

"SLOW FIRES" IN HARVARD LIBRARIES

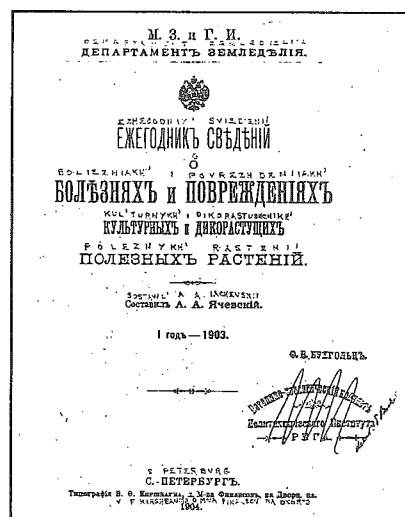
Jean Boise Cargill

In December 1991, Harvard University's first shipment of books traveled to Texas for mass deacidification. Among the shipment was an assortment of journals from the Farlow Reference Library of Cryptogamic Botany. By its participation in this program, the Farlow Library can truly say that it is at the cutting edge of a new technology. You may ask, why are the ivy-covered Harvard libraries breaking from their traditional conservatism and taking action on a problem ahead of other universities? Why take the risk? Why not wait for someone else to smooth out the details before committing to a contract? The answer is that the lights are flashing, the alarms are sounding, the "slow fires" are burning and the libraries agree that if we don't act quickly we will lose irreplaceable collections holding the reports of a century's worth of research.

"SLOW FIRES"

Anyone who has come across an aged newspaper clipping that has yellowed and turned so brittle that it shatters when handled can begin to appreciate the problem facing the world's research libraries. Those books printed on the machine-made papers developed during the mid-

1800's are aging just like our newspaper clipping. Turn back the corner of a page and it will break loose rather than folding; photocopy the book and you leave a pile of chipped and broken paper. In the worst cases, the book literally self destructs into a pile of dust even as it sits quietly on the shelf. What is acting on the book's paper is a "slow fire." Acid is attacking the fundamental structure of the pages by breaking the cross-linking chemical bonds of the cellulose fibers.



Sample Farlow serial included in initial mass deacidification: a 1903 St. Petersburg *Annual Report* [of the Department of Agriculture] on *Diseased and Injured, Cultivated and Wild Useful Plants*.

The earliest books in the Farlow collection are not at risk, for early paper-making processes, say pre-1850, relied on linen and cotton rags as their chief source of raw material. Turn a page in one of the Farlow's grand eighteenth century folios and you will notice the fluidity of the page which moves just as any fine fabric. These ancient tomes are not candidates for the mass deacidification program. The problems arise with the later volumes, those produced by the machinery devised in the middle of the nineteenth century that revolutionized the printing process. The huge productivity of machine-press methods of book production intensified already serious shortages and sharply rising prices for linen and cotton rags. The demand for substitute raw materials encouraged inventors to devise cheaper, faster methods of paper production. The material that quickly emerged as the popular substitute for linen and cotton fibers was wood pulp. Either by mechanical chipping (mechanical wood) or by chemical digestion (chemical wood), whole logs could be cheaply and efficiently converted to pulp suitable for paper. Sulfite chemical wood produced a really fine, strong paper of good stability that by the 1880's became the commonest of all fibers used for making book-printing papers both in America and in Europe.

The problem that we face today is that along with the cellulose on which paper-making depends, plant fibers in their raw state also carry lignin and other undesirable compounds. Earlier, hand methods of paper production required that the linen and/or cotton rags be beaten and set aside for a time to rot so as to separate the fibers. A favorable side-effect of the process is that the undesirable compounds were eliminated from the pulp. However, in sulfite chemical wood and other wood pulp processing used for machine-made papers the lignin and everything else are left in the slurry of woodpulp. The result is that papers made of chemical wood slowly discolor and decompose after they are made.

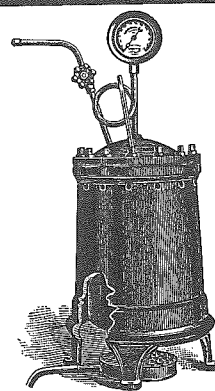


FIG. 63.—EXPERIMENTAL DIGESTER.

A lead-lined bronze "Digester" used in sulphite chemical wood production. From: *The Chemistry of Paper-Making*, 1894.

120 MILLION VOLUMES AT RISK

The Commission on Preservation and Access, National Endowment for the Humanities (NEH), estimates that the paper of one hundred and twenty million volumes in our nation's research libraries are seriously deteriorated and that at least twelve million of the volumes at risk are unique or endangered. In other words, these volumes are irreplaceable. For example, the Farlow's contribution to the first book shipment for mass deacidification was 23 titles of eighteenth and early nineteenth century Russian, Siberian and Ukrainian scientific journals. Most are the only recorded copies in North America; thus, to lose these volumes is to lose the fruits of research that they document.

During the 1980's the NEH strategy figured heavily on the reformatting of materials, e. g., microfilming, but the most optimistic estimates project only three million volumes filmed by the year 2010. Also, anyone who has used a microfilm reader can attest to the unpopularity of the format for researchers to use, as well as, the poor reproduction of illustrations and other graphic details.

Thus, attention has turned towards the development of whole-book mass deacidification techniques. When Harvard's task force had narrowed the field of potential vendors to two, they

called upon Associate Professor of Chemistry Andrew Barron to compare the competing processes. A Harvard polymer chemist, Prof. Barron subjected treated books to scanning electron microscopy, Rutherford backscattering and X-ray photoelectron spectroscopy. What he discovered is that only one process succeeded in deacidifying the paper throughout, not just its surface, that was the diethyl zinc (DEZ) process developed by the Akzo Chemicals, Inc., a Dutch firm. By the DEZ process, books are placed in a vacuum chamber, the air and water are drawn off and replaced by the DEZ gas, which neutralizes the sulfuric-acid residues and leaves behind a safe, alkaline buffer. Then, air and humidity are restored to the chamber and the books are ready for return shipment.

Persuaded by Prof. Barron's research findings, Harvard has signed a one-year contract with Akzo to treat about 5,000 volumes at a cost of \$85,000, or about \$12.50 per book. Library administrators are hopeful that the per book price will fall to between \$6 and \$10 as the industry shifts into a full-scale program. This would bring the price down to a range comparable to the cost of binding a journal volume. The books are shipped by a common carrier in a "overpack" of 36 plastic crates. The individual crates make for easy lifting, and the overpack reduces the chances of a lost box. The turnaround time for a shipment is 15 to 21 days, again comparable to schedules for binding, with which libraries are already accustomed.

Because zinc is a nutritionally essential metal (our average daily intake is 12-15 mg), the likelihood that the DEZ process might pose an occupational health risk is greatly reduced. Furthermore, a review of the scientific literature, including studies funded by the Library of Congress, supports the conclusion that DEZ-treated books pose no more health risk than untreated books. The U. S. Occupational Safety and Health Administration's (OSHA) "Threshold Limit Value" and "Permissible Exposure Limit"

for those handling DEZ-treated books were comparable to handling untreated books (the risk involved is the exposure to dust). Anyone who wishes to examine the treated books first-hand is welcome to stop by the Farlow Reference Library during regular business hours.

RARE EXCURSION

As everyone knows who uses the Farlow Library, the books do not leave the building. An exception was made one cold morning this January. The Farlow copy of *The Nature-printed British Seaweeds*, Bradbury & Johnstone, England, 1859 (one of only 221 copies printed) traveled with library escort to a class presentation on nature-printed books held at Harvard's Rare Book Library, The Houghton. The request was made by Harvard student Jackie Weicker when she could not locate any nature-printed books in the Houghton collection. The printing process, which has been lost to the nineteenth-century craftsmen who developed it, employed real seaweeds, other plants and even small animals, e.g., moths and butterflies, which conveyed a truly life-like quality to the print.

SEAWEED

*When descends on the Atlantic
The gigantic
Storm wind of the Equinox,
Landward in his wrath he scourges
The toiling surges,
Laden with sea weed from the rocks.
Ever drifting, drifting, drifting,
On the shifting,
Currents of the restless main;
Till in sheltered coves, and reaches
Of sandy beaches,
All have found repose again.*

Longfellow

FOF NEWS

NEW OFFICERS

New FOF officers were elected by the 26-member Advisory Board in the fall of 1992. FOF began its 10th year with **Elizabeth Kneiper** as President and **Philip May** as Vice-President, both new faces to the FOF Executive Committee. **Anna Reid** continues (in her seventh year) as Secretary, and **Harvey Pofcher** remains the only Treasurer FOF has ever had!

A member of FOF since 1982, **Elizabeth Kneiper** attended Russell Sage College for two years where she had the memorable experience of being taught the history of science by Geneva Sayre. Since graduating from Skidmore College in 1967, Elizabeth has taught high school biology at the National Cathedral School in Washington, D. C. and the Winsor School in Boston. Her original contact with the Farlow was that of a student in Donald Pfister's Harvard Extension course in introductory mycology and Martha Sherwood's course in lichenology. Soon a survey of Boston's urban lichens ("Boston Lichens - Past, Present and Future", FOF Newsletter no. 15, October, 1989) followed, as did a master's thesis in lichenology.

Philip May is an amateur student of lichens living in Belmont, Massachusetts. He is a regular user of the Farlow while working on a lichen flora of El Paso, Texas. Phil is a private investor with avocational interests in geology, raptors, theater and natural history travel.

NEW MEMBERS

Linda Berard (Cambridge), Karen & George Davis (Holliston, MA), Inge M. Dewald (Winchester, MA), Sarah Heintz (Cambridge), Joseph Lenoce, II (Winsor, CT), & Thorsten Lumbsch (Essen, Germany)

HAMMER TO HAWAII

Harvard graduate student **Sam Hammer** has been invited to present a paper at a special symposium at this year's American Bryological and Lichenological Society meeting in Honolulu. The symposium, which is planned in memory of Dr. Mason Hale, is entitled "Innovations and Traditions in Lichen Systematics: A Tribute to Mason Hale." Sam's talk will focus on his work with cryptic characters and developmental morphology in the lichen genus *Cladonia*. Sam is the only graduate student who has been invited to give a talk at the symposium, which will include papers by leading lichenologists from around the world.

BMC VISIT

Over thirty members of the **Boston Mycological Club** came to an open-house of the Farlow Reference Library and Herbarium this February. **Donald Pfister** introduced the Club to the herbarium, its filing system and its holdings, by leading three separate groups through the collections. **Jean Boise Cargill** outlined the history of the building and the establishment of the library. Current journals and books held in the library which might be of interest to the mycologists were introduced in the description of the library's holdings. The beauty and work in Joseph Bridgham's & L. C. C. Krieger's original watercolors reproduced in the *Icones Farlowianae* highlighted the nature of the treasures in the Farlow Reference Library.

The FOF would welcome the BMC members to its functions. We would even overlook their professed habit of eating fungal collections, if they promised to leave our Farlow collections intact!

WILLIAM BRIDGE COOKE
(1908-1992)

William Bridge Cooke, a charter member of FOF and a specialist in aquatic fungi and public health, died early this year. A native of Ohio, he took a bachelors degree from the University of Cincinnati (1937) and a Masters from Oregon State College (1939). In the mid-1940s he served as a mycologist at the Tropical Deterioration Research Laboratory of the U. S. Quartermaster Corps. He secured his Ph. D. (botany) from the State College of Washington in 1950, and shortly thereafter joined the U. S. Public Service, serving as the principal mycologist through 1970 at its Robert A. Taft Sanitary Engineering Center in Cincinnati. His work resulted in service awards from the Department of Health, Education & Welfare and the Department of the Interior. In 1970, he became a senior research associate in the Biological Sciences Department at his alma mater, the University of Cincinnati. In addition to his numerous publications in professional and governmental serials, he authored the widely known (and recently reprinted) *Our Moldy Earth*, a compilation of "techniques used in the isolation of filamentous and yeast-like fungi described together with the types of media" Dr. Cooke also maintained special interests in the Polyporaceae, the fungi of Ohio, and the fungi of our national parks.

1992 ANNUAL MEETING

The 1992 Annual Meeting of the Friends of the Farlow will be held on Saturday, the 7th of November at the Farlow. The business meeting will commence at 3:30 p. m. and will be followed by a lecture at 4:00. The guest lecturer will be announced in the fall newsletter. Members, friends and interested cryptogamic botanists will be welcome.

FARLOW VISITORS

(September 1991 - April 1992)
Excluding members of the Harvard
University Community

V. Ahmadjian (Worcester), T. Ahti (Helsinki) H. Akiyama (Kyoto), C. Arthur (Swampscott, MA), J. Barrett (West Roxbury, MA), D. Barry (Durham, NH), J. Bates (Boston), J. Beck (Boston), L. Berard (Cambridge), C. Brainerd (Cambridge), P. Chamberlan (Cambridge), D. Cheney (Boston), L. C. Colt, Jr. (North Dartmouth, MA), D. Conadino (Woburn, MA), M. R. Crosby (St. Louis), G. & K. Davis (Holliston, MA), C. D. DiGiambattista (Everett, MA), P. M. Eckel (Buffalo), A. Eckhardt (Lincoln, MA), S. Fenner (Huntington, MA), L. Froberg (Lund), J. Heifitz (Cambridge), S. Heintz (Cambridge), D. Hibbett (Tottori, Japan), J. & P. Hinds (Orono), C. A. Johnson (Worcester), P. Johnson (Cambridge), D. Landowne (Miami), E. Landowne (South Miami, FL), S. Landry (Arlington, MA), E. Lay (Boston), B. Maleson (Jamaica Plain, MA), R. Palombo (McLean, VA), J. Samper, (Boston), P. Strong (Petersham, MA), R. A. Tulloss (Roosevelt, NJ), E. Urbach (Cambridge) M. A. Walker (Petersham, MA), J. Weicher (Cambridge), R. Zander (Buffalo).

THE FIRST DECADE

As FOF completes its first decade, it is able to look back on a variety of recurring and successful events and activities contributing to the interests of the Farlow and cryptogamic botany - book sales, national and international support for graduate fellowships, special library purchases and restorations, and stimulating annual lectures by leading cryptogamic botanists. Moreover, FOF has accepted the charge of its founders and become a nucleus for interested and talented cryptogamists, who not only recognize the value the Farlow but have served as advocates for its health. The industry and generosity of FOF members have brought to near fruition a \$30,000 FOF endowment, which will be a source of sustained and stable income for its mission.

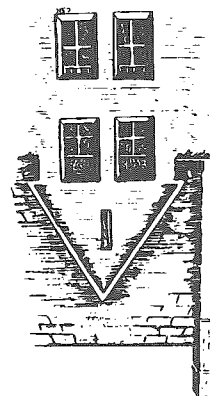
FOF has been able to maintain a steady membership of about 130 individuals over the past five years. A roughly 5% annual loss of members has been consistently balanced by the addition of new members.

FIRST CLASS

20 Divinity Avenue • Cambridge • Massachusetts 02138 • U.S.A.

FRIENDS of the FARLOW

BOTANY • HARVARD UNIVERSITY



OF CRYPTOGRAMIC

FARLOW REFERENCE LIBRARY

Friends of the Farlow is an international group of amateur and professional botanists concerned with supporting the programs and resources of the Farlow Reference Library and Herbarium of Cryptogamic Botany of Harvard University. Membership categories are: Associate member, \$5-25; Full member, \$25; Sponsor, \$50-100; Benefactor, \$1000 or more. To join please make your check payable to the **Friends of the Farlow** and send to the address below. The membership year runs from January 1st to December 31st. Members receive a discount on Farlow publications and services, participate in book sales, annual meetings and other events, and receive a special welcome at the Farlow. This newsletter is published twice a year, in April and October. For more information, contact the Farlow Reference Library, 20 Divinity Avenue, Cambridge, MA 02138 USA (Tel. 617-495-2369; FAX 617-495-9484).