first four months of CAS DDS operation, requests were received at an average rate of 85 per day. By the

third quarter of 1981, this rate had increased to 196 per day. Such rates are modest indeed when compared to those experienced by institutions such as the British Library Lending Division, the National Library of Medicine, and many academic libraries in the United States. However, processing nearly 200 document requests per day has helped some 1300 organizations and individuals satisfy, in part at least, their needs to gain physical access to the documents cited by CAS.

The CAS DDS has received a positive reception from the community it serves, and CAS staff are pleased with its operation. By closely monitoring its performance, areas in need of improvement have been observed, and changes have been introduced in an effort to increase the fill rate and to reduce the time required to process requests. It is CAS's intention to continue to provide a Document Delivery Service that is reliable, economical, and responsive to our customers' needs.

## Our Stake in Data Base Protection<sup>†</sup>

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Received October 5, 1981

Data bases, whether scientific, technical, or personal, are definitely a part of the future for all who generate, distribute, and use information. The trends of technological development, coupled with growing user satisfaction, point clearly toward the ability to use data bases in a variety of new applications. These must be regarded as opportunities to vendors and users as a basis for working out use and pricing arrangements acceptable to both.

What have we learned these past 30 years in dealing with copyright problems that we can apply to the matter of data base protection? Certainly we have worked hard trying to solve the copyright problem:

- We have sat through numerous meetings;
- published equally numerous papers;
- we have formed the Cosmos group, the Upstairs-Downstairs group, to name a few;
- we conducted seemingly endless surveys on the basis of the premise if only we knew how many copies were being made we would be able to solve the problem—assuming, of course, that we could ever reach agreement on what the photocopying problem is;
- we started the Copyright Clearance Center;
- we spent some 15 years getting Congress to pass a bill to settle the problem;
- now we are going to the Courts to resolve the matters we hoped were taken care of by the legislation.

Thus, I am concerned to see the matter of data base protection starting to heat up in much the same way the photocopy issue became a problem. Particularly I am concerned about the assumption that the problems of photocopying from printed products bear a direct relationship to the protection of data bases. The emotional issues may be similar but the practical aspects are different. From my experience to date, it appears that users and publishers have learned some lessons in the years of tilting at the windmills of copyright—lessons that are being applied in working out relationships that will enable both users

and publishers to maximize their respective benefits from automated data bases.

We should note also that the cast of characters involved in data base protection is somewhat different from that which took adversary positions on the photocopying issue. On the data base producer/vendor side the lead in making data bases available for computer search and retrieval was taken by individuals and organizations knowledgeable about computer technology rather than the publishers of print materials. The latter have since recognized the role of data base publishing in their respective futures, and they have acquired the necessary technological skills related to the building and dissemination of data bases.

On the user side of the photocopying issue, libraries played, and continue to play, the leading role. Libraries do have a special set of interests and problems that make it possible for libraries to present a unified position on photocopying. In the case of data bases, the users are more heterogeneous and do not perceive, as clearly as the libraries do, a special set of interests and problems. Even those users coming from a library culture tend to approach data base access differently from access to print products. Therefore, there is less likelihood that a common adversary position on data base access will develop.

As a result of their somewhat narrow interests and concerns, publishers and libraries both failed initially to recognize the significance of developing new technology. Thus the introduction of the Xerox machine was seen as a low-cost information option for users and a threat to the survival of their business by publishers. Only a few recognized this technology and the developing computer technology as an early step toward a solution to more effective and efficient access to information. Needs that were already becoming apparent as

<sup>†</sup> Presented (in part) before the Division of Chemical Information and Chemical Education, Symposium on "The Copyright Law", 182nd National Meeting of the American Chemical Society, New York, Aug 27, 1981.

rising costs began to erode the economic advantage of traditional printed products and specialization of interest began to create new information requirements.

Unfortunately and needlessly, the adversary relationship between library and publishers grew and continues to this date. There are thus far, despite all of the prophecies of doom on both sides, no reported casualties among users who have failed in their work because they were unreasonably denied access to copyrighted information. Neither are there any publishers who have—as yet—been forced out of business as a result of unauthorized photocopying.

How does data base protection differ from photocopying? For one thing, the uncertainty about the future of their business that bothered publishers so much with the onset of photocopying technology has been greatly reduced. As the ease and volume of photocopying steadily increased, publishers began to see that traditional methods of distribution would be challenged. But until fairly recently technology was not yet far enough advanced to demonstrate its potential in a measurable way, nor were users able to test the new systems. In this vacuum of information it was natural that publishers would seek to hold the line on copyright until such time as they could better determine the impact of the new technology on their business. Early on in the development users began to sense the potential for better access to information and were anxious to put the potential to use as rapidly as possible.

While publishers and librarians engaged in the battle over copyright protection, a new class of users and publishers were learning “to live with technology”. They adsorbed the lesson that technology is in itself neither good nor bad but succeeds only to the extent it meets a socioeconomic need. They learned also that technological progress is an evolutionary process. That is, change is the expected norm and yesterday's solutions may not solve today's problems. Even as this paper is being written, technology is being developed that will provide new capabilities to organize, transmit, store, process, and receive information—capabilities to be exploited by users as well as publishers.

About 20 years ago when the first efforts at computer-aided composition were being made, it was suggested that the resulting machine-readable record of the full text of papers would provide a means for direct access to scientific and technical papers via the computer. This suggestion was put down as impossible because in no way would the necessary computer storage capacity ever be available. But we did not have to be too alert to read the signs that computer processing costs were on a downward trend and computer storage capacities were on an equally sharp upward trend. Today it is clear that we have available the processing economics and the storage capacity to put us within a few years of easy access via the computer to full-text data bases.

The signs are even clearer that the impact of microprocessor chip technology is producing a somewhat astounding growth in the use of personal computers. Not only are prices dropping, but also capacity and capability are increasing rapidly. It is estimated that by 1985 you will be able to acquire a micro-computer system with mass storage and a printer for about \$1500. Only those publishers completely out of touch with reality would seek to “protect” themselves against the obvious role these computers will have in the use of data bases. Fortunately, the evidence is strong that today's publisher sees the new markets being created and seeks to cooperate with his users in working out acceptable pricing arrangements.

Another technology-related lesson affecting data base protection is the awareness that the user has become highly sophisticated in the application of computer technology. Much of the technology used by today's publishers of data bases has been made available through the knowledge and skill of the users of data bases. In many cases—maybe in most cases—the

user works with computers at a sophisticated level of application far beyond what is required by data base producers. Effective communication technology, a key factor in making data base access an economic reality, is also the result of computer processing capability far beyond that required for data base publishing. It may have no relevance, but data base publishers appear to be continuing the tradition of their print technology predecessors in leaving research and development to others.

Still another lesson aiding the growing use of data bases is the acceptance of unit pricing—that is, payment for information on the basis of use rather than on the size of a fixed package, such as a book or journal. Before the advent of photocopying machines and computers, publishers had tried a variety of ways to charge users on the basis of use. None were successful. Some credit is due to the genius at Xerox who introduced the per copy concept for use of the machine. About the same time as photocopying was maturing into wide use, CA introduced a licensing concept for the use of its microfilm. Here the product was leased instead of outright sale as a means by which the publisher could be protected against unauthorized photocopying.

Still later we learned to pay for “hits”, to charge for and to pay for connect time, to pay for printouts, and to pay royalties in fulfilling our needs for information. One of the problems of introducing a unit pricing scheme is how to keep track of who owes what. Computers can really do a job of who, what, and how many. It can even issue bills and send dunning letters.

More recently several major data base producers of data bases developed out of long-standing printed products have announced policies aimed at pricing data base use at full cost. In effect, users of many popularly used data bases have been subsidized in part by the print editions. As increasing use of automated access to data bases has reduced revenues from printed versions, publishers are finding it necessary to increase the price of data base access to include the cost of building the data base. Any price increase, particularly a sizeable one, stimulates the buyer to examine the need and/or to find alternatives.

Thus the message is clear for all to read who wish to do so. The technology points directly to an increasing ability to utilize the product of a data base in a variety of applications and higher prices provide stimulus to do so. Such usage might include

- holding data in storage for later use
- combining data base outputs to create a specialized data base for limited use
- repackaging for sale.

In effect, these are the photocopies of computer technology. Not as easily captured as a photocopy on a Xerox machine, but there is a Xerox equivalent. They are called “black boxes”. A discussion of the technology of black boxes is outside the scope of this paper. It is sufficient to be aware of their effective role in capturing the content of data bases for subsequent reuse and to be aware that they are becoming increasingly available and versatile.

Thus, at the user level, the scene is set for using data bases for almost any use that can be conceived. Why then are the publishers of data bases not storming the halls of Congress demanding legislative relief or giving papers at meetings like this to protest the evil of copying from their data bases?

One reason is that today's publisher of data bases is highly sophisticated about the capability of computer-based systems, their reliability, and their economics. This sophistication permits a publisher to bring a data base to market with reasonable expectation of producing sufficient revenue to stay in business. In addition, the users role and capacity to purchase and use data bases has become well defined. As stated earlier,

much of the data base application technology stems from users who are associated with organizations that make extensive use of computers. Thus a common interest focused on computer technology has tended to create a common bond between user and data base publisher—one which enables them to understand each other's needs and problems and therefore to cooperate in working out solutions.

None of this may sound very professional to those who might prefer to talk about data base protection in terms of right of access, need for a national policy, privacy, or the other emotional subjects that seem to come to the surface when we talk about copyright protection. Also, economic and cultural forces affecting our information requirements need to be analyzed in far greater depth than the hints given here. Rather, I have tried to present a sense of the results of those factors at work in a free market place and further to suggest that those forces have tended to produce a healthy marketplace for data base

publishing. What problems there have been to date have been regarded by publishers and by users as minor and subject to ready solution.

There is strong evidence that users recognize the rights of the data base producers and show a willingness to cooperate with publishers in working out arrangements acceptable to both. It appears to be working both ways, with publishers showing a similarly cooperative attitude.

The result is a growing business of data base publishing and a growing clientele of users. Data bases, whether scientific, technical, or personal, are definitely a part of all of our futures. There will be problems to solve. But the trends of technological development, coupled with growing user sophistication, point clearly toward the capability to provide a truly effective system of more selective dissemination.

Our stake is simply to recognize there are not threats—only opportunities.

## The CONTU Guidelines and the Transfer of Scientific Information: Fair Use or Unfair Use?†

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Received October 5, 1981

The CONTU (Final Report of the National Commission on New Technological Uses of Copyrighted Works, Library of Congress, Washington, 1979) guidelines and "rule of five" limiting the photoreproduction of copyrighted works inhibit the transfer of scientific information from author to user and have adversely affected the service mission of the academic research library. The rule of five, essentially a ban on photocopying, has caused uncertainty and unnecessary costs and delay for users of scientific information and goes against the spirit of the U.S. Constitutional clause for the promotion of the arts and sciences. In addition, the guidelines have required costly record keeping in libraries which far exceeds any possible revenue to publishers. Lastly, since authors of scientific works must relinquish their copyright to publishers, publishers rather than authors benefit from the guidelines. It is now evident that a system which was initially designed to serve human needs has become seriously encumbered by the proliferation of materials and advances in technology.

### SCIENTIFIC COMMUNICATION

The transfer of scientific information is an integral part of science itself. It was Michael Faraday who said in 1821 that there were three necessary stages of useful research. The first to begin it, the second to end it, and the third to publish it.<sup>1</sup> Publishing, particularly in the physical and natural sciences, has been the primary means of communication among scientists actively involved on the research front since the nineteenth century. Some of the oldest scientific journals are found in the chemical sciences, and today journals remain the basic means of formal scientific information transfer.

New science builds on recorded knowledge. This is evident in the pattern of citing previously published documents as well as the practice by scientists of using more current literature. And published information by scientists is on the rise. Statistics in scientific-technical journal data prove that there is more published in the pure sciences than in the behavioral sciences, or humanities, or in the related fields. Reasons for this productivity may be the increased pressure to publish in the academic sector, the growth of spinoffs into specialized interdisciplinary fields and the development of printed literature to support them, the trend toward submitting shorter articles for publication and/or republishing previously reported data,<sup>2</sup> and finally, the growth and numbers of research scientists since World War II.

In the flow of scientific information four parties are involved: author, publisher, library, and user. For the sake of effective

transfer of information the most important parties of these four are the author and the user, while the publisher and the library are intermediaries in the process. The use of the information completes the cycle.<sup>3</sup> However, to use published information, researchers must have access to it in all its kinds and forms—books, report articles, conference proceedings, symposia, handbooks, bibliographies, indexes, and abstracts. Scientists demand access to information and, as creators and evaluators of much of this information, have a right to make that demand. Therefore, any system which reduces this width of access to information and dissemination of information will be resisted. Thus publishing organizations and libraries, the intermediaries in the flow of information transfer, are judged by whether they fulfill, or fail to fulfill, the vital part of this information transfer process.

### INFORMATION AS A COMMODITY

In the post-industrial world, information has become one of the most important resources of society. It was clear after World War II that science changed from the occupation of a relatively few independent scholars into a network composed of a well-trained, highly intellectual elite, and this group was courted by governments who wanted to support scientific research. Since this period, science has continued to grow at an enormous rate and so has the information supporting it.<sup>4</sup> Publishing organizations began to capitalize on the unlimited market for information, and they were determined to make as much profit as possible from this powerful new commodity. In recent years many commercial publishers have started new journals, often competing with those from the so-called, not-for-profit learned societies, and costs for these new spe-

† Presented before the Divisions of Chemical Information and Chemical Education, 182nd National Meeting of the American Chemical Society, New York, Aug 26, 1981.