

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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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.¹ 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,² 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.³ 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.⁴ 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-

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cialized journal subscriptions are astronomical. We have also seen those who own information, by possession of the machine-readable tapes of the primary literature, reprocess and repackage the same information in a variety of guises to increase revenue.⁵

In addition, scientific-technical publishing organizations have gained control over authors by forcing them to release their copyrights to them, and subsequently any royalty fees which may be gained, in order to have their work published. Scientists have no choice but to give way to such pressure, because they want nothing more than to disseminate their work to the widest possible audience. However, the new Copyright Act of 1976 has raised many basic questions about the production of copyrighted works for personal and educational uses. Sections 107 and 108 of the new law, which deal with the exceptions to the exclusive rights of copyright proprietors, called the "fair use" exceptions, ambiguously spell out rules for the reproduction of work, and these exceptions focus upon the area of photocopying of copyrighted materials by students, educators, scholars, researchers, and librarians.

BASIC PRINCIPLES OF COPYRIGHT

Let us look at some of the basic principles of copyright and at some of the reasons why copyright has become such a controversial issue as a result of the vast technological developments of this past century.

The principles of copyright originated in Western culture, and their developments were an outgrowth of multiple factors: the invention of the printing press, the advent of the industrial revolution, and the philosophy of the market place and of fundamental human rights.⁶ Copyright was used then and continues to this day to provide the answer to the question of how intellectual creativity is best promoted. The economic tenet underlying the copyright code states that "encouragement of the individual effort by personal gain" is the best way to advance public welfare. Thus, the copyright law theoretically ensures the promotion of arts and sciences based upon the profit motive and thus protects the self-expression of individuals.⁷ This protection is guaranteed by the First Amendment of the U.S. Constitution. However, it is important to distinguish it is not an idea but the form into which the idea is put that is copyrightable. Thus, when publishers put the ideas of an author together in the form of a book or a journal, it is that form which is exclusively owned. Hence, copyright has developed into a monopoly which grants the owner the right to control the publication and sale of the work.

The fair use code represents the principle which takes exception to copyright protection and is made for the common good of public dissemination of information which promotes the "Progress of Science and Useful Arts".⁸ The problem of how best to reconcile the partly shared and partly contradictory interest of "authors who give expression to ideas, publishers who disseminate ideas, and members of the public who use ideas" is the crux of the issue. The fair use code, while not new to the 1976 law, now specifically spells out the amount of photocopying libraries are allowed to provide to users. Once that limit is reached, libraries can no longer make copies from their collections.

CURRENT PROBLEMS

Yet, since the inception of the new copyright law and the CONTU guidelines which require the monitoring and limiting of library photocopying, the copyright controversy has neglected the interests and requirements of the teacher, the researcher, and the scholar and has become obscured by the active lobbying of special interest groups. Copyright has been discussed as a narrow professional matter among these various interest groups in which the researcher, teacher, or scholar has

little bargaining power to assert his rights.

For instance, the question of copyright in scientific journals is different from that in other forms of publication. A scientist has no interest in copyright. He does not get payment for what he has written (oftentimes he must pay to have his works published), and the publishers profit from the sales. Why then should fair use limitations and the questions of copyright be applied to authors of scientific articles? Why should the users of scientific information, who are often the authors as well, be penalized? It is unfair and unethical that scientists may be denied access to material because the library in which they work does not have a subscription to a given journal. Scientists are indispensable to maintaining the tone of our society and to the very life which we all enjoy. They should be treated accordingly.

As viewed by the publishing concern, the problem is that photocopies are exact duplicates of the original work and thus are intended to be a substitute for the original work. It is the publisher's view that a photocopy may diminish the copyright owner's potential market for the original article and therefore technically is considered an infringement on a proprietor's work. Yet photocopying copyrighted materials is essential to the educational process. And while this element to serve the public interest in the promotion of the arts and sciences is the primary goal of any copyright law, it has become obscured by the lobbying of these special interest groups.

We are all familiar with journal article tear sheet services and document delivery services and their associated high costs. Although the turn-around time from the ordering to the receipt of a document is faster than libraries' interlibrary loan service, these delivery services are prohibitively expensive for research scientists. Publishers should not stifle the free accessibility of copyrighted materials by making it economically unfeasible.

In addition, scientists are unfairly penalized by the CONTU guidelines rule of five because in general they use more current literature in order to carry out their research, in comparison to researchers in other scholarly fields. At the University of Oklahoma libraries, interlibrary loan documentation for current titles borrowed in 1980 (while still representing only 1-2% of total photocopy requests) reports that two-thirds of the titles were in the so-called "hard" sciences and the remaining one-third were scattered among the social sciences, humanities, and business fields.⁹

The CONTU guidelines for the proviso of subsection 108 (g)(2) which contains the rule that during one calendar year libraries may make only five copies of any given periodical title published within the last five years has caused uncertainties, costs, and delays to users. In addition, libraries have been burdened with additional record keeping to comply with monitoring these limitations. Patricia Berger, Chief of the Library Division of the National Bureau of Standards, during her testimony before the Library of Congress Copyright Office in June 1980, concluded that the internal interlibrary operations required to comply with the CONTU guidelines add 2.7 h per week to the interlibrary loan workload. While this is seemingly not a great deal of time, it is a large percentage for those titles which exceed the rule of five which are involved in the total workload. She concludes her statement by saying "that the danger to the interests of authors and publishers is slight, compared to the burden imposed on libraries in carrying out the Congressional will".¹⁰

The fact is, if libraries have to spend more money on copying privileges, less money will be spent on the acquisitions of journals. Publishers defeat their own purposes when they insist that copying should be paid for as well. Sales are affected by the price that libraries pay for published materials and not to the extent of whether or not photocopying occurs.¹¹ Publishers may make themselves feel better by blaming journal cancel-

lations and shrinking book orders on increasingly effective library resource sharing via photocopying and interlibrary loan rather than on the real problem of proliferation of materials and inflation. Yet publishers persist with the idea that if they can discourage interlibrary loan and photocopying, libraries will be forced to spend more money to buy books and journals. This is nonsensical since libraries cannot spend money which they do not have. The fact is that with or without effective sharing mechanisms, with rising prices and declining support, libraries simply do not have the funds to maintain their previous acquisition levels. If libraries cannot afford to buy the materials users need and if the law prohibits libraries from photocopying what they do not own, then users will simply have to do without.¹² These hard facts could have severe consequences for the academic scientific research community.

The academic research scientist should lobby to throw out the CONTU rule of five which is really nothing more than a ban on copying. The photocopying of copyrighted scientific material by academic researchers is not unfair; it is necessary, and it should be legal. Scientists should not be denied access to information, and libraries should be permitted to perform the vital role in the information transfer process.

Private sector vs. public sector, profit vs. nonprofit, publishers vs. librarians, publishers vs. users—these animosities are inhibiting and counterproductive to the goals of education and research. However, many of those in the information business are planning systems in isolation from the user. The new mechanized systems should be designed to serve human needs rather than subject users to the tyranny of the system. The consequences may be Orwellian for the researcher as the systems become more powerful and more expensive than is justified by the procurers and users of scientific information. The very basis of traditional librarianship, which is basically ownership of information sources and maintenance of direct service to users, is at stake.

The processes for the transfer of scientific information are changing dramatically, and they will change even more in the next decade. The Copyright Act of 1976 and CONTU guidelines for copyrighted materials are merely a stopgap before newer methods of handling information are fully developed. Copyrighted materials are necessary to the development of science. Librarians need the help of the scientists, as creators, evaluators, and users of scientific information, to see that libraries can continue to provide current, timely, and inexpensive information.

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Introduction to the Symposium on the Uses and Applications of the Wiswesser Line Notation Today[†]

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This introduction sets forth key considerations on the uses and applications of the Wiswesser line notation today. The contributions of the international gathering of speakers in the symposium are introduced in this context.

INTRODUCTION

The historical development and past uses/applications of the Wiswesser line-formula chemical notation or, more simply, Wiswesser line notation (WLN) have been published profusely in the past.¹ The most recent years have been relatively quiet on current uses of the WLN. However, it is the most widely used system of structure symbolism in the world today. The

rules for the WLN are provided in a large, easy-to-use workbook.²

I believe this symposium and others involving computer graphics linked with chemistry clearly shows the maturing of thought and philosophy concerning systems involving chemical structure description beyond traditional chemical nomenclature.

OVERVIEW

It is only appropriate that a symposium on the Wiswesser line notation should start with its creator, Dr. William J.

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