

Review Articles

Durability of Paper

Deterioration of Book Stock: Causes and Remedies; Two Studies on the Permanence of Book Paper Conducted by W. J. Barrow. Edited by Randolph W. Church. (Virginia State Library Publications, No. 10.) Richmond, Va.: The Virginia State Library, 1959. 70p.

During the 1930's the National Bureau of Standards conducted an extensive research program on the permanence of book and other papers. The findings were, on balance, anything but reassuring. While these studies were certainly well known to at least some librarians and book publishers, no general tocsins were sounded and no organized actions were taken to remedy the deteriorating paper situation, with the major exception of a series of steps to microfilm newspapers. The scientific phraseology of the Bureau's reports, the non-library media in which most of the reports appeared, and even some of the optimistic statements contained in some of the reports, may have combined to minimize professional response to the issues posed. One example of optimism was the following statement: "The tests indicated that the quality of paper available at the time for permanent records was not in general as good as considered desirable, and this was attributed to the probability of good printing quality having been given more attention than permanence. The situation in this respect has since been materially improved by the increased attention given permanence requirements by paper manufacturers, printers, and librarians."¹

This new pamphlet, *Deterioration of Book Stock: Causes and Remedies*, strongly suggests that this optimism of 1937 was probably ill-founded. The new report is a partial presentation of the results of a series of studies on the deterioration of modern book papers conducted by the Virginia State Library under the technical supervision of W. J. Bar-

¹ A. E. Kimberly and B. W. Scribner, *Summary Report of National Bureau of Standards Research on Preservation of Records*. (National Bureau of Standards Miscellaneous Publication M154; Washington, D. C.: Government Printing Office, 1937).

row with a grant from the Council on Library Resources. The title of the pamphlet is a bit misleading for it deals with the causes of the deterioration of book stock only by inference. However, the subtitles within the booklet are specific and more clearly indicative of the contents: "Study 1, Physical Strength of Non-Fiction Book Papers, 1900-1949"; and "Study 2, The Stabilization of Modern Book Papers." Other reports of the work on these studies have appeared in *Publishers' Weekly*, September 2, 1957 and January 5, 1959, and a quite detailed report appeared in *Science*, April 24, 1959. This booklet gives supplementary data on the books chosen for the samples, 1900-1949, and 1955-57, and the results of the stabilization of modern book papers, but it should be read in conjunction with the other reports to get a reasonably complete picture of the research to date.

In brief, the research completed or in progress under these grants involves these topics or problems: (1) To ascertain the current physical strength, determined principally by tear resistance and folding endurance, of the paper in a carefully chosen sample of some five hundred unused books, published in the United States between 1900 and 1949. (2) Similar data were compiled for thirty-two titles published between 1955 and 1957 as a basis for comparison. (3) Some twenty-six different reams of frequently used American book papers were obtained and samples of these papers were tested in a similar fashion before and after accelerated aging tests. (4) These same paper samples were also treated with a stabilizing solution and then tested for endurance before and after accelerated aging. (5) Finally, the investigators have turned their attention to the feasibility of economically manufacturing attractive and reasonably permanent book papers.

Substantial evidence on all of these problems has been given in the cited reports. The investigators conclude that while atmospheric sulphur dioxide and other adverse external effects may hasten the physical deterioration of book papers in libraries, the primary causes of paper deterioration are the result of the original ingredients in the pa-

per, the manufacturing processes, or both. The study reveals that the useful life of the paper used in books printed between 1900-49 is likely to be short: e.g., "The median folding endurance of the total sample for the five decades is well below the corresponding figure for new newsprint. Actually 76 per cent of the books for the first four decades are below the range for new newsprint (twelve to forty-five folds) in folding endurance; 17 per cent are within that range, and only 6 per cent are stronger."² Or, more pungently: ". . . it seems probable that most library books printed in the first half of the twentieth century will be in an unusable condition in the next century."³

Other findings are to the effect that many of the papers frequently used for current books printing have very unsatisfactory life expectancies; that treating these papers with an aqueous solution of magnesium carbonate and calcium carbonate will apparently extend their folding and tear resistance enough to suggest that some of them might serve usefully for an indefinite period; and that a book paper of excellent appearance with fine printing quality can be manufactured with sufficient alkalinity to predict a long life. The report itself is printed on such specially manufactured paper. Paper that has already deteriorated cannot, of course, be restored to useful life by the proposed stabilization treatment; the process is one that can only arrest deterioration. Further research may be needed to determine the level of deterioration beyond which stabilization is unlikely to be worthwhile.

Clearly there are at least two major issues emerging from this research that deserve prompt and vigorous library attention. Librarians must begin to exert whatever influence they can to see that books intended for permanent use are printed on papers with a reasonable, *and tested*, prospect of permanence. Action should not be delayed on this matter where libraries are the primary or sole purchasers and can, in consequence, enforce compliance with acceptable standards or decline to purchase. Such action with respect to many major bibliographical, abstracting, and reference tools would appear

to be long overdue, relatively easy to organize, and relatively easy to enforce. In many ways, a failure to take such action promptly could be regarded as an abdication of professional responsibility. An assurance by a publisher that a work is printed on "good book paper, free of ground wood fibers" is not sufficient by itself to assure reasonable permanence. The tests conducted by Mr. Barrow reveal not only that special papers, designed for permanence, can now be manufactured, but that there are a few papers that are already manufactured with reasonably acceptable characteristics. There are almost certainly others. Proper efforts to persuade paper manufacturers to make and general publishers to use permanent papers will surely be effective but are likely to take longer than efforts directed toward publications destined essentially for the library market.

The second broad issue emerging from these studies relates to the actions that librarians will have to take with respect to books already in their collections. For those books that are already falling apart, the only relief is still some form of reproduction. For the others, Barrow recommends soaking the pages of the book in the alkaline stabilizing solution after the binding has been removed. He asserts that with simple equipment semi-skilled labor can process some 2,500 pages per day. Based on a very unscientifically selected sample, we determined that a relatively full three-foot shelf (chosen more or less at random in American history) held twenty-two bound volumes and three unbound pamphlets, containing approximately 9,281 pages. Based upon Barrow's estimate of 2,500 pages per day, and an eight-hour day, the production rate would be approximately 312 pages per hour. Applying this rate to the sample shelf of books would thus require at least 28.9 production man hours. Assuming a \$1.50 per hour minimum labor cost, and adding a conservative \$1.25 per volume for re-binding (journals would, of course, be much higher) would bring the total cost to a rather conservative \$70.85 or about \$.0076 per page. If we assume, unlike our sample, that the average number of pages in a typical library "volume" is 312⁴, we

² W. J. Barrow and Peavis C. Sproull, "Permanence in Book Papers," *Science*, 129 (April 24, 1959) 1078.

³ *Deterioration of Book Stock: Causes and Remedies* . . . p. 16.

⁴ This is a completely arbitrary figure⁴ to match the estimated stabilizing rate per man hour.

might reasonably anticipate that the costs of stabilization may be in the vicinity of \$2.75, \pm 50 per cent, per volume. We assume the cost of equipment and chemicals to be negligible. This cost would be less than that of making a single negative microfilm. Cooperative filming might produce a more competitive rate whether a master negative were made to be used only if, as, and when a need for a copy materialized, or duplicate prints were run off and distributed to the participants. Microfilming would also offer reduced space costs, but it would result in higher costs for use and be much less convenient or even impractical for many types of material. Furthermore, if a cooperative microfilm negative is feasible in terms of accessibility, then the profession might be well advised to consider a cooperatively stabilized copy or two of seldom used titles. It might be less costly and much more convenient in the long run than for each library independently to try to stabilize or microfilm everything of possible interest. The economies of massive cooperative reprinting may also be competitive with microfilm or chemical stabilization. It should be possible to mechanize the stabilizing operation and possibly reduce the labor costs very significantly; the re-binding cost appears inescapable. Current periodicals, if needed in original form, should obviously be treated before the initial binding. If chemical stabilization is to be used, it is abundantly clear that the sooner it is started, the greater will be the number of important books salvaged in useful form.

One may take the happy and complacent view that the permanent loss of a few thousand tons of books and journals each year for the next fifty or one hundred years may do the world little harm—possibly some good—and be right. But unfortunately, no two people are likely to agree on the titles to be condemned to extinction, and even if they could, it would not be just the worthless books and journals that will be stricken. As all librarians know, the best along with the worst will be eager candidates for disintegration. Research and other libraries of permanent record may confidently anticipate that a growing percentage of their budgets will be required to meet, in one way or another, this problem. We are indebted to Messrs. Barrow and Church and the Council on Li-

brary Resources for a well designed and clearly reported investigation of a very serious problem. While it would be helpful to have the presently scattered reports on this investigation brought together in one consolidated report, it does not appear too soon for the ALA, ARL, and other affected groups to begin weighing the implications of this investigation and to set about designing an efficient and effective program to respond to the situation. It appears to be later than we think.—*Herman H. Fussler, University of Chicago Library.*

A Rewarding Festschrift

Libris et Litteris. Festschrift für Hermann Tiemann zum 60. Geburtstag. Hrsg. von Christian Voigt und Erich Zimmermann. [Hamburg] Maximilian-Gesellschaft, 1959. 364p., 16 illus. DM40.

This volume, excellently produced for the Maximilian-Gesellschaft, was issued in honor of the librarian of the State and University Library of Hamburg, Dr. Hermann Tiemann. The variety of articles, of which many are of scholarly value, reflects the wide interest and the erudition of one of the leading figures in contemporary German librarianship. The *Festschrift* is divided into three parts, one dealing with librarianship, another with the history of books, and a third with literary history. This review will for obvious reasons be more concerned with the first than with the second and third parts.

Dr. Schmidt-Künsemüller reviews Hermann Tiemann's place in librarianship, particularly the rebuilding of the largely destroyed Hamburg library and the formulation of West German library policies after the debacle of 1945. Two carefully discussed problems will be of special interest to American readers: (1) the relationship between central and departmental libraries in universities (Tiemann, like so many of us, strives towards a policy of supplementation rather than competition); and (2) the place of a central national library in the network of research libraries (he sees a central library not as an overpowering universal library, but as an institution which should furnish a