

Copyrighting physics journals

Unauthorized photocopying and republishing by other institutions threatens the wide dissemination of research results and the financial stability of our publishing program.

H. William Koch

Changes in the manner of publishing and disseminating physics information have been coming faster and faster during the last decade or so, and with them they have brought an increasingly urgent need for changes in copyrighting procedures and practices. Every user of American Institute of Physics and its member societies' journals is bound to be affected in some way, as will be the authors contributing to the journals, when journal copyright ambiguities and inconsistencies are clarified. Will the individual physicist, or his library, be able to continue purchasing primary journals and secondary-information products at fair market prices—or will he be subsidizing the commercial use of these products in some other form, or in some other country? Will the one quarter of all AIP society members who (according to one count) themselves contribute, as authors, to the physics literature at some time or other be completely clear as to their rights to protect the scientific integrity of their own published works? Or will they find that questions concerning the re-use of their works dissolve into a fog of international disagreements?

The issues involved in journal copyrights have scientific as well as financial significance; they are also fundamental and critical at this time. Society officers are concerning themselves more and more with the issues and feel the need for involving society members in the problems and the resolution of these problems.

The scientific issues are at times subtle, relating to rewritten abstracts that attempt to duplicate authors' original abstracts, uncorrected pages

that propagate inadvertent errors, and inaccurate translations into another language. But the financial implications are clear. I shall present here some estimate of the substantial reduction in AIP and member-society income represented by subscriptions lost as a result of unlicensed publication of complete issues of our journals in foreign markets, of unlicensed use of abstracts, and of increased photocopying—all matters related to the copyright questions. The sum could be as high as \$1 million per year; compare this to the total subscription income of AIP and its societies, in 1973, of \$4 million (from primary journals) and \$275 000 (from secondary services), and you will see why AIP and its member societies cannot afford to neglect copyright issues. In fact, if the balance becomes very much worse, one can see how the entire physics-publishing operations of AIP and its societies would become imperiled—with repercussions that would extend far beyond the AIP society membership.

I should point out at this stage that there is no intention of attempting to limit the photocopying or reproduction of single journal articles by individual physicists for their own use. Indeed, we take a favorable attitude to the increasing use of the primary journal material, such as in abstract journals or in translations by foreign publishers. This is, after all, in keeping with the Institute's stated aim, the "advancement and diffusion of the knowledge of physics..." But satisfactory agreements must be worked out between the copyright owner and the republisher to protect the scientific interests of the authors and the financial investments of the publisher. Unless agreements are completed, problems are bound to develop. Typical of the existing prob-

lems are those, discussed in this article, that arise from wholesale cover-to-cover copying of all, or parts of, AIP and member-society journals by foreign institutions, other publishers and libraries.

The problems

All of the primary and secondary journals of the AIP and its member societies are copyrighted—see figure 1 for the complete list. The copyright owner (AIP or member society) thereby enjoys, according to one definition,¹ "the exclusive right, granted by law for a certain number of years, to make and dispose of and otherwise to control copies" of the journals. But this protection has disadvantages as well as advantages arising from the fundamental limitation of statutory copyright generally to the "expression of ideas in a published work."² The copyright protects against outright copying, or paraphrasing, but not against a subsequent original work that utilizes the same idea.³

There is a marked contrast between copyright and patent issuing practices. Patents are thoroughly researched and eventually granted to protect the ideas themselves; copyright is perfunctorily registered, without research, when the published work and its copyright notice are presented at the Copyright Office and a \$6.00 fee is paid. Also, to establish proof of violation of copyright one must prove actual copying of the work; proof of patent violation, on the other hand, may be found irrespective of whether the defendant's work is indeed a copy or is an independent creation. Incidentally, there is common-law protection against copying of unpublished works.

In seeking adequate copyright protection for the journals, AIP and its so-

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cieties are naturally trying to protect their financial investment. Currently an \$8 million per year enterprise, this physics-publishing business is worth more than \$30 million when integrated over the past five years. However, there is another aspect that must also be considered. AIP and society journals contain almost 90% of all the physics research and education results published in the US. The journals provide a means for establishing scientific standards; they are the public record of research performed by members of AIP societies, and they are the basic resource embodying the knowledge of physics that AIP and its member societies are chartered to advance and diffuse.

So what is wrong with copyright as far as we are concerned? The three basic reasons for its inadequacy are:

- ▶ The antiquated copyright law of 1909, which could not anticipate new copying technologies such as computerized information systems, photocopying and micropublishing
- ▶ Rapid expansion in the applications of these techniques, without regard for copyright protection and, therefore, without recompense for lost subscriptions
- ▶ Inconsistent, uncoordinated application by AIP and its societies of the values and rights represented by the journal properties.

Here I will be dealing with the second and third of these three points; the reader is referred elsewhere³ for several excellent summaries of the present copyright laws and attempts at their revision.

New copying technologies

Individual physicists have traditionally approved of the rapid and wide dissemination of science information made possible by the photocopying of journal articles. Their attitude could be summed up as "It's great; who cares about the financial and legal details?" This kind of emphasis on easy copying and dissemination may have been appropriate ten years ago before other significant considerations became as compelling as they are today. But we must now recognize that a means has to be developed for obtaining recompense for the production costs of the journals, despite the elusiveness and pervasiveness of the new copying technologies. Otherwise society dues, member subscription rates and page charges for physicists will have to increase, or the journals and the societies will have to stop their operations.

Although AIP and its societies have been actively developing techniques for accomplishing and stimulating wide dissemination of physics results,⁴ these developments must be coupled with an appropriate sharing of expenses by in-

stitutional users, such as libraries, universities and research laboratories both in the US and abroad. Not only does inadequate sharing exist in the US today, but the situation is being aggravated by the rapid growth in the tendencies of various nations to reproduce and disseminate, within their boundaries, scientific and technical information originating in other countries without recompense to the original publishers for the resulting losses in subscription income. Because 55% of the 300 000 subscriptions sold by AIP for itself and its member societies each year are to foreign readers and institutions, the significance to AIP and societies of these international developments is enormous, representing several million dollars per year.

Three examples

To be more specific about these developments let me give in some detail three examples; these are cases where AIP and society journals are reproduced by others on an inclusive, cover-to-cover basis. They concern the photocopying, for sale, of our journals by the USSR, the copying of abstracts by the Institution of Electrical Engineers in London for use in *Physics Abstracts*, and the reproduction of articles by the National Lending Library in England for its customers in the UK. These three examples are typical of the problems we are beginning to face on many fronts as massive operations threaten to displace the roles of AIP and its societies as publishers.

Last year the USSR signed the Universal Copyright Convention (effective 27 May 1973), and one result has been that we now have some details of the extent of cover-to-cover photocopying of journals in the Soviet Union. The data in Table I, provided by the USSR, show that some 15 AIP and society journals are currently being photocopied and sold—every page of every issue—in the USSR. The number of copies of each issue is put at an average of 400, and sales are made at artificially set subscription prices to USSR and east European customers. The additional income AIP would have received had it sold these copies amounts to more than \$300 000 per year.

We have other data relating to complete translations of AIP and society journals made in the USSR, but no detailed information on the books of collected papers, either photocopied or translated from our journals, that we know in some instances are being produced in quantities of about 50 000 copies each.

With the signing of the Universal Copyright Convention by the USSR there is some hope that we can develop equitable agreements with them covering:

PUBLICATIONS OF THE

Owned and published by AIP

Primary Journals and Proceedings
Applied Physics Letters
Journal of Applied Physics
Journal of Chemical Physics
Journal of Mathematical Physics
Physics of Fluids
Physics Today
Review of Scientific Instruments
AIP Conference Proceedings
Journal of Physical and Chemical Reference Data

Translation Journals

Soviet Astronomy—AJ
Soviet Journal of Nuclear Physics
Soviet Journal of Particles and Nuclei
Soviet Journal of Quantum Electronics
Soviet Physics—Acoustics
Soviet Physics—Crystallography
Soviet Physics—Doklady
Soviet Physics—JETP
JETP Letters
Soviet Physics—Semiconductors
Soviet Physics—Solid State
Soviet Physics—Technical Physics
Soviet Physics—Uspekhi

Secondary Publications

Searchable Physics Information Notices (tape)
Current Physics Microform (microfilm)
Current Physics Advance Abstracts
Current Physics Titles

Owned by the American Physical Society

Primary Journals

Physical Review: A; B; C; D
Reviews of Modern Physics

- Physical Review Letters

Secondary Publications

- Bulletin of the American Physical Society
- Physical Review Abstracts
- Physical Review Index

Owned by the American Association of Physics Teachers

American Journal of Physics
The Physics Teacher

- AAPT Announcer (bulletin)†

Owned by the Optical Society of America

Journal of the Optical Society of America
Program of the OSA (bulletin)

- Applied Optics
- Optics and Spectroscopy (translation)
- Soviet Journal of Optical Technology (translation)

Owned by the Acoustical Society of America

Journal of the Acoustical Society of America
Program of ASA (bulletin)

Owned by the Society of Rheology

- Transactions of the Society of Rheology
- Rheology Bulletin†

Owned by the American Astronomical Society

Astronomical Journal
Bulletin of the AAS

Owned by the American Crystallographic Association

- ACA Newsletter†

Owned by the American Association of Physicists in Medicine

Medical Physics

Owned by the American Vacuum Society (affiliated)

The Journal of Vacuum Science and Technology

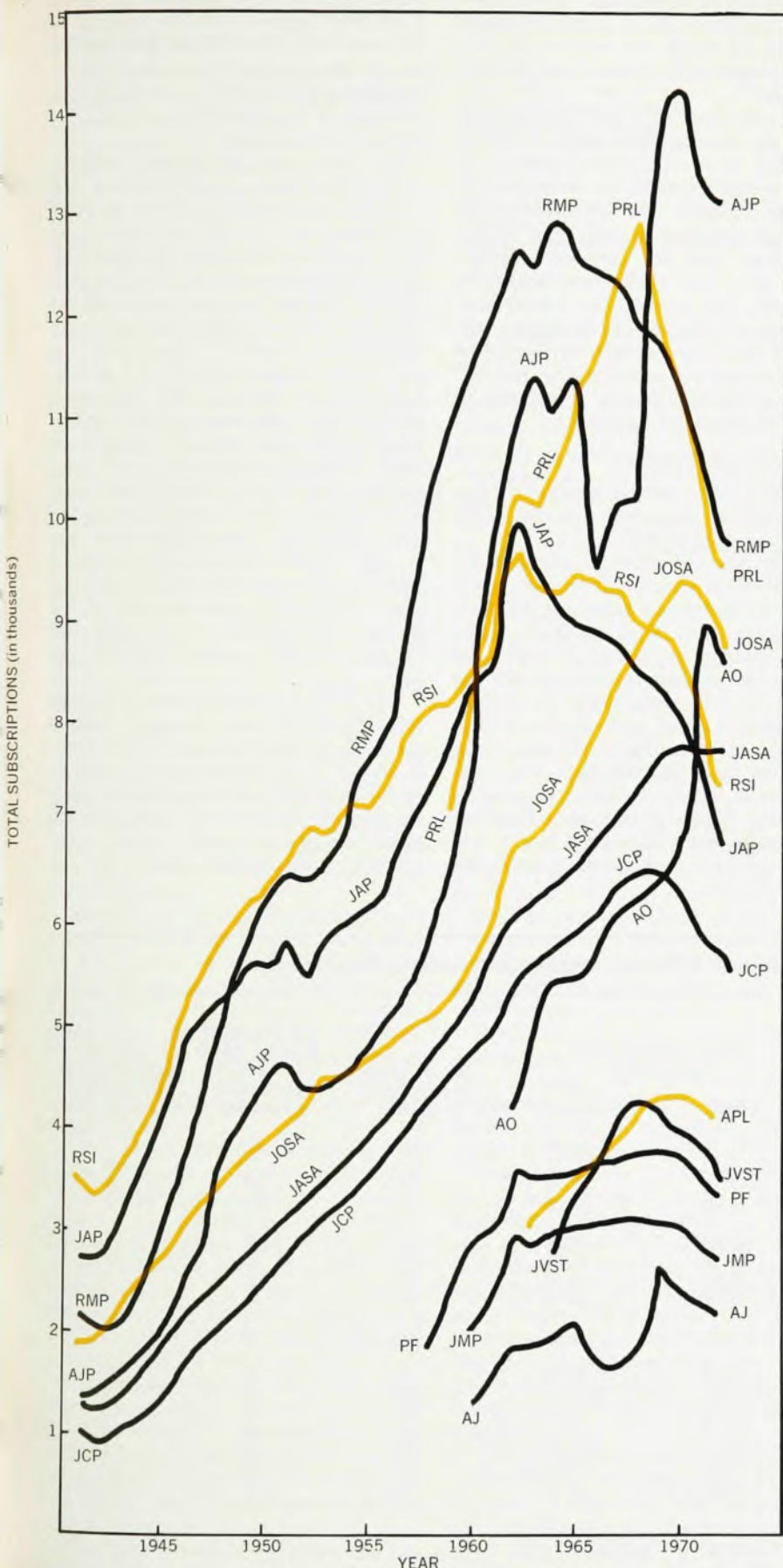
All journals are copyrighted by the owner except where shown otherwise

* Jointly copyrighted by AIP and the American Chemical Society

† Not copyrighted

- Journals shown with this bullet are published by the owning society; the remainder are published by AIP for the society.

AN INSTITUTE OF PHYSICS AND MEMBER SOCIETIES



AIP and society publications are listed at left, arranged according to owner. The graph above shows total subscriptions (member plus nonmember) since 1941. Figure 1

- ▶ dollar payments to AIP for lost subscriptions for some journals
- ▶ royalty-free permission for AIP and the Optical Society of America to continue their translations from Russian into English of 15 Soviet physics journals, including about half of the Soviet physics published in journals, in return for:
- ▶ reproduction privileges in the USSR for some of our journals
- ▶ reductions in the number of complete copies of AIP and society journals produced in the USSR, competing with our own sales in Asia and both western and eastern Europe.

Negotiations now in progress are expected to set up a similar pattern of future agreements with China, India and other countries.

My second specific example concerns *Physics Abstracts*, produced in London by the Institution of Electrical Engineers. This publication uses, verbatim, every abstract from every journal published by AIP and its societies. Abstracts taken from AIP and society journals represent a large fraction—more than 25%—of the total numbers of journal abstracts in *Physics Abstracts*.

In recent times, increases in the amount of physics literature to be covered and in the unit cost of including each abstract combined to force up the subscription prices to *Physics Abstracts*, the key IEE service (now at \$380 per year compared to \$12 per year in 1967). The result was the virtual elimination of the individual physicist subscriber from the market for comprehensive abstracts services and the concentration of IEE on institutional subscribers. On the other hand, AIP's obligation to attempt to serve individual members with useful abstract services continued.

In order to meet that obligation, AIP has negotiated with IEE to supply AIP's abstracts in computer-readable form and to be recompensed equitably for the substantial savings accruing to IEE as a result. Part of the agreement would result in income to assist in the improvement in secondary services of the sort listed in Table 2 and supplied by AIP to individuals. Thus the agreement would have financial as well as scientific implications and would provide IEE with licensed use of AIP's copyrighted abstracts. Abstracts written by authors and reviewed by editors are just as much a part of the journal article as are figures, tables, and individual paragraphs, all of which are protected by copyrights.

We hope that negotiations with IEE will lead to the continued use of our author-produced abstracts together with some arrangements for sharing of the financial return from the institutional sale of physics secondary services. Thus AIP could support the development of this kind of service for its

memberships at reasonable subscription prices, in analogy to the way institutional income from the primary journals allows AIP and its societies to provide members with primary services at low subscription prices.

Other abstracting and indexing services, such as Chemical Abstracts Service, Engineering Index, *Bulletin Scientifique* and *Referativni Zhurnal*, should recognize that we encourage them to use the abstracts from AIP and society copyrighted journals, so long as they do not produce English-language, secondary services in the science of physics that detract from services AIP could produce for its own society memberships with its own copyrighted material. Therefore, we plan to institute procedures for licensing the use of our copyrighted material by other services, and we expect that in most cases these licenses will be readily granted.

The services offered by the National Lending Library, Boston Spa, UK, provide me with my third example of new copying techniques that affect our operations here at AIP. This library has developed an overnight mail service through which copies of articles from any journal can be supplied to customers in the UK at low cost. Such an operation is the forerunner of future similar services in every major country of the world. The major English-language abstracting and indexing service in the science of biology is eagerly awaiting⁵ the arrival of such services in

the US, and in that same field an investigation is in progress "to discover whether there is not a large number of journals for which one copy could adequately serve US, British and Canadian users."⁶

The position AIP and its societies takes on developments such as these, intended to provide better access services to the journals, is, of course, favorable. Indeed, we are eager to see such services growing, and plan to support them with the products and services that are their raw materials. However, just as with the Soviet photocopies and the use of copyrighted abstracts mentioned earlier, we should be recompensed for subscriptions lost because of these services if we are to maintain financial viability.

The financial situation

How much money is involved in lost subscriptions from, say, just the three examples cited above?

From the information supplied by the USSR on their photocopied-journal sales, we know we have lost \$300 000 each year from that category alone. Add another estimated \$100 000 for losses due to their translation journals and book collections made up of AIP-published articles, and we find a total loss to AIP from the Soviet operations of more than \$400 000 per year. For the loss of income to AIP and societies resulting from the lack of a licensing agreement with IEE for *Physics Abstracts* we can look at the conclusions

of IEE's negotiating team as they were stated during the summer of 1973. That team agreed with the concept of AIP receiving \$190 000 per year for the use of the computer tape, and we can therefore assume this to be a minimum estimate of the annual loss in AIP income from this source.

My third example above, cover-to-cover reproduction of articles from AIP and society journals, gives rise to a loss of income that is much harder to figure than it was for the first two examples. The loss of subscriptions that the AIP and its member societies have suffered over the last five years has been substantial—see figure 1. We have lost about 20% of the total number of subscriptions we had in 1966. Domestic non-member and member subscription losses account for most of this decline, while foreign subscriptions and total society membership have been relatively stable. We therefore make the assumption that the subscription loss is attributable largely to wholesale copying of single articles by institutions in the US. An estimate of the dollar value of the subscriptions lost for this reason is about \$400 000 per year.

The total estimated losses for these three effects is thus about \$1 million per year, an estimate that is admittedly crude. If this money were available to AIP and the member societies, page charges to authors and subscription prices to readers could both be decreased, with obvious benefits for the

Table 1. Reproduction of AIP and society journals in the USSR

Journal	Subscription rates (in rubles)		No. of copies produced by USSR	No. of copies sold by USSR to eastern European countries	No. of subscriptions purchased through AIP
	USSR	AIP- Society			
American Journal of Physics	11.76	17.25	425	90	2
Applied Optics	27.00	41.25	474	71	4
Applied Physics Letters	12.76	21.40	283	30	19
The Journal of the Acoustical Society of America	29.40	36.00	462	114	2
Journal of Applied Physics	53.88	46.90	695	120	7
The Journal of Chemical Physics	99.36	92.25	425	91	12
Journal of Mathematical Physics	24.60	38.25	253	57	2
Journal of the Optical Society of America	16.08	34.50	495	74	2
The Journal of Vacuum Science and Technology	5.40	29.25	276	69	4
Physical Review, A, B	85.20	92.25	436	57	28
Physical Review C, D	127.80	103.40	338	51	72
Reviews of Modern Physics	7.48	9.75	469	74	15
Physical Review Letters	31.72	47.25	424	60	20
The Physics of Fluids	26.16	38.25	314	60	3
Physics Today	12.36	10.15	251	47	15
Bulletin of the American Physical Society	11.60	13.15	248	35	5

\$1.00 = 0.74 rubles

Data obtained from Yuri K. Melnik, Assistant Science Attache, Soviet Embassy, Washington D.C.

"advancement and diffusion of the knowledge of physics."

Copyright principles

To protect the financial viability of AIP and society publishing operations, the appropriate principles involved in the copyright process need to be presented and understood in some detail. We should remember that the particulars of the copyright claimed for a given physics article will affect four different individuals or groups: the author of the article, his employer, the publisher of the journal and individual users and republishers. Let us consider each in turn.

First, the author of the article. He originates the material that is published and usually makes the decision on where it should first appear (with either active or tacit agreement of his employer). He decides whether the subject matter of the article should be patented, whether it should be supplied to a publisher for a fee, or to a publisher (such as AIP) who expects a fee in the form of page charges. Once he makes this decision, the author should comply with the conditions of the publisher—normally stated in the journal or by a separate letter.

If the author decides to publish with AIP or one of the member societies, he should be asked by the publisher to assign, in writing, full publication and republication rights to the publisher. This request should be made at the time the editor accepts the manuscript for publication.

Should the article be subsequently republished, either by itself or as part of a collection of articles, the original publisher should give the author the opportunity to register errata or corrections to the material as first published. Thereafter, the publisher should serve for the articles in his trust as the scientific and financial negotiator with republishers.

The author should have the right to make nonprofit or noncommercial use of his work, provided he affixes to each copy, in the position legally required, the copyright notice used by the AIP or society publisher when the article was first published. To make or authorize commercial use, for profit, of his work the author must first obtain the written consent of the AIP or society.

I mentioned earlier that the copyright protection is limited to the expression of ideas in the published work and protects against outright copying of the work but not against copying of the ideas. The author must be aware of this limitation.

The author should be given the opportunity to write his own abstract, and also to assign the appropriate classification and indexing terms required when the article is inserted into the

Table 2. Secondary services

Meeting programs of abstracts (for example, BAPS, PASA, etc)
Physical Review Abstracts
Annual journal indexes
Cumulative journal indexes
Current Physics Titles
Current Physics Advance Abstracts
SPIN computer tape of abstracts from journal articles
Bibliographies (lists of articles) on a given subject
Journal tables of contents

data base of an information-retrieval system. He can thus be assured of the scientific validity of both abstract and classification. This author-written abstract then becomes as much a part of the copyrighted material of his article as the individual paragraphs of the main text, or the figures, tables, and so on.⁷

The second individual affected by copyrighting procedures is the author's employer. He normally helps to defray the cost of publication of his employee's manuscript, if it is to appear in an AIP or member-society journal, by making a page-charge contribution; in return he may want to retain some rights over the published material. For example, the employer might give permission for first publication only, reserving to himself the rights for republication if such conditions are accepted by the publisher. If no conditions are stated when the manuscript is submitted, the publisher must assume that there are none—except those dictated by custom or tradition.

When the employer is the US Government we have a special case. Articles written by US Government employees as part of their official duties are in the public domain and are not covered by copyright.

The publisher is the third individual for whom copyright interpretation is important. He may elect to publish only that material for which he has full publication rights, both for initial and republication. AIP-owned journals operate under the principle that unless otherwise stated, submission of a manuscript is a representation that it has not been copyrighted, published, or currently submitted for publication elsewhere.

When a publisher such as the AIP or a member society copyrights an issue of one of its journals, the rights apply to the whole issue. Such a copyright gives the publisher, as against third parties, "the same rights as if he had secured a separate copyright on each individual piece."⁸ This statement applies equally to the copyright protec-

tion of each individual abstract of a copyrighted issue of *Physics Abstracts*, for example, as it does to the protection of each individual abstract in an AIP or society copyright journal. For this reason, abstract services (such as Chemical Abstracts Service) have insisted that their copyright notice appear on copies made, under license and for a fee, of pages and abstracts from their abstracts journals—even when these abstracts are taken verbatim from copyrighted journals.

Lastly, we should consider the rights of individual users and republishers. An individual scientist has an accepted right to copy a copyrighted article for his own use under the traditional copyright concept of "fair use." Republishers, as in the three examples in this article, will at times use the argument that they are operating under the "fair use" concept. Clearly, when a republisher uses every page or every abstract in a systematic, production manner, whether for commercial or noncommercial purposes, he is doing something more than "fair use" and is in infringement of copyright if he does so without permission of the copyright owner.

What are the prospects?

Our examination of the copyright issues that face AIP and its member societies has shown how complex are the problems that arise under US copyright laws; then how much more complex must be the international implications! The examples quoted earlier in this article demonstrate in some degree how the AIP and member societies' publishing program interacts with the programs of foreign publishers, libraries, and so on, each operating under the copyright law of his own country. These other nations too are taking a hard look at copyright legislation in the light of modern developments, with the result that we can expect a shifting pattern of interrelating national copyright laws to affect our physics journals for some time to come.

One example of the kind of change we might expect is the licensing scheme, varieties of which are being tried out in at least three countries—Sweden, France and Canada. The Swedish scheme permits multicopying of works protected by Swedish copyright only on payment of a small fee. Surveys indicate that 150 million page-copies are made in Sweden each year; rough estimates for the US suggest that several billion page-copies are made here per year. Even if the new scheme works in Sweden (and it is still too new for conclusions to be drawn) we cannot be sure that a similar plan would be appropriate here.

While we are monitoring possible US developments in the national copyright

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laws, AIP and its member societies have to keep in mind the framework of the entire US publishing business and be aware of how they fit into that framework. We would deceive ourselves if we believed that new copyright laws will be drawn up solely for the benefit of this institute and its societies—or even for the entire scientific publishing effort.

The problems of the scientific journals are quite dissimilar from the problems faced by the publishing industry as a whole; in the area of photocopying, for example, where according to one estimate an average physics article is of special interest to only six readers and would be copied by an equally small number.

Any conceivable new copyright law in the US would be directed primarily to the larger needs of the general publishing industry. One could imagine circumstances in which rules framed for this community would wipe out the specialized scientific journals.

Currently changes in the law are less important as a day-to-day threat than changes in reprographic technology, which is moving very fast in the US and indeed over the whole world. Each new advance in copying technology is potentially a new area where AIP and society copyright protection might be eroded yet further.

The institute and its societies must establish clear and complete copyrights on all their publications, protect these rights once established, and continuously and closely monitor all developments that could endanger their own financial investments and the scientific accuracy of their members' published works.

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