versity of Virginia. In addition there will be a program of contributed papers. Dr. Clyde B. Crawley, University of Alabama, is chairman of the Biophysics Symposium.

THE 1939 annual summer term of the American School of Prehistoric Research will open in Paris on July 1 and close in France on September 9. The tentative program includes laboratory work and visits to the museums in Paris and Saint-Germain-en-Laye; visits to the principal museums and excursions to important prehistoric sites in various parts of France, and practice in excavating at two or more sites. The Abbé H. Breuil, an authority on Old World prehistory, will be in charge of the course, assisted by Harper Kelley, a former student of the school. They will have the cooperation of various French specialists. Prospective students should apply for enrolment as soon as possible. Applications for enrolment and for further information should be addressed to George Grant MacCurdy, director, American School of Prehistoric Research, Old Lyme, Conn.

WE are requested to state that all reprints of the work of the late Professor George Barger have been deposited in the department of chemistry of the University of Glasgow, and that copies can be obtained by application to the secretary of that department.

THE Office National des Universités et Ecole Françaises has offered a graduate fellowship of 18,000 francs for the study of science at a French university. Two fellowships of a similar amount are being offered for study in Paris by the Société des Amis de l'Université de Paris; one for a graduate student to undertake scientific research and one for a graduate student specializing in the study of international relations. Application blanks may be secured from the Institute of International Education at 2 West 45th Street, New York City. The closing date for filing applications with complete credentials is April 1.

A GIFT of $100,000 has been made by Bertram J. Cahn, of Chicago, toward the fund being raised by Northwestern University for the erection of Scott Hall, as a tribute to President Walter Dill Scott, who will retire next autumn to become president emeritus. The sum of $200,000 has been given for the Hall by the Woman's Building Association of the University Guild and the sum of $85,500 has been received from various sources.

DISCUSSION

MICROFILM COPYING OF SCIENTIFIC LITERATURE

SCIENTIFIC research may in certain rare cases be pursued for personal gain, but its publication is practically always solely for the benefit of others. The real problem is to insure its widest possible dissemination to those best able to make use of it for the advancement of science.

By far the largest part of scientific research is published under the auspices of institutions, societies, associations, governmental agencies, academies or other organizations having for their object either the advancement of learning or the industrial applications of scientific discoveries. The supplementary diffusion of scientific literature by means of microfilms is, accordingly, in entire accord with the aims of those who are principally responsible for its publication.

There are, however, a small number of scientific periodicals which are published by private initiative, and some of these are copyrighted or prescribe restrictions in regard to copying their contents. It is this relatively small number of journals which give rise to the question as to the legality of microfilm copying of scientific periodicals.

In the case of these, as with research periodicals in general, the contributors are very rarely paid and of course do not participate in the profits, if any, derived from their publication. It may, therefore, be asked whether it is the contributors or the publishers who are entitled to the protection afforded by copyright. It is evident that the contributors do not desire such protection and it is certainly rarely possible for the publishers to benefit from it. It is, therefore, not clear why any publication of scientific research is ever copyrighted.

Although it was believed that a very small proportion of scientific periodicals are copyrighted it was decided to make a survey to ascertain approximately what proportion are so protected. For this purpose 101 periodicals received in the field of biological and agricultural chemistry in the library of the Pasteur Institute of Paris were examined, and only 15 found to bear the copyright mark or make any reservation in regard to copying their contents. Of the latter several prohibited complete or partial reproduction except by authorization. It is probable that many of the copyrighted ones would also grant permission for microfilm copying if requested. It may be concluded, therefore, that the proportion of current scientific periodicals restricted in regard to microfilm copying is very small.

In this connection it may be mentioned that Bibliofilm Service has been operating in the library of the U. S. Department of Agriculture for four years and has now attained a monthly distribution of more than 20,000 pages of scientific literature copied from several hundred periodicals, for more than a thousand research workers in the United States and elsewhere, and has never had a complaint of copyright infringement. This

may be considered good evidence that in so far as scientific literature is concerned, the limitations of microfilm copying imposed by copyright is negligible.

There is, however, another angle of the subject which has been suggested as of perhaps greater importance than the legal aspect. That is, the effect which the general distribution of the material printed in current journals may have upon their circulation. It can not be denied that certain ones, devoted to narrow fields of learning, do have great difficulty in securing and earning the support necessary for their existence. In these cases it is possible that some individuals and even libraries would not subscribe to them, if the papers they contained could be obtained in the form of microfilms for less than the cost of the subscripiton. These, therefore, might be damaged by unrestricted microfilm copying.

This situation, however, raises the question whether the printing of journals which fail to command sufficient support to pay their way is economically justified. There is little doubt that the present system of publishing certain very highly specialized research is extremely wasteful. In the case of journals of interest to a very limited number of workers the expense and effort necessary for their editing, printing, distributing, cataloging and conserving in libraries should be weighed against the advantage to the small group of persons capable of making use of them. Of course if publication by printing was the only means by which the results of highly specialized research could be brought to the attention of persons capable of making use of it for the advancement of science, there would be no question of paying the cost, no matter how great. Fortunately, however, the development of microfilms has introduced a far simpler and more economical plan of distributing such reports to other workers. This is by what has come to be known as auxiliary publication. By it, the author publishes in the widely circulating printed journals only such details of his work as are necessary to acquaint others with its scope and conclusions. He prepares for an authorized depository a detailed description of his experiments, accompanied by tables, charts, illustrations or anything else needed to convey to others a thorough comprehension of his work. This complete report serves for the preparation of microfilm copies which are given an identifying number corresponding to the number which accompanies the printed summary of the work. Those who read this brief account in the widely circulated journal and desire the complete paper simply order a microfilm copy of it by number from the authorized depository at a very modest price. Only the number of microfilm copies that are ordered are made, and only one repository is charged with keeping the original paper. Thus the cost of printing, distributing and conserving in libraries voluminous detailed reports of research, of interest to only few workers, is completely avoided.

This plan of publication also has another very important advantage. The rising costs of printing and increasing number of papers submitted have forced the publishers of practically all scientific periodicals to insist on the greatest possible condensation of the papers they print. This results in the publication of many papers in such an abbreviated form that their value to others is diminished. Auxiliary publication by microfilm distribution avoids this and insures that the work of every investigator is brought in its most complete form only to those investigators who are able to make best use of it.

From the above it follows that even though microfilm copying may adversely affect the publication of certain small numbers of highly specialized journals it provides a substitute plan for the diffusion of scientific research which is far superior and much more economical than the system of publication solely by printing.

Finally, attention should be called to the fact that library collections contain not only current periodicals the contents of which are subject to greater diffusion by the medium of microfilms, but the accumulated mass of scientific literature over many years which microfilms can also place at the disposition of those workers not having access to such collections. Thus, the question of copyright restriction and possible adverse effect of microfilm copying upon a relatively few journals should have little weight in appraising the tremendous service which microfilm copying in libraries can contribute to the advancement of learning.

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AN EASIER METHOD FOR MAKING AN INDEX

"AN easy method for making an index," described in the issue of SCIENCE for January 20, involves cutting innumerable strips, handling slips of varying sizes which would be awkward to alphabetize, working with adhesive tape and typing twice. Sticking the entries on 11-inch tape would hamper editing, cross-referencing and possible transfer of material from one heading to another, all of which has to be done after the alphabetizing has been completed. Thus it appears that indexing by the proposed method would consume more time than it would save. When the work is done by the usual one-card-per-entry method there is but one typing, alphabetizing is easily done, there is no messing with tape or time-consuming cutting, and the easily numbered cards can be readily bundled and sent to the printer. No typing on sheets is necessary.

If even a quicker method is desired the following is