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ABSTRACT

This document presents testimony heard on S. 2418, a bill to authorize the Librarian of Congress to construct the Library of Congress Mass Book Deacidification Facility at Fort Detrick, near Frederick, Maryland, subject to the supervision and construction authority of a federal, civilian, or military agency. The facility would be used to neutralize acid in book paper, thereby extending the life of books in the library's collection by 400 to 600 years. The bill would authorize $11.5 million for a building to house the necessary equipment and its laboratory facilities. Deacidification costs in the mass facility are estimated to be $3-5 per book, substantially less than the alternative cost of approximately $30 for microfilming each book. Operating costs for this laboratory facility are expected to be between $2-3 million per year, including three or four new positions to staff the facility. The document includes testimony of Daniel J. Boorstin, Librarian of Congress; Beverly B. Byron, Congressional Representative from the State of Maryland; Carolyn Greiner, on behalf of Mayor Ronald N. Young, city of Frederick, Maryland; a panel including Carolyn L. Harris (Columbia University Libraries), Susan Martin (Johns Hopkins University), and Gary E. Strong (California State Library); and Steven W. Linger (President, Frederick County Chamber of Commerce). Prepared statements from each of the above participants and Wendell H. Ford, Senator from Kentucky, and a summary of the costs of the project prepared by the Librarian of Congress are included. (THC)

S. HRG. 98-1134

LIBRARY OF CONGRESS MASS BOOK DEACIDIFICATION FACILITY

HEARING

BEFORE THE

COMMITTEE ON RULES AND ADMINISTRATION UNITED STATES SENATE

NINETY-EIGHTH CONGRESS

SECOND SESSION

ON

S. 2418

PROVIDING FOR THE LIBRARY OF CONGRESS MASS BOOK DEACIDIFICATION FACILITY

APRIL 11, 1984

Printed for the use of the Committee on Rules and Administration
United States Senate

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APRIL 11, 1984

LIBRARY OF CONGRESS MASS BOOK DEACIDIFICATION FACILITY

WEDNESDAY, APRIL 11, 1984

U.S. SENATE,
COMMITTEE ON RULES AND ADMINISTRATION,
Washington, DC.

The committee met, pursuant to notice, at 2:05 p.m., in room SR-301, Russell Senate Office Building, Hon. Charles McC. Mathias, Jr., chairman, presiding.

Present: Senators Mathias and Ford.

Staff present: John B. Childers, staff director; William McW. Cochrane, minority staff director, Gerald W. Siegel, minority chief counsel; John K. Swearingen, director, technical services; Ann B. Cook, chief clerk; Peggy Parrish, professional staff member (minority); Carole J. Blessington, assistant chief clerk; Waitus A. Dowless, professional staff member; Gerald Gereau, chief investigator; Dennis G. Doherty, auditor; Anthony L. Harvey, senior analyst; Connie Friedman, staff assistant; and Beth Cady, professional staff member.

OPENING STATEMENT OF SENATOR CHARLES McC. MATHIAS, JR., CHAIRMAN, COMMITTEE ON RULES AND ADMINISTRATION

The CHAIRMAN. The committee will come to order.

We are meeting this afternoon to receive testimony on S. 2418, a bill to authorize the Librarian of Congress to construct the Library of Congress Mass Book Deacidification Facility—the Librarian is going to be required to pronounce that word—at Fort Detrick, near Frederick, MD, subject to the supervision and construction authority of a Federal, civilian, or military agency.

This facility would be used to neutralize acid in book paper, thereby extending the life of books in the Library's collections by 400 to 600 years. At present the effective life for acid paper books is 30 to 40 years.

There is, of course, a real crisis which exists not only with the collections of the Library of Congress, but in libraries all over the world, caused by the rapid deterioration of books printed on paper produced since roughly 1850. It is, of course, something of an irony that the very technology which has enabled inexpensive books to be produced in vast numbers carries with it the seeds of its own destruction. The Industrial Revolution, a century and a half ago, phenomenally increased the demand for paper products of all sorts, especially the demand for newspapers, magazines, and above all,

the printed book. As a result, scientists and engineers began casting about for cheaper and more plentiful paper.

Prior to 1850, books had been printed on linen or cotton rag paper, and in some cases on vellum made from animal skins.

The new paper supply was discovered in the cellulose fibers from ordinary wood pulp. Finding the right absorbency for dried and finished paper required treating and sizing the wood pulp paper with a variety of chemicals. Unfortunately, these chemical additives, especially aluminum sulphate, combine with the moisture in the air to form sulphuric acid. So any of us with books published since the 1850s have experienced the same disheartening phenomenon—the books literally disintegrating in our hands.

The bill before us would authorize $11.5 million for a building to house the equipment and its laboratory facilities. Funds for the activity are included in the Library's fiscal year 1984 supplemental request budget, and it is anticipated that the Army Corps of Engineers will construct the building within the complex of army and research facilities at Fort Detrick.

I am going to try and set an example for all the witnesses by summarizing my statement just that briefly and putting the balance of it in the record.

The Library of Congress, and libraries throughout the world, face a crisis caused by the rapid deterioration of books printed on paper produced since the 1850's. It is ironical that the very technology which has enabled inexpensive books to be produced in vast numbers carried with it the seeds of its own destruction. The Industrial Revolution, a century and a half ago, phenomenally increased the demand for paper products of all sorts, especially the demand for newspapers, magazines, and above all, the printed book. As a result, scientists and engineers began casting about for a cheaper and more plentiful paper supply. Prior to the 1850's, book had been printed on linen or cotton rag paper and, in some cases, on vellum made from animal skins. Technologists discovered their new paper supply in the cellulose fibers from ordinary wood pulp. Finding the right absorbency for the dried and finished paper, however, required treating and sizing the wood pulp paper with a variety of chemicals. Unfortunately, these chemical additives, especially aluminum sulphate, combine with the moisture in the air to form sulphuric acid. Any of us with books published since the 1850's have experienced this same disheartening phenomenon—the books literally disintegrating in our hands.

I think we can all take great pride in the fact that the ingenious chemists in the Library of Congress' own preservation and restoration office have found the solution of this problem. These chemists have developed a patented process that will neutralize the harmful acids destructive to paper and leave an alkaline reserve on the paper to combat the return to an acid condition in the future. The process is based on the vapor-phased impregnation of books and other library materials with diethyl zinc resulting in the neutralization of the acidity while leaving a residue of zinc carbonate to protect the paper from further acid-induced loss of strength. Invention of this process by the Library's chemists began with tests in an ordinary pressure cooker. After further successful tests with larger numbers of books in facilities of the General Electric Co. in Valley

Forge, PA, the Library staff worked with scientists at the National Aeronautics and Space Administration to develop and test an economical technique for the mass deacidification of books printed on paper susceptible to this type of deterioration. NASA's experience with vacuum technology and its facilities at Goddard Space Flight Center in nearby Greenbelt, MD, made it possible for the Library to demonstrate the feasibility of large-scale applications. The success of the Library and NASA's first large experiment with 5,000 books proves it is time to establish a permanent book deacidification facility for the Library of Congress at Fort Detrick.

This bill would authorize $11.5 million for this new building, its equipment, and its laboratory facilities. Funds for this activity are included in the Library's fiscal year 1984 supplemental budget and it is anticipated that the Army Corps of Engineers will construct the building within the complex of army and research facilities at Fort Detrick. Both the House and Senate Appropriations Committees are cognizant of the need for this authorization as they consider the supplemental and regular appropriations measures for fiscal years 1984 and 1985. The Army Corps of Engineers estimates that the building will cost $3.5 million; laboratory facilities and equipment, together with directly related costs, total $8 million. Deacidification costs in this mass facility are estimated to be $3–5 per book, an amount dramatically less expensive than the alternative cost of approximately $30 for microfilming each book.

Operating costs for this laboratory facility are expected to be between $2–3 million per year, including three or four new positions to staff the facility. Once appropriations are enacted, approximately 500,000 books will be deacidified each year using this revolutionary new technology. The Librarian of Congress will request these operating funds in his fiscal year 1987 budget request. With 80 million items in the Library's great collections, I would anticipate an indefinite need for such a facility.

Enactment of this bill, together with the subsequent appropriations, will enable the Library of Congress to preserve a great national treasure, namely, three quarters of the Library's vast collection of books, from rapid and total disintegration. It will also make it possible to preserve these books in their natural and original state, that magnificent product of the printer's and publisher's art, the hand-held book. Construction of this "first of a kind" laboratory facility will also provide a prototype for the library and scholarly community throughout the country, and, for that matter, throughout the world. I commend the Librarian of Congress for his outstanding leadership in this matter.

I am pleased to be joined in the sponsorship of this measure by the distinguished ranking minority member of the Rules and Administration Committee, Senator Ford, and by my fellow Senate members of the Joint Committee on the Library, Senator Hatfield, Senator Warner, and Senator Inouye. Since I introduced this bill on March 13, 1984, the senior Senator from California, Senator Cranston, and my Maryland colleague, Senator Sarbanes, have also asked to be cosponsors.

We have a distinguished group of witnesses today—the Librarian of Congress and his staff, a panel of experts from the American Library Association and the Association of Research Libraries, and

several of my fellow Marylanders—led by the distinguished Member of Congress from Frederick, MD, Representative Beverly Byron.

Our first witness was to be Mrs. Byron, Representative of the Sixth District of Maryland. She has been delayed, so I would ask Dr. Boorstin if he would present his statement.

TESTIMONY OF HON. DANIEL J. BOORSTIN, LIBRARIAN OF CONGRESS, ACCOMPANIED BY WILLIAM J. WELSH, DEPUTY LIBRARIAN OF CONGRESS; DONALD CURRAN, ASSOCIATE LIBRARIAN OF CONGRESS; AND PETER G. SPARKS, DIRECTOR, PRESERVATION OFFICE, LIBRARY OF CONGRESS

Dr. BOORSTIN. Mr. Chairman, I would like to introduce Bill Welsh, the Deputy Librarian of Congress and Don Curran, the Associate Librarian of Congress.

The CHAIRMAN. It is a pleasure for the committee to have both of them.

Dr. BOORSTIN. My statement is very brief, Mr. Chairman, so I think I will just read it, if I may. It at least summarizes some of the problems that you were referring to.

It is a pleasure to appear here today to support S. 2418, to authorize the construction of a Library of Congress Mass Book Deacidification Facility. This facility would be a 40,000 square-foot building, outfitted with two large vacuum chambers. The building would be used for the purpose of neutralizing acid in book paper in the Library of Congress collections, thereby extending the life of books 400 to 600 years.

The CHAIRMAN. And I hope we have a chance to enjoy the books during that whole period of time.

Dr. BOORSTIN. It is an act of faith, Mr. Chairman, and we believe that they will be with us and that we will still be enjoying them.

The cost to construct and equip the facility is estimated at $11.5 million.

As you have observed, one of the most pressing problems facing libraries today is the rapid deterioration of their collections due to the unstable quality of paper produced since about 1850.

After much research, a process was developed and patented by the Library of Congress to arrest the degradation of paper and increase the life of books and other library materials by a figure of two to five times. This process, based on vapor phased impregnation of books and other library materials with diethyl zinc, will neutralize the acidity and leave a residue of zinc carbonate to protect the paper from further acid-induced loss of strength.

After small pilot-scale experimentation—and one thing I wanted to emphasize, Mr. Chairman, is that this proposal is the result of a long period of experimentation; we did have pilot-scale developmental work done on this same process in our Preservation Research and Testing Office in the Library in 1982 and 1983. We successfully conducted a large scale, 5,000-volume test at Goddard Space Flight Center and did smaller-scale testing at the 100-volume level to refine the process. The result of these trials was then used to establish the engineering requirements and costs of large-scale treat-

ment. This work was done at NASA's Goddard Space Flight Center, using Northrop Services, Inc. as a subcontractor.

Recently, a careful survey undertaken at the Library of Congress of our general and law collections resulted in data showing that 75 percent of these collections would benefit from deacidification treatment. The remaining 25 percent have deteriorated to such an extent that they may not all benefit from treatment, and they will have to be transferred to another format, such as microform.

The proposed facility consists of twin vacuum chambers made in a rectangular shape to accommodate pallets loaded with books. The building includes staging areas for book loading and unloading, a series of rehumidification rooms, and a complete developmental test facility, which has its own small diethyl zinc test chamber independent of the production system. In addition to that, the building includes support facilities for maintenance, storage, offices, heating, ventilating and air condition control. There is a summary of the costs Mr. Chairman, which I will submit for the record.

[The summary referred to above follows:]

SUMMARY OF COSTS—LIBRARY OF CONGRESS BOOK DEACIDIFICATION FACILITY, FORT DETRICK, MD

	(Thousands)
Building construction and site preparation	$3,362
Equipment:	
Vacuum chambers (two)	1,102
Vacuum pumps (two)	851
DEZ distillation	632
Vacuum chamber thermal system	285
Data system	284
DEZ condensation	171
Instrumentation	150
DEZ recycle system	72
Passivation system	11
Book handling—crates, pallets, carts	491
	4,049
Support equipment:	
Developmental test facility	$732
Major spare parts	577
Maintenance shop	256
Utilities and bulk storage	66
Quality assurance laboratory	156
Personnel safety, fire protection, and security	33
	1,820
General management and oversight fees for all aspects of construction and installation including testing and checkout of the plant system	1,838
Cost escalation and contingency	431
Total estimated cost	$11,500

Dr. BOORSTIN. During April of last year, we enlisted the support of the military services in locating a site on government property within a 1- to 2-hour drive of Washington. This kind of arrangement is highly desirable because of the availability of engineering and maintenance services, fire protection, safety, and security.

We considered sites at numerous military installations and some property surplus to GSA where no support services would be available. We also consulted with the Office of the Architect of the Capitol about a site location under his jurisdiction.

Our final site preference, Mr. Chairman, was Fort Detrick, MD, in Frederick, which is about 50 miles from Capitol Hill. It has support service arrangements; other civilian government research facilities are located there; the Army staff at the base has been most accommodating. The conditions of the Army for locating the Center at Fort Detrick are set forth in a letter, dated October 4, 1983, which I will provide for the record.

[The letter referred to above follows:]

DEPARTMENT OF THE ARMY,
FORT DETRICK,
Frederick, MD, October 4, 1983.

Reply to attention of: Engineering Plans and Services Division.
LIBRARY OF CONGRESS,
Library Environment Resources Office, Attn. Mr. James R. Trew, Director, Washington, DC.

DEAR MR. TREW: I appreciate your letter of September 7, 1983, indicating interest to locate the Library of Congress book deacidification facility at Fort Detrick. Since your meeting in June with Mr. John Bennett, I have received much "informal" favorable acceptance of your facility locating at Fort Detrick.

In regard to the formal adoption of the proposed site for your facility, the following information/guidance must be considered for your planning purpose:

a. Master Plan Approval.—This proposed facility will require incorporation into Fort Detrick's Master Plan.

Procedure: Formal acceptance of this facility and siting by Fort Detrick's Installation Board as an advisory board to the installation commander is required. Approval will also be required by Health Services Command and by Headquarters, Department of the Army.

Time frame: Approximately four to six months

b. Real Estate.—Because the proposed site is contained within Fort Detrick's security performer, with independent access not otherwise available, this site cannot be excessed (transferred) directly to the library of Congress as real property.

c. Permit.—Prior to construction, a permit for the use of this proposed site will be required. Permits are issued by the Baltimore District Corps of Engineers.

Procedure.—A Report of Availability needs to be completed in accordance with Army Regulation 405-80 and submitted to the Baltimore District Corps of Engineers through Army approval channels. For permits greater than five years, additional approval by the Secretary of the Army is required. Normally, permits are issued for 25, 30, or 50 years. Indefinite permits may also be issued.

Time frame for permit: Four to six months.

d. Facility Title.—The Library of Congress may decide to hold title to the constructed facility for the duration of the property permit at which time title of the facility would pass to the Army. It is usual, however, for the tenant activity to pass title of the facility to the Army upon completion of construction.

e. Operations and Maintenance Supports.—Prior to occupancy as the facility approaches 80 percent completion, an Inter-Service Support Agreement would be developed between the Library of Congress and Fort Detrick. This Support Agreement will commit the Army and assess costs for the utilities and services which the Library will require.

f Environmental Evaluation.—A written environmental evaluation will be required and will be the responsibility of the Library of Congress to provide. This evaluation will consider the activity to be housed and the impact of this facility as well as after construction. Documentation will take the form of either: Record of Environmental Consideration Assessment, Finding of No Significant Impact, or Environmental Impact Statement as required by Army Regulation 200-2. This environmental evaluation may be required as supporting documentation for Master Plan site approval and should be submitted to us as soon as documentation becomes available Essentially, the environmental evaluation should support this statement. "This project will not contribute significantly to air and/or water pollution, during or not after the construction phase. This project has been assessed and will not significantly affect the quality of human environment".

The Library of Congress' interest in Fort Detrick is appreciated. My point-of-contact for this project remains Mr. John Bennett, Master Planner, (301) 663-2263 or Autovon 343-2263.

Sincerely,

WILMER O. ELLIOTT,
LTC, EN, Director, Facilities Engineering.

Dr. BOORSTIN. I might mention parenthetically, Mr. Chairman, that some of the spiritual advantages of that location include its historic significance and even its relationship to some members of this committee.

The Library will transfer funds to the Corps of Engineers, which will be responsible for actual construction of the building. The Army Corps of Engineers has authority to accept orders from other departments and agencies under Public Law 89-298, section 219.

The building will be designed by an independent architectural engineering and design firm who will work closely with the corps and Northrop Services, Inc. during the design phase. The Library will be responsible for outfitting the diethyl zinc equipment within the structure, with the advice and assistance of Northrop Services, Incorporated.

The request for funds to construct and equip this facility is included in the Library of Congress' 1984 supplemental request for appropriations. I cannot overestimate the urgency to proceed with the project, Mr. Chairman. There are many millions of books in our collections whose useful life can be extended hundreds of years by this process, plus many millions more yet to be added to our collections; every year that we delay increases the problem and the number of deteriorated books.

We estimate the useful life of the building and equipment at 25 years. The depreciation cost allocated for a single book would be less than $1. The facility for which we are seeking authorization can be a prototype for others in the United States, and so encourage economies of preservation and acquisitions for all our Nation's libraries and help fulfill the mission of the Library of Congress, which is to lead them in the preservation of the records of civilization.

At the request of the committee, we will now have a short slide show, which explains in more detail the chemical processes at work on paper and the treatment we propose to give to the Library of Congress Collections.

Mr. Chairman, Peter Sparks, the Director of Preservation, will narrate the slides, with your permission.

The CHAIRMAN. Thank you, Dr. Boorstin.

Before we go to the slide show, I see that Representative Byron has arrived, and I am wondering if she would like to make her statement at this time, because I know the House is in session, and she may be on her way for a vote. Then, we will have some questions to address to Dr. Boorstin.

TESTIMONY OF HON. BEVERLY B. BYRON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MARYLAND

Ms. BYRON. We are working on procurement, and I said I would not be long; we may lose Fort Detrick if I do not get back in a hurry.

Let me say first of all that I want to thank the chairman and commend you for introducing this piece of legislation which authorizes the construction of the facility at Fort Detrick to handle the mass deacidification of books for the Library of Congress collection.

I think the fact that Fort Detrick is located in the Sixth Congressional District is a statement that I have to plead guilty to the fact that I have a parochial interest in this matter. But above and beyond that, I sincerely believe that the location is an ideal choice because of the proximity to Washington and the proximity to the Library of Congress.

The CHAIRMAN. I think you have to admit to a triple interest in this matter. You are representing the sixth District, you are a member of the Armed Services Committee, and you live in Frederick.

Ms. BYRON. That has nothing to do with the matter, and I know you are not parochial on this at all, either. [Laughter.]

But let me say that, for those who are not familiar with the Frederick area, it is about 55 miles from Washington. In the last two decades, Frederick has become more of a part of the Washington community, although it still has retained its small-town flavor. We have a very favorable and competent work force which can be used not only to build and maintain the facility, but to be part of the operational staff.

It is my understanding that the proposed facility will encompass some 40,000 square feet and will contain two large vacuum chambers. Those chambers will be used to deacidify the paper and thereby extend the life of books within the Library's existing collection and also to treat the Library's new incoming paper material.

Officials from the Library of Congress have stated that the facility will handle half a million books a year, and that the process will extend the life of a book by some 400 to 600 years.

I am not a member of the Joint Committee on the Library, but I certainly do understand the importance of preserving our Nation's written heritage for future generations. And I once again want to commend the Committee for its foresight in taking this action.

On the House side, I have contacted Congressman Young and Congressman Shaw, who are the ranking majority and minority members of the Subcommittee on Public Buildings and Grounds and have urged them to consider this legislation regarding this matter. It is my understanding that the subcommittee staff is currently in the process of drafting a bill for consideration by the House which would be a companion bill to this one.

I will continue to lend my support to the efforts of this committee and also on the other side, in the other body, and I thank you once again, Mr. Chairman, for giving me the opportunity to testify on a matter that I think is going to be one that is going to be important.

The CHAIRMAN. We thank you very much, Ms. Byron, for your statement and for your efforts in the other body. I know that you arrived just about the time that Dr. Boorstin was describing the urgency of this matter.

Ms. BYRON. I did.

The CHAIRMAN. And I think that is one of the aspects of it that we need to underscore.

Thank you very much.

Ms. BYRON. Thank you.

[The prepared statement of Congresswoman Byron follows:]

PREPARED STATEMENT OF HON. BEVERLY B. BYRON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MARYLAND

Thank you, Mr Chairman: I would like to take this time to commend you and the committee for introducing S. 2418, which authorizes the construction of a facility at Fort Detrick, Maryland to handle the mass deacidification of books in the Library of Congress's collections. Since Fort Detrick is located in the Sixth Congressional District of Maryland, I must plead guilty to having a parochial interest in this matter. Nevertheless, I sincerely believe that this location is an ideal choice because of its proximity to the Washington area and the Library of Congress. For those on the committee who are not familiar with the Frederick area, it is approximately 55 miles from Washington In the last two decades, Frederick has become more a part of the Washington community, although it still maintains its small town flavor. We also have a very able and competent workforce which can be used to build and maintain the facility.

It is my understanding that the proposed facility will encompass some 40,000 square feet and will contain two large vacuum chambers. The chambers will be used to deacidify the paper and thereby extend the life of books within the Library's existing collection and also to treat the Library's new incoming paper material. Officials from the Library of Congress have stated that the facility will handle a half a million books a year and that the process will extend the life of a book by some 400 to 600 years Although I am not a member of the joint committee on the Library I certainly understand the importance of preserving our Nation's written heritage for future generations I commend the committee for its foresight in taking this action now.

I have been in contact with Robert Young (D-MO) and Clay Shaw (R-FL) who are the ranking majority and minority members of the subcommittee on public buildings and grounds and have urged them to consider legislation regarding this matter. It is my understanding that the subcommittee staff is currently in the process of drafting a bill for consideration by the House. I will continue to lend my support to the efforts of this committee and the Library of Congress in getting this legislation passed and this facility in operation by 1986. Thank you once again for your time, Mr. Chairman.

The CHAIRMAN. Now, if we can have the slide presentation.

Why don't we proceed with the questions while you are working out the technical problems?

One of the questions which comes to mind is the volume of business that this facility would do. How many books and other library items would need to be deacidified?

Mr. WELSH. We have a total, sir, of 80 million items in the collections, of which there are 13 million books. The study that we just completed shows that 25 percent of those books, of the 13 million, are beyond help. May I just illustrate this?

This is a book taken from the shelf. This is the state of its deterioration. [Book crumbles.]

The CHAIRMAN. That was the book.

Mr. WELSH. It was the book. This is the state of 25 percent of those collections, so about 3 million would not benefit from treatment; the rest of the 10 million would—plus countless other millions of manuscripts, for example.

Dr. BOORSTIN. Mr. Chairman, that would also apply to the incoming material. That is one of the features of this plan.

The CHAIRMAN. To new acquisitions.

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Dr. BOORSTIN. Yes, so that we will try to treat materials as they come in and in that way, avoid the problem from the beginning.

The CHAIRMAN. So that there would be an indefinite need for this facility.

Dr. BOORSTIN. Yes, sir.

The CHAIRMAN. It is not just a one-shot proposition.

Dr. BOORSTIN. That is right. It is indefinite.

The CHAIRMAN. Well, now, if you program the processing of all new acquisitions and then had a schedule of existing volumes put through the process, how long would it take you to catch up to just the——

Mr. WELSH. For the books, there are approximately 300,000 new additions a year, with a total capacity of 500,000, which would give us a residue of 200,000—probably a 20-year period, Mr. Chairman.

The CHAIRMAN. So it would be 20 years before everything in the library had been treated.

Mr. WELSH. Unless there is some other advance in new technologies of preservation. Some materials would deteriorate during that process to a point where you would have to use some other technology.

The CHAIRMAN. What would be the capacity of this facility?

Mr. WELSH. At the minimum, 500,000 volumes a year.

The CHAIRMAN. So, if you had 300,000 new acquisitions, then you have only 200,000 excess capacity——

Mr. WELSH. Yes, sir.

The CHAIRMAN. Will there be any demand from other facilities to use the——

Mr. WELSH. Yes, sir. We would expect that this facility would provide a model for the Nation's libraries, and there obviously would be a demand from, say, for example, libraries on the east coast to use that facility.

The CHAIRMAN. Would you contemplate charging a user fee?

Mr. WELSH. We are not that far along in the planning, but we certainly have to consider that, yes, sir.

The CHAIRMAN. That is somewhere down the road before you reach that.

Mr. WELSH. Yes, sir.

The CHAIRMAN. If this is successful—and I am not casting any doubt that it will be—but would you think it would become a standard library practice?

Mr. WELSH. Yes, sir.

The CHAIRMAN. So that other facilities of this kind would be added in the course of time.

Mr. WELSH. Yes, sir.

Dr. BOORSTIN. Mr. Chairman, may I make a comment on that?

The CHAIRMAN. Yes, Dr. Boorstin.

Dr. BOORSTIN. This really provides the Library of Congress with an opportunity to play its proper role, that is, to lead the Nation's libraries in the direction of the preservation of the record of our civilization. There is no other library that has done this, and by this act, the Congress and the Library would be showing that it is possible to overcome the dangers of deterioration that are at work on our books.

The CHAIRMAN. Of course, one of the questions that I am sure will be asked on the floor of the Senate is, if this is a desirable process and a useful process, why doesn't someone in the private sector undertake it; why should a Government agency——

Mr. WELSH. We have anticipated that, Mr. Chairman, and we have, in fact, worked with two firms in the private sector to attempt to encourage them to use this as a model and establish facilities elsewhere throughout the country.

The CHAIRMAN. So that, in other words, this is a pilot project?

Mr. WELSH. It is a pilot in the sense that it is the first one, but it will be a full-scale program for the Library of Congress.

The CHAIRMAN. And State facilities, State libraries, might build one, or private commercial operators could build them.

Mr. WELSH. Yes, sir.

The CHAIRMAN. What were the figures, again? I believe Dr. Boorstin mentioned them in his statement, to operate it on an annual basis?

Mr. WELSH. $2 to $3 million a year.

The CHAIRMAN. How do you break that down per book—$2 to $3 million per year, plus 500,000 books.

Mr. WELSH. It is about $3 to $5 a volume at the test we conducted at Goddard.

Dr. BOORSTIN. Mr. Chairman, this could be contrasted with the cost of transferring the books to some other medium, such as microfilm, which would be about 10 times that per book; it would probably cost in the neighborhood of $40 per book to transfer a book to microfilm. Also, of course, there is the additional fact that, once it is on microfilm, it is not as accessible or as handy as if it were in its original format.

The CHAIRMAN. How large an operating crew will be required?

Mr. WELSH. A staff of about 5, and we hope to operate on three shifts, continually shifting because of the process itself, so a total of about 15 persons.

The CHAIRMAN. Is there any environmental impact? Are there hazardous chemicals that would be used; are there any kinds of problems that would be anticipated?

Mr. WELSH. No, sir. We have investigated that, and we will provide an environmental impact statement. There will be some ethane gas that will be disbursed, but the concentration will be below the level required for environmental safety.

The CHAIRMAN. What about the use of hazardous chemicals of any kind?

Mr. WELSH. The shipment of the diethyl zinc did prove to be a problem. It is shipped now from Houston, TX, and is mixed in a mineral oil to preclude there being any problem in this regard.

The CHAIRMAN. Of course, one of the responsibilities of this committee is not only taking an interest in the custody of the books that are in the collections of the Library of Congress, but we also do some publishing ourselves. Is most of the paper used at the Government Printing Office acid paper?

Mr. WELSH. Yes, sir.

The CHAIRMAN. So it will deteriorate.

Mr. WELSH. Yes, sir.

The CHAIRMAN. Is it possible to obtain paper now that is acid-free?

Mr. WELSH. Yes, it is. There is a considerable amount of acid-free paper being produced. There are a couple of major firms that produce the acid-free paper.

The CHAIRMAN. What is the effect on the price of publishing?

Mr. WELSH. It is about the same. It is the cost of converting from one technique to another that is the prohibitive expense.

The CHAIRMAN. I think that covers most of the questions that I had.

Have we got power?

Mr. SPARKS. Yes, Mr. Chairman.

The CHAIRMAN. All right. We will now proceed with the slide show.

Mr. SPARKS. The objective of my talk today is to present some key facts about a technology that will have a significant impact on library preservation and service.

Deacidification of paper has been around as an idea for several decades and considerable research and development has been carried out to make mass techniques available to the library and archives field.

The principles of papermaking have not changed since its invention in China nearly 2,000 years ago.

The basic ingredient of paper is cellulose fiber which for centuries was obtained from old rags of linen, cotton clothing, and other plant sources. Cellulosic fibers can be separated and processed in water, and dried, to form a tightly woven paper mesh. By the middle of the 19th century, the demand for paper had surpassed the supply of rags and, hence, the gradual conversion to woodpulp papers began. The crushing of the fibers with a mortar and pestle to make pulp became highly automated with the advent of continuous papermaking equipment and in the case of better grade book papers, it became a chemical process.

The great speed at which modern papers can be made was achieved at the expense of paper permanence. It is the modern chemistry of pulp and paper production that has introduced the acids that cause paper deterioration.

Acid-producing materials enter the paper in chlorine bleaching, and more seriously, with the introduction of sizing essential to modern printing papers. Earlier paper was sized by dipping in gelatin or natural gluelike mixtures.

Modern papers use rosin that is precipitated with a chemical known as alum and which is the principle cause of acidic paper.

The brittle paper challenge can be summarized as follows. Causes are shown on the left and known solutions on the right. The causes are well understood, with the primary culprit identified as alum-rosin sizing. The solutions yield papers whose lifetimes can be measured in centuries rather than decades. Environmental controls are important because the two solutions depend on good conditions for maximum lifetime benefit.

Before discussing deacidification, I would like to say something about an important partial solution—the manufacture of alkaline paper. These papers are made with nonacidic sizing systems, have a built-in calcium carbonate alkaline reserve, and use only chemi-

cally purified woodpulp. They have excellent lifetime characteristics and will contribute to the overall solution. Modest amounts of alkaline papers are being used in the printing of high-quality books.

Now, let's discuss some simple chemistry about why paper becomes brittle and how the deacidification agent stops this process.

The embrittlement process can be best understood by looking at paper and its chemical characteristics at the molecular level. If we started with a sheet of paper and look at the fibers at higher and higher magnifications and continued this process into the world of molecular dimensions, we would get to a point where we could see the cellulose chains that are made up of connected rings having specific chemical groups attached to them.

This chain structure can be idealized to a ball-stick model, so that the cellulose can be viewed as a collection of beads held together by links in a long chain. It is this long chain characteristic of cellulose that contributes directly to the paper fibers' strength. With this in mind, let us leave our mental image of the cellulose molecule and talk about alum-rosin sizing.

Alum is a common name for a compound used in the paper industry known as aluminum sulfate, or sometimes referred to as potassium aluminum sulfate. Under the influence of high humidity and warm temperatures, alum breaks up into different products by a reaction called hydrolysis.

Depending upon the type of alum used, the products are sulfuric acid and one or two bases. The acid generated from the hydrolysis of alum attacks the cellulose molecule and changes the nature of the various pendant chemical groups on the cellulose chain in a complex series of reactions which eventually lead to the breaking of the chain structure. This chain-cutting process yields paper that is weak and embrittled.

The application of a deacidification agent to the paper inhibits this chain-breaking process. These agents are usually chemical compounds called bicarbonates or carbonates, which react directly with the free acid in the paper, producing through a series of reactions the harmless salt of the acid, carbon dioxide gas, and water. Thus, a simple chemical reaction between the deacidification agent and the free acid in the paper prevents the acid from attacking and cutting the cellulose chain.

Now, I would like to discuss some general ideas about deacidification, deal briefly with single-page treatment, and then go on to mass treatment.

All successful deacidification processes, whether they are single sheet or mass techniques have some fundamental similarities.

In all processes, the agent is first brought into intimate contact with the paper material. In single sheet processes, the agent is dissolved as liquid and brought into contact with the paper in this vehicle. In the mass processes, one sees both liquid and gas phase contact.

Second, the deacidification agent chemically neutralizes all the existing free acid in the paper.

Third, an alkaline reserve is left in the paper.

And finally, all liquids or reaction byproducts are removed from the paper before it is returned to the library.

There are a number of deacidification processes that have been used and experimented with in the last 20 years, and the more important ones are shown on this slide. The processes in bright yellow have been used for single-page deacidification, while the orange-colored processes have been used in mass deacidification, and one has been used in both.

Single-page deacidification is usually applied to rare and important items and done by or under the guidance of a trained conservator. The technique cannot be applied efficiently to thousands of items at once, although with similar materials, one can develop limited production techniques.

The attempt to find an approach for treating great numbers of items at the same time has led to considerable research and development during the last 10 years. The objective of this research has been to develop a chemically sound process that is cost effective and which can treat hundreds of thousands of items in a given year.

The Library of Congress, in an exhaustive research program spanning a 7-year period, has chosen a gas phase process using a material called diethyl zinc, or DEZ, for short.

This process has been demonstrated at the lab bench and pilot plant scale.

We have been working with NASA's Goddard Space Flight Center for the past 2 years to buy the engineering required to scale up, using a chamber that will hold 5,000 books and to demonstrate the process at this level. The first 5,000-book test was accomplished on October 15, 1982. Additional trials and experimentation leading to optimum plant design were done in 1983, and some experiments and component testing will continue in 1984.

Because of the reactive properties of DEZ, it cannot be exposed directly to water or oxygen. Thus, the treatment must be carried out in a closed chamber so that the books and the DEZ gas can be brought together in an environment free of excess water and oxygen. Diethyl zinc as a material possesses some unusual properties that set its deacidification mechanism apart from others.

The molecule itself is extremely small, 10 angstroms from end to end, which means you could put about 2 million of them across the head of a pin. Because of this small size, DEZ moves easily between the pages of the book or document and diffuses right into the paper fibers, coming into intimate molecular contact with the cellulose chains to react with the water that is chemically bound in those fibers to form an alkaline reserve compound, zinc oxide and zinc carbonate. One of the interesting results of this molecular reaction of DEZ is a uniform distribution of very small particles of alkaline reserve throughout the paper fibers.

The diethyl zinc process is carried out in three stages. First, the residual water in the book is carefully lowered so that the heat from the reaction of the DEZ with any excess water is minimized and the correct amount of water is present to react with the DEZ. Once this is completed, in about 18 hours, DEZ is introduced into the chamber as a gas and left to permeate the paper, react with the water, and neutralize excess acid for a period of 12 hours. At the end of the permeation process, the excess DEZ is removed and reclaimed. In the third passivation stage, the final alkaline reserve

compound is formed, and some water is reabsorbed into the paper. The paper approaches its initial equilibrium water content when it sits in a rehumidification room for about 1 to 2 days.

The Library of Congress has developed plans for implementing the diethyl zinc process on a large scale. Our best case plan at its present level of development is characterized by the tasks in the next slide. Our objective is an operational treatment plant by late 1987.

In summary, let me leave you with some encouraging words about deacidification as a promising approach to keeping the book available in libraries and preventing costly microfilming of brittle materials.

The brittle paper challenge in front of us has been clearly defined. We know why paper becomes brittle and have identified several solutions to prevent this from happening. Manufacture of alkaline paper and the mass deacidification of library materials to make them alkaline appear to be the promising solutions to extend the permanence of stronger papers.

This combination of technologies can provide the team work to solve this important national challenge by the end of this century.

Thank you.

The CHAIRMAN. So the process works without having to open the books.

Mr. SPARKS. Yes, sir. That is because the molecules are so small that they diffuse between the pages.

The CHAIRMAN. Well, thank you very much. I know that I personally understand the process a little better as a result of that briefing.

We also have with us today the president of the Board of County Commissioners of Frederick County, Hon. Galen Clagett.

The mayor of Frederick, Mayor Young, had intended to be here, and I understand he is ill, but is represented by Carolyn Greiner.

Perhaps Mr. Clagett and Ms. Greiner would like to come to the table at this point.

It is a great pleasure to have you both here, although I regret that Mayor Young is ill.

Mr. Clagett, do you want to proceed?

Mr. CLAGETT. I will defer to Ms. Greiner, first.

The CHAIRMAN. Fine.

TESTIMONY OF CAROLYN GREINER, ON BEHALF OF MAYOR RONALD N. YOUNG, CITY OF FREDERICK, MD; AND GALEN CLAGETT, PRESIDENT, BOARD OF COUNTY COMMISSIONERS OF FREDERICK COUNTY, MD

Ms. GREINER. Chairman Mathias, it is a pleasure to be here. I am sorry the mayor did not schedule his flu a little better. He sent a prepared speech, which I can read, if you wish. If not, I would be happy to let you do your own reading.

The CHAIRMAN. We can accept the mayor's statement as part of the record, and we appreciate your bringing it.

Do you have any questions on the mayor's behalf as a result of what you have seen here today?

Ms. GREINER. Well, when we first received news of this process in a letter, we were all wondering, really, what it was. So I am delighted to have seen the slide show, so that I can take that information back.

I would like to say just a little bit about Frederick. I cannot pass up this opportunity—not that you need to be educated at all. But in addition to all the technical things that are so wonderful about this—it boggles the mind that such a thing can occur that will save this tremendous natural resource. I wish that we could say the same thing could occur in our natural resources. It would be a wonderful thing to give the lifespan of those resources that tenfold life.

But a little bit about Frederick that makes Frederick an ideal location. We are also history conscious. Historic preservation has been the key to the economic recovery of our inner city over the last dozen years. We have a large historic district, reported on the National Register; an interested and committed citizenry; an aggressive city government with a strong historic district commission, and private investors' use of the well-conceived Federal program which permits tax credits for rehabilitation of historic properties which have transformed our decaying central city to a healthy, vibrant downtown business district. And we have received national recognition for historic preservation.

During the Civil War, Frederick, which was then a town of 8,000, played a significant part in saving the Nation. Jubal Early's army came through, threatened to destroy Frederick, and demanded a $200,000 ransom, offering the townspeople the opportunity to satisfy that ransom with Union ordnance, medical, quartermaster, and commissary supplies stored in the area. But the town paid the ransom. That day's delay, combined with the Battle of the Monocacy, just east of town, provided enough time to call up troops to reinforce the defense of Washington. Frederick bonded that debt created by the ransom, and did not finish retiring the debt until the 1950's.

Perhaps our town's action saved the Library of Congress from burning a second time.

When the mayor was a student, he used some of Thomas Jefferson's materials, which formed the basis of the Library's collection after the British burned the original Library of Congress in 1814. And he likes to think that his home town may have played a part in preserving his library. It gives him much pleasure to believe that Frederick, through providing a home for the deacidification facility, may again play a part in preserving this marvelous national resource.

Incidentally, I have brought a document with me that you have not seen for a while—the original Civil War ransom note. When your new facility is open, I would be honored if you would consider deacidifying our ransom papers as part of the dedication activities. [Laughter.]

In addition, as Frederick's mayor, Mayor Young says he has a use for th n in mind. Senator Mathias for many years tried to have Frederick reimbursed for its financial sacrifice of $200,000 on behalf of the Nation. Though that effort was not successful, perhaps Congress would look favorably upon repaying the country's debt to Frederick in another fashion. It appears that Frederick will

need the assistance of Congress to proceed with a flood control project vital to the continued recovery of our center city. And it may literally take an act of Congress to cut the redtape to permit us to continue a project which is already underway. The city of Frederick is not necessarily asking for fiscal support, but we may need a returned favor showing the faith and support of Congress, as Frederick showed faith and support for the Union, to permit the development aspects of our Carroll Creek project to occur simultaneously with the flood control construction.

I thank you sincerely for the opportunity to speak.

[The prepared statement of Mayor Young follows:]

PREPARED STATEMENT OF RONALD N. YOUNG, MAYOR OF THE CITY OF FREDERICK, MD

Senator Mathias, members of the Senate Committee on Rules and Administration, thank you for the opportunity to speak before you on Senate Bill 2418, a bill to authorize and direct the Librarian of Congress to proceed with the construction of the Library of Congress Mass Book Deacidification Facility at Fort Detrick, in the City of Frederick.

I was pleased to learn of the development of a process to preserve paper which makes its possible to treat books in large numbers, and the more I reflect upon it, the more momentous it seems. The chemists at the Library of Congress who developed the process should be congratulated. We owe a debt of gratitude to them, to their supervisors who understood the importance of the research, and to Congress for supporting it We have come to understand the value of conservation of natural resources in our country, as we have begun to appreciate the economic loss we sustain when resources are squandered. Under your leadership, a process has been developed which will extend the life of books more than ten times. Use of the process will effectively "purchase" ten times the number of volumes the library acquires, for it will not be necessary to replace them so frequently. Would that a like process could be used to extend the life span of reserves of natural resources ten-fold!

But the fiscal savings are only part of the story Many of the volumes could never be replaced This technology will not only save money, it will preserve our history, knowledge, and culture for future generations.

We are delighted you are planning to build the facility in Frederick and can see many factors which make our City a good location:

Proximity to Washington and the Library, Frederick is only 45 miles away by excellent interstate highway.

Fort Detrick's security facilities and specially trained fire and emergency services, which are supplemented by the City's fire and ambulance service.

Location at a major center for communications and government-sponsored research and development activities compatible with the laboratory portion of the deacidification facility Fort Detrick has over a dozen tenant units involved in medical research, bioengineering research and development, and plant disease research, as well as the East Const Telecommunications Center and various Department of Defense medical material and logistics activities Just outside its gate, a large research park is being privately developed.

Although the number of employees to be hired is not large, the fifteen to twenty new contract positions will be helpful to our community's economy. During the recent economic recovery, Western Maryland's unemployment rate has lagged behind the national rate Frederick County's unemployment rate last month was 8.2%, compared with a 7.8% national average.

Lastly, you could not have selected a more compatible community for a preservation activity Frederick is history-conscious, and historic preservation has been the key to the economic recovery of our inner city over the last dozen years. We have a large historic district recorded on the National Register. An interested and committed citizenry, an aggressivie City Government with a strong Historic District Commission, and private investors' use of the well-conceived federal program which provides tax credits for rehabilitation of historic properties have transformed a decaying central city to a healthy, vibrant downtown business district. Frederick's achievments in historic preservation have attained national recognition.

Frederick was founded in 1745 The town and its citizens have had major roles in our nation's history from pre-revolutionary times:

Western frontier town before the French and Indian War.

Home of John Hansen, our first president under the Continental Congress.

Home of Frnncis Scott Key, and of Justice Roger Brooke Taney, who administered the oath of office to seven presidents, and of Barbara Fritchie, the Civil War heroine memorialized in John Greenleaf Whittier's poem.

During the Civil War, Frederick, then a town of 8,000, played a significant part in saving the Union. Jubal Early's army came through, threatened to destroy Frederick, and demanded a $200,000 ransom, offering the townspeople the opportunity to satisfy the ransom with Union ordnance, medical, quartermaster, and commissary supplies stored in the area. The town paid the ransom. The day's delay, combined with the Battle of the Monocacy just east of town, provided enough time to call up troops to reinforce the defense of Washington. Frederick bonded the debt created by the ransom, and did not finish retiring the debt until the 1950's.

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Incidentally, I've brought with me Frederick's original Civil War ransom note. When your new facility is open, I would be honored if you would consider deacidifying our ransom papers as part of the dedication activities. In addition, As Frederick's mayor, I have a use for them in mind. Senator Mathias for many years tried to have Frederick reimbursed for its financial sacrifice on behalf of the nation. Though that effort has not been successful, perhaps Congress would look favorably upon repaying the country's debt to Frederick in another fashion. It appears that Frederick will need the assistance of Congress to proceed with a flood control project vital to the continued recovery of our center city. It may literally take an act of Congress to cut the red tape to permit us to continue a project which is already underway.

The City of Frederick is not necessarily asking for fiscal support, but we may need a return favor showing the faith and support of Congress, as Frederick showed faith and support for the Union, to permit the development aspects of our Carroll Creek Project to occur simultaneously with the flood control construction.

I thank you sincerely for the opportunity to speak with you today, and issue you an invitation to visit Frederick soon. As Senator Mathias will confirm, I am sure you will receive a warm welcome.

The CHAIRMAN. Well, thank you very much for being here. Assure the Mayor that we will give him all the aid and support of which we are capable.

Ms. GREINER. Thank you, sir.

The CHAIRMAN. Mr. Clagett?

Mr. CLAGETT. Thank you, Senator. I appreciate you having us today. I did not bring a list of projects that I would like to have completed.

The CHAIRMAN. Well, you can communicate them on another occasion.

Mr. CLAGETT. I will do that. And I will not give you a history lesson. I would just like to reiterate and echo basically what Ms Greiner has said about the project and inform the committee that the county is in full support of the project.

The CHAIRMAN. Well, we appreciate both of you being here. I think this is an important national project, and I share with you some satisfaction that Frederick can be the site for doing this important work.

So, thank you for being here.

Senator Ford, do you have any questions?

Senator FORD. I have no questions. I apologize, Mr. Chairman, for being late. I would say that if I get another day like this, I am not sure I want any more. I have been hustling.

But may I, with your permission, submit a short statement for the record? It is my privilege and pleasure to be a cosponsor with

our Chairman. I figured if he could get it in Maryland, maybe something like this might spill over on Kentucky, and we would be looked at in a different light. So, if you do not mind, Mr. Chairman, I ask unanimous consent that a short statement of mine be included in the record as if given earlier.

The CHAIRMAN. Without objection, so ordered.

[The prepared statement of Senator Ford follows:]

PREPARED STATEMENT OF SENATOR WENDELL H. FORD, A U.S. SENATOR FROM THE STATE OF KENTUCKY

Mr. Chairman: I will take but a few minutes for some brief remarks.

It was my privilege and pleasure to co-sponsor S. 2418 with you Mr. Chairman. I consider it a most fortunate event that a method to deacidify the paper on which virtually all of the books at the Library of Congress were printed on was discovered.

I don't know how anyone can place a true value on this process. The facility which S. 2418 would authorize may well be the most essential and worthy construction project this Congress will act upon.

To be able to retard the disintegration of the book paper and extend the life of the priceless words in the Library of Congress and in our other libraries, public and private, is an achievement of unmeasurable value.

I am very proud to be able to play a small role in this fine project.

The CHAIRMAN. Let me assure the Senator from Kentucky that I am a great believer in "bread cast on the waters."

Senator FORD. I want to tell you, Mr. Chairman, you and I are going to get along fine. [Laughter.]

The CHAIRMAN. Thank you very much.

Ms. GREINER. Thank you.

Mr. CLAGETT. Thank you.

The CHAIRMAN. We now have several representatives of the library profession here, Ms. Carolyn Harris, Ms. Susan Martin—Ms. Harris is the head of the Preservation Department of Columbia University Libraries in New York, and Ms. Martin is director of libraries at the Milton S. Eisenhower Library at Johns Hopkins University. Mr. Gary E. Strong is State librarian of the California State Library in Sacramento.

I would suggest that the three of you come to the table together, and we can then ask you for your statements.

TESTIMONY OF A PANEL, INCLUDING CAROLYN L. HARRIS, HEAD OF PRESERVATION DEPARTMENT, COLUMBIA UNIVERSITY LIBRARIES, NEW YORK, NY; SUSAN MARTIN, DIRECTOR OF LIBRARIES, MILTON S. EISENHOWER LIBRARY, JOHNS HOPKINS UNIVERSITY, BALTIMORE, MD; AND GARY E. STRONG, STATE LIBRARIAN, CALIFORNIA STATE LIBRARY, SACRAMENTO, CA

Ms. HARRIS. Mr. Chairman, my name is Carolyn Harris, and I am the head of the preservation department at the Columbia University Libraries. I am also chair-elect of the preservation section of the American Library Association. I am the author of two articles on mass deacidification processes and numerous lectures. I am testifying today as a representative of the Association of Research Libraries. I am very pleased to have this opportunity to testify.

The greatest crisis facing not only the Library of Congress, but all research libraries, is the preservation of materials in our collections printed on paper that has become embrittled because of acid inherent in the paper and the poor conditions under which they

have been stored. It is estimated by the Yale University Libraries that close to 45 percent of the volumes in their collections are on embrittled paper, and 87 percent are on paper that is acidic. Studies at Stanford University and the New York Public Library bear out these statistics. Columbia estimates at least 30 percent, or 1.5 million volumes, are embrittled.

These embrittled materials are being preserved in microform. Microform is currently the most cost-effective storage media for text, but it cannot satisfactorily substitute for the volume. Readers must have machines mediating their contact with the volume. Color and halftone, the feel and look of paper, impression of type and binding, is lost, as well as the convenience of using the book, and the historical evidence contained in the artifact.

But, microforms are long lasting if stored properly, and can be cheaply duplicated. Cost-effective is, however, a relative term; it is estimated that it costs $50 or more to film a monographic volume of 300 pages. However, at this time, microforms are our best alternative for preserving much of the endangered information now held in research library collections.

Despite the strong commitment of the Library of Congress and other research libraries to preservation microfilming, and considerable funding, we feel that we will be unable to save every title before it is too late. It is highly possible that most of the evidence we have of printing between 1850 and, perhaps, 1950, will only exist in another format, facsimile reprint, which solves a few of the problems, but not all of them, microform, or in a high-density storage media. The actual volume preserved in cold storage or rare book collections will become very precious.

The future promises no better. Materials printed in the 20th century are quickly becoming embrittled. Current publishing trends show a movement toward the use of permanent paper. Encouragement from the Council on Library Resources Committee on Book Longevity has had some effect. An American National Standards Institute standard for permanence of paper for printed library materials is soon to be approved. But, the movement is very slow. Most publishing today still employs paper produced from untreated wood pulp and sized with aluminum sulfate.

Of the 100,000 volumes added to Columbia last year, we estimate that about 20 percent were on permanent paper.

From the time that William J. Barrow identified acid as the prime factor in the deterioration of paper, the greatest hope of the library preservation community has been for a process which will neutralize the acid in paper and prevent future embrittlement. Traditional approaches, disbinding books and washing them leaf by leaf in a deacidification solution, work well, but are very time-consuming and expensive. Only the most important books deserve this treatment. Solvents have been developed that carry the deacidification agent into the paper quickly so that fragile materials can be deacidified, and spray application is possible. This has speeded up the process, since the book does not have to be disbound, but the toxicity of the solvents require that the work be done under a fume hood, and the process still requires leaf by leaf treatment.

The ideal solution was identified early—a mass process—penetrating many books with a deacidification agent at one time, re-

quiring no disbinding or high labor costs. Under the leadership of the Library of Congress, such a process has been developed and tested by scientists and engineers. In a sophisticated technical environment, the process will neutralize the acid in the volumes, as many as 500,000 a year, by a vapor phase impregnation with diethyl zinc. This will ensure that currently undeteriorated paper will remain usable for hundreds of years.

The Columbia University libraries contributed books to the first large-scale test run. That test assured me that the process works effectively, although a few problems were encountered. I understand these problems have been solved in the final plant design.

Research librarians have begun to see the light at the end of the tunnel. Finally, it appears to be possible to put a book on the shelf, deacidified and buffered against future acid attack, and be able to assume it will last for more than 50 to 100 years. The binding may fall apart from use, but the paper will be strong enough for rebinding. This would alleviate the long-term need for expensive preservation treatment programs. We could focus our attention on the embrittled materials already in our collections.

Although the mass deacidification unit is to be built for the prospective collections of the Library of Congress, other research libraries will benefit. First, preserving the collections of the Library of Congress is of paramount importance to the support of the scholars of the Nation and, in turn, to the research libraries. It is not possible to say too strongly how crucial the collections of the Library of Congress are to, and will be to, future scholarship.

It is also highly probable that other facilities will be constructed based on the design of this prototype, or that the Library of Congress facility will become available to other libraries. Because of the nature of the process, libraries will not be able to construct local plants, but will turn to centralized facilities when they become available.

It is assumed that the importance of the process to the preservation of library collections will secure the necessary funding. The costs, at $3 to $5 a book, although reasonable, will require considerable sums of money in large libraries, but they will alleviate the need for the much larger sums microforming requires.

The U.S. Congress is to be congratulated for providing the funding for the development of this process, and on behalf of the Association of Research Libraries, I urge Congress to authorize the funding to construct the mass book deacidification facility so the future generations of national and international scholars, students, and researchers will benefit from the capability of the Library of Congress and other research libraries to provide continuing access to materials in original format and usable condition.

Again, I thank you for this opportunity to testify.

The CHAIRMAN. Thank you very much.

[The prepared statement of Ms. Harris follows:]

PREPARED STATEMENT ON BEHALF OF THE ASSOCIATION OF RESEARCH LIBRARIES BY CAROLYN HARRIS, HEAD, PRESERVATION DEPARTMENT, COLUMBIA UNIVERSITY LIBRARIES

My name is Carolyn Harris. I am the head of the Preservation Department in the Columbia University Libraries. I am also Chair-Elect of the Preservation of Library

Materials Section of the American Library Association. I am the author of two articles on mass deacidification processes. I am testifying today as a representative of the Association of Research Libraries in support of Senate Bill 2418 to authorize the construction of the Library of Congress Mass Book Deacidification Facility. I am very pleased to have this opportunity to testify.

The greatest crisis facing not only the Library of Congress, but all research libraries, is the preservation of materials in our collections printed on paper that has become embrittled because of acid inherent in the paper and the poor conditions under which they have been stored. It is estimated by the Yale University Libraries that close to 45% of the volumes in their collections are on embrittled paper and 87% are on paper that is acidic. Studies at Stanford University and the New York Public Library bear out these statistics. Columbia estimates at least 30% or 1,500,000 volumes are embrittled.

These embrittled materials are being preserved in microform. Microform is currently the most cost-effective storage media for text, but it cannot satisfactorily substitute for the volume Readers must have machines mediating their contact with the contents of the book. Color and half-tone, the feel and look of paper, impression of type, and binding is lost, as well as the convenience of using a book, and the historical evidence contained in the aritifact. But, microforms are long-lasting if stored properly, and can be cheaply duplicated. Cost-effective is a relative term; it is estimated that it costs $50.00 or more to film a monographic volume of 300 pages. However, at this time, microforms are our best alternative for preserving much of the endangered information now held in research library collection.

Despite the strong commitment of the Library of Congress and other research libraries to preservation microfilming, and considerable funding, we fell that we will be unable to save every title before it is too late. It is highly possible that most of the evidence we have of printing between 1850 when the damaging materials began to be used in the manufacture of paper, and, perhaps, 1950, will only exist in another format, facsimile reprint (which solves some of the problems, but not all), microform or a high density storage media. The actual volumes preserved in cold storage and rare book collections will become very precious.

The future promises no better. Materials printed in the twentieth century are quickly becoming embrittled. Current publishing trends show a movement toward the use of permanent paper. Encouragement from the Council on Library Resources Committee on Book Longevity has had some effect. An American National Standards Institute Standard for Permanence of Paper for Printed Library Materials is soon to be approved. But, the movement is very slow. Most publishing today still employs paper produced from untreated wood pulp and sized with aluminum sulfate. Both substances create highly acidic paper.

From the time that William J. Barrow identified acid as the prime factor in the deterioration of paper, the greatest hope of the library preservation community has been for a process which will neutralize the acid in paper and prevent future embrittlement Traditional approaches, disbinding books and washing them leaf by leaf in a deacidification solution, work well, but are very time-consuming and expensive. Only the most important books deserve this treatment. Solvents have been developed that carry the deacidification agent into the paper very quickly, so that fragile materials can be deacidified, and spray application is possible. This has speeded up the process, since the book does not have to be disbound, but the toxicity of the solvents require that the work be done under a fume hood, and the process still requires leaf by leaf treatment.

The ideal solution was identified early—a mass process—penetrating many books with a deacidification agent at one time, requiring no disbinding or high labor costs. Under the leadership of the Library of Congress, such a process has been developed and tested by scientists and engineers. In a sophisticated technical environment the process will neutralize the acid in the volumes, as many as 500,000 a year, by a vapor phase impregnation with diethyl zinc and leave a residue of zinc carbonate to neutralize acid introduced into the paper as a product of future slower deterioration or from the environment. This will ensure that currently undeteriorated paper will remain usable for hundreds of years. Paper already deteriorated may be stabilized, but still will not be able to withstand physical use.

The Columbia University Libraries contributed books to the first large scale test run That test assured me that the process works effectively, although a few problems were encountered. I understand these problems have been solved in the final plant design.

Research libraries have begun to see light at the end of the tunnel. Finally it appears to be possible to put a book on the shelf, deacidified and buffered against future acid attack, and be able to assume it will last for more than fifty to a hun-

dred years. The binding may fall apart from use, but the paper will be strong enough for rebinding This would alleviate the long-term need for expensive preservation treatment programs. We could focus our attention on the embrittled materials already in our collections.

Although the mass deacidification unit is to be built for the prospective collections of the Library of Congress, other research libraries will benefit. First, preserving the collections of the Library of Congress is of paramount importance to the support of the scholars of the nation, and in turn, to the research libraries. It is not possible to say too strongly how crucial the collections of The Library of Congress are to, and will be to future, scholarship.

It is also highly probable that other facilities will be constructed based on the design of this prototype, and that the Library of Congress facility will become available to other libraries. Because of the nature of the process, libraries will not be able to construct local plants, but will turn to centralized facilities when they become available. It is assumed that the importance of the process to the preservation of library collections will secure the necessary funding. The costs, at $3.00 to $5.00 per book, although reasonable, will require considerable sums of money in large libraries—but will alleviate the need for the much larger sums microforming requires.

The United States Congress is to be congratulated for providing the funding for the development of this process, and on behalf of the Association of Research Libraries I urge Congress to authorize the funding to construct the mass book deacidification facility so the future generations of national and international scholars, students, and all researchers will benefit from the capability of the Library of Congress and all research libraries to provide continuing access to materials in original format and usable condition.

Again, I thank you for this opportunity to testify.

The CHAIRMAN. Ms. Martin?

Ms. MARTIN. Thank you, Mr. Chairman.

My name is Susan Martin, and I am the director of the Milton S. Eisenhower Library at the Johns Hopkins University. I have been asked to represent the Association of Research Libraries, an organization whose membership comprises the 117 largest and most comprehensive research and academic libraries in North America.

The Association of Research Libraries, or ARL, has long been concerned with the preservation of library collections and for all of the reasons that the previous speakers have given.

I have submitted my testimony for the record, and rather than reading this testimony, I would like to show you some books that I have brought along, in this case from the Johns Hopkins University Collection, for the most part, to give you an idea of what kinds of activities and what kinds of materials might be seen in a library, just very quickly.

The CHAIRMAN. Without objection, your statement will be included in the record.

Ms. MARTIN. Thank you.

First of all, I have a book here, published in 1982, which has been printed on non-acid paper. In this case, the publisher has been working, I believe, with the Council on Library Resources in the Book Longevity Program that was mentioned, and it is very clearly stated, for library staff, on the back of the title page, "This publication is printed on permanent, durable acid-free paper."

The library staff opening the package containing this book can take the book, put it to one side, and know that it would not have to be treated by the mass deacidification facility, because the research that the Library of Congress has done with accelerated aging shows that this kind of paper will endure for centuries, as well.

Another type of material that comes through in most large libraries—and I have one page, here—of an 18th century French volume where there has been no deterioration at all. It is in perfectly good shape. It bends. It does not break. It is excellent. That also would not have to go, I believe, through deacidification treatment.

Then, after that, we begin to run into some problems. Here, I have another recent book, a 1983 book. In this case, there is no statement on the back of the title page, indicating whether it is or is not printed on acid-free paper. My guess is that the Library of Congress, or my library, in pursuing this activity, would not find it economically feasible to test each book coming through to find out whether it contained acid paper or not, and would probably put it in the file to go to a mass deacidification facility. If that were not to be done, then we know from experience that within a few decades, the same kind of thing would happen, and at the risk of copying Mr. Welsh, we would find some deterioration and embrittlement to the point where the only thing that can be done with it is to treat it one last time to retain the text. The book as an artifact has completely disappeared, and we cannot use it any longer.

I also had my staff treat two pages of this embrittled book, to show you what might be done. This is a page which has been encapsulated. This is a reversible process, encapsulated. Now I can do a little more with it. I can certainly read it. It is still brittle, but nonetheless, it can be used. This page has been treated with Japanese tissue on both sides, that has been pasted on and then heated into the page, so that the texture of the page has changed, and I can move it around without it breaking, and I can also read the text. Both of these treatments, like the single-leaf-washing process, are a page-at-a-time process, a process that cannot be contemplated in a regular operating environment. It is far too expensive and can only be done for the rarest material.

So, in essence, we are dealing with the materials that are newly-incoming material, on acid-containing paper, and the material of the last 100 years or so, which is yellowing, showing that they contain acid, and if we let them go too long, they will become as brittle as this item. But this book, for example, also could be treated in a deacidification facility; it would continue to be yellow, it would not improve in terms of its quality, but at least it would stabilize and be usable for future generations.

I can only repeat what others here have said, that this process is an extremely important one. The Library of Congress' collections are too significant. They are our major resource in this country; therefore, the repository for our culture, our civilization, and it is essential—I strongly urge that this bill be passed so that a deacidification facility can be established and operating as rapidly as possible.

Thank you very much.

The Chairman. Well, thank you very much for a demonstration that suggested several questions, but I will wait until after Mr. Strong has testified.

[The prepared statement of Ms. Martin follows:]

PREPARED STATEMENT OF SUSAN K. MARTIN, DIRECTOR, MILTON S. EISENHOWER LIBRARY, JOHNS HOPKINS UNIVERSITY

Mr. Chairman and members of the Committee: My name is Susan Martin, and I am the Director of the Milton S. Eisenhower Library at The Johns Hopkins University. I have been asked to represent the Association of Research Libraries (ARL), an organization whose membership comprises the 117 largest and most comprehensive research and academic libraries in North America. Particularly because of the nature of the collections in ARL libraries, the question of preservation of materials is vitally important. Although the Library of Congress is far larger than other ARL institutions, each institution faces the same issues and is anxious to look toward the lead of the Library of Congress in solving the problems of deteriorating books.

The bill before you, Senate bill 2418, would authorize the construction of a mass book deacidification facility, with a capacity of treating up to 500,000 books per year. I strongly urge the adoption of this bill since the impact of the results of this activity would be felt not only within the collection of the Library of Congress, but nationally and internationally as well. It has been less than five years since librarians considered the problem of acid-containing books to be an unsolvable one. Indeed, most solutions available for the preservation and conservation of printed materials were considered to be too costly and too time-consuming to adopt. It is remarkable that in such a short time that we have learned about many methods by which we can improve the physical conditions of our most important information sources, allowing us to make rational decisions about the preservation and safeguarding of the records of our past and also of our present.

The problem to be solved can be described fairly simply. In the mid-nineteenth century, techniques were developed which allowed paper to be made from wood pulp rather than 100% rag. These techniques, a result of the successful industrial revolution, produce paper containing molecules which breaks down into an acid residue, especially under poor environmental conditions. The acid residue destroys the fabric of the paper itself. Ironically, a surge in the production of books began about the same time that the shift in paper production took place. For example, the prestigious George Peabody Library in Baltimore, established in 1857, was created with a selection of just over 100,000 volumes representing the entire universe of knowledge of that time. In those days, that was considered a comprehensive research library. You are aware, of course, that today the Library of Congress has over 80,000,000 items and even the smaller research libraries have 2,000,000 volumes or more. That is to say, the research library in the 1850s was small but contained books with stable paper, whereas the research library of the 1950s and later was more than 20 times larger, but contained a large percentage of deteriorating books.

At the same time, the library and book professions lacked economical methods to treat material. It was possible to stabilize these deteriorating books, but it might have to be done by taking the book apart carefully, and washing each page one at a time in a solution which would stabilize the acidifying process. The process was so slow that one person could do no more than 25 or 30 books per year. Obviously, this was such a labor-intensive and expensive job that hardly any library did approach the effort.

In the 1960s and 70s, much research was done regarding the question of book preservation. The Library of Congress' activities were critical to this research. It has been a guiding force in the library world, identifying techniques which might bear fruit and urging participation of other libraries in such exploration.

L.C.'s proposed facility for mass deacidification by use of diethyl zinc is indeed a welcome proposal for the research library world. Most importantly, the Library of Congress will carry out an even larger scale its pilot project of last year to test the method for the nation and the world. Since tests have already been conducted successfully, it is reasonable for us to assume that the library will be able to rehabilitate a large percentage of its older books, although approximately 25% of the books are so badly deteriorated that they cannot be stabilized even using the diethyl zinc process. In addition, new books will be treated so that they will not deteriorate as they sit on shelves or are used by the public. Only 25% of the currently published trade books are printed on acid-free paper; therefore, the remaining 75% must be treated soon after acquisition to prevent deterioration.

Finally, the Library of Congress will as a result of its efforts provide methods for use of diethyl zinc mass deacidification for other libraries and for individuals with significant collections.

The benefits of this effort are many and obvious. I would like to identify just three. First, the Library of Congress will begin to save its own collection as a record of our civilization. With a collection of that size, this action is no small accomplish-

ment and is extremely important to researchers and the information seeking public. Second, the project will take advantage of the Library of Congress' cooperation with the research library community. In particular, the Library of Congress has worked on an informal level with the Research Libraries Group, which has in place a preservation committee and preservation program. Thus far, the Research Libraries Group (a consortium of about 28 large research libraries) has only been able to address preservation by microfilming. The mass deacidification process will allow large research libraries, such as the Yale University Library, the New York Public Library, and the University of California at Berkeley to broaden the scope of their activities and to identify those areas of their collections which could be suitably treated by mass deacidification.

Finally, the successful use of the mass deacidification process will allow libraries to begin selecting important material to be preserved, in a manner tht is both cooperative and that also allows the identification of important collections in libraries throughout the country to be preserved for use by the nation's citizens.

In closing, I once again urge strongly that this bill be adopted so that the community may take advantage of the knowledge gained by the Library of Congress to broaden this program to save an increasing number of otherwise deteriorating books.

Thank you very much.

The CHAIRMAN. Mr. Strong?

Mr. STRONG. Thank you, Mr. Chairman.

My name is Gary Strong, and I am the State librarian of California. I also chair the American Library Association's Legislation Committee, and I am the vice-president/president-elect of the Library Administration and Management Association. ALA is a nonprofit educational organization of over 40,000 librarians, library trustees, library educators, and friends of libraries.

I am pleased to be here today to have the opportunity to testify on behalf of the association, providing very strong support to S. 2418, which would authorize the construction of a library mass deacidification facility.

I would like to summarize my remarks, if I may.

The CHAIRMAN. You are certainly free to do that, and without objection, your full statement will be included in the record.

Mr. STRONG. Thank you.

The facility would provide for the first large-scale attack on one of the most pressing problems facing libraries. The paper in books printed since the middle of the last century has been treated with chemicals which combine with the moisture in the air to produce acid, which causes the paper to gradually disintegrate.

The Library of Congress is, of course, Congress' own library. It is also the finest research library in the country, and its marvelous collections are known and used by scholars and researchers from all over the world. We believe, though, it is also our national library; it provides many services to other libraries.

The Library's leadership in this area is of enormous value to other libraries throughout the Nation, those in California included. The library collections of the State of California are no doubt some of the richest in the country. Yet the State of California requested 3,500 items on inter-library loan from the Library of Congress last year, and over 1,060 reference questions were asked of the Library of Congress by California residents. The Library's collections are considered by librarians and scholars in this country as the collections of last resort. To know that effective preservation efforts are being taken with respect to the Library of Congress' materials, past and present, would alleviate some of the necessity for libraries

throughout the United States to maintain extensive collections of little-used materials. Libraries will be able to build on the Library of Congress' expertise and effectively treat their own collections that should be retained for posterity.

The University of California, in a 1983 report, estimated that 80 percent of its 16 million volumes in the university's collections are printed on acidic paper that will eventually self-destruct. The problem is compounded by the fact that each year, the university adds another 600,000 volumes to its collections, and of these new books, 450,000 to 500,000 volumes will begin the slow process of disintegration—very similar to the other factors that you have heard this afternoon. The university is hopeful that through a process of mass deacidification that might be available through the technologies developed at the Library of Congress, that they would be able to treat as many as 200,000 of those volumes per year from their collections to arrest acid deterioration and to allow that these volumes be returned for an extended useful life.

The problems in the University of California are not unique, however. They are repeated in libraries throughout California, from the smallest to the largest. Without a proven process such as mass deacidification, unique materials will be lost for future generations of Californians. In the California State Library collections, for example, acid paper threatens our valuable collections of 19th and 20th century manuscripts, as well as papers of historic special collections, such as newspapers from World War II, and from Japanese internment camps in the West, as well as other representations of California life, such as posters and broadsides celebrating historic events.

The collection of the California State Archives is also subject to the ravages of acid paper. A program of deacidification has been underway at the archives for a number of years, but similarly, is on almost a page-by-page basis, and only the most precious and most rare are the ones being treated.

I would like to add, however, that States such as California and its academic institutions are making similar commitments as the Library of Congress. For example, in the Governor's budget this next year, the California State Library makes provisions for funds to microfilm a number of unique index files which would otherwise be lost for historic research. Another proposal approved by the State Legislature would provide the California State Library with the 1st of 5 years of funding to expand its microfilming program in which that 5-year effort to preserve the content of more than 8,000 volumes of historic local newspapers will likely otherwise succumb to the ravages of acidic paper, destroying the history of several generations of Californians. The preservation of these newspaper volumes as historic artifacts and research tools is highly desirable, but, unfortunately, many of them have already disintegrated—and I did not bring a volume of newspapers to crumble in front of you—

The CHAIRMAN. Hopefully, because yours have not reached that stage yet.

Mr. STRONG. No, because I could not carry it on the plane.

The process as proposed by the Library of Congress would arrest some of the time and acid erosion that would destroy all paper copies currently being saved for the use of future generations.

The Library of Congress' leadership efforts in the preservation of materials are widely admired and supported by the library community, and utilized by them, as well. The process that has been defined has great implications for other libraries as a relatively quick and economical method of deacidification. The American Library Association enthusiastically supports the construction and equipping of the proposed Library of Congress mass book deacidification facility.

I would add that, given the success of the project, I am convinced that it is the kind of technology and the kind of leadership that the Library of Congress has provided to many of us across the country, and that we will be replicating that kind of success in other areas to arrest the problem.

I would thank you for your support to the Library of Congress, and for the opportunity to testify.

The CHAIRMAN. Well, thank you very much, Mr. Strong.

[The prepared statement of Mr. Strong follows:]

PREPARED STATEMENT OF GARY E. STRONG, STATE LIBRARIAN, CALIFORNIA STATE LIBRARY

My name is Gary Strong, and I am the State Librarian of California. I also chair the American Library Association's Legislation Committee, and I am the vice-president/president-elect of the Library Administration and Management Association, a division of ALA. ALA is a nonprofit educational organization of over 40,000 librarians, library trustees, library educators, and friends of libraries.

I am very pleased to have this opportunity to testify on behalf of ALA in strong support of S. 2418, a bill to authorize the construction of a Library of Congress Mass Deacidification Facility. For the relatively modest sum of $11,500,000, such a facility would provide for the first large-scale attack on one of the most pressing problems facing libraries. The paper in books printed since the middle of the last century has been treated with chemicals which combine with the moisture in the air to produce acid which causes the paper to gradually disintegrate.

The Library of Congress is, of course, Congress' own library. It is also the finest research library in the country; its marvelous collections are known and used by scholars and researchers from all over the world. It is also our national library; it provides many services to other libraries, and its specialized staff provide leadership in many areas of library science. The proposed facility would allow the Library to treat quantities of books in large vacuum chambers where they would be impregnated with diethyl zinc vapor to neutralize the acidity in the book papers. The books thus treated would last two to five times longer, or an additional 400-600 years.

This would allow the Library to implement on a large scale the diethyl zinc process its own preservation specialists developed. The Library's leadership in this area is of enormous value to other libraries throughout the nation. Library collections in the State of California are no doubt some of the richest in the country. Yet, the State of California requested 3,500 items on interlibrary loan from the Library of Congress last year and over 1,060 reference questions were asked of the Library of Congress by California residents. The Library's collections are considered by librarians and scholars in this country as the collections of last resort. To know that effective preservation efforts are being taken with respect to Library of Congress materials, past and present, would alleviate some of the necessity for libraries throughout the United States to maintain extensive collections of little-used materials.

In addition, as is the case in the Library's automation research and development program, the experience, expertise, and application of new techniques are shared with the entire library community in this country and abroad. Libraries will be able to build on the Library of Congress' expertise and effectively treat their own collections that should be retained for posterity.

The University of California, in its 1983 report, Conservation of the Collections, as supplement to The University of California Libraries. A Plan For Development,

1978-88, estimated that 80 percent of the 16,000,000 volumes in the University's collections are printed on acidic paper that will eventually self-destruct. The problem is compounded by the fact that each year the University adds another 600,000 volumes to its collections. Of these new books, 450,000 to 500,000 will begin the slow process of disintegration. The University is hopeful that the process of mass deacidification, as it is being developed by the Library of Congress, would be available in two or three years to treat 200,000 volumes per year from their collections to arrest acid deterioration and to allow these volumes to be returned for an extended useful life. At this rate it will take the University of California several decades to control their deacidification problem.

The problem of the University of California is not unique, it is repeated in libraries throughout California from the smallest to the largest. Without a proven process such as mass deacidification, unique materials will be lost for future generations of Californians. In California State Library collections, acid paper threatens valuable collections of 19th and 20th century manuscripts and papers as well as historic special collections such as newspapers from World War II, and from Japanese internment camps, as well as other representations of California life such as posters and broadsides celebrating historic events.

The collection of the California State Archives is also subject to the ravages of acid paper. A program of deacidification has been underway at the Archives for a number of years, but only a program of mass deacidification can make inroads into the total problem in their historic collections.

In a similar vein, the Governor's budget for the Caliornia State Library for 1984-5 makes provisions for funds to microfilm a number of unique index files which will otherwise be lost for historic research. Another proposal approved by the State Legislature would provide the California State Library the first year of funds to expand its microfilming programs in what would be a five-year effort to preserve the content of more than 8,000 unique volumes of historic local newspapers which will otherwise quickly succumb to the ravages of acidic paper destroying the history of several generations of Californians. The preservation of these newspaper volumes as historic artifacts and research tools is highly desirable, but without further testing and the availability of the proposed mass deacidification techniques and facilities, such as those proposed at the Library of Congress, time and acid erosion will destroy all paper copies currently being saved for the use of future generations.

In summary, the Library of Congress' leadership efforts in the preservation of materials are widely admired and supported by the library community, and utilized by them as well. The diethyl zinc process has great implications for other libraries as a relatively quick and economical method of deacidification. ALA enthusiastically supports HR 2418 for the construction and equipping of the proposed Library of Congress Mass Book Deacidification Facility.

Thank you for your support of the Library of Congress, and for the opportunity to testify.

The CHAIRMAN. Let me ask a question that I perhaps should have put to Dr. Boorstin. What is the effect of this process on binding? I would ask Mr. Sparks to respond to that.

Mr. SPARKS. Mr. Chairman, there is no effect on the binding, other than to make it alkaline, also.

The CHAIRMAN. Whether it is a cloth binding or a leather binding or whatever.

Mr. SPARKS. That is correct. In fact, our observations are that there is no effect at all that would be negative on any of the components of the book, which is very reassuring.

The CHAIRMAN. Ms. Martin commented that the process stabilized the paper, but did not improve it. In other words, if the process of embrittlement has proceeded to a certain degree, it will always be that degree of brittleness, but it will not get worse.

Mr. SPARKS. That is correct.

The CHAIRMAN. There is no way to restore the original flexibility of the paper.

Ms. MARTIN. Only with a great deal of effort.

The CHAIRMAN. By the encasement in some other material?

Ms. MARTIN. Right.

The CHAIRMAN. Let me be the devil's advocate for a minute. Instead of spending $11.5 million on a plant—and obviously, if this is to be a national service, it would have to be a greater investment than that—why don't librarians simply insist that all the books you buy be on acid-free paper?

Ms. MARTIN. I think it would decrease significantly the number of books that we would be buying. I am sorry, that is rather a flip answer. I think there is significant progress that has been made in increasing the number of volumes, titles, that are published on acid-free paper. I do not know to what extent this, for example, has been the case outside this country. We know that we have an effort in this country to ask paper manufacturers to provide acid-free paper. It is my guess that outside the United States, there is nowhere near such an effort. And, even though we may see an increasing number of U.S. titles on acid-free paper, the foreign materials, there will still be a high level of acidity.

The CHAIRMAN. Yes, Mr. Welsh?

Mr. WELSH. The Council on Library Resources, which is a Washington-based foundation, has played an innovative role in this area. However, the amount of paper used in books that libraries buy is less than 1 percent of the total paper produced. So we do not have enough of a market force to produce this. And the problem is, as Ms. Martin has testified, in our case and in many other resource libraries, more than half of our materials are acquired from abroad, so we have very little impact on the international paper market.

The CHAIRMAN. So at least in the present state of the art, the acid-free paper simply is not available.

Mr. WELSH. That is right.

The CHAIRMAN. Well, let me continue my role as devil's advocate for one more question, and then I want to defer to Senator Ford.

If this is a service that is so valuable, why hasn't some entrepreneur gone out and set up his own operation out there, making money like McDonald's?

Mr. WELSH. I think I can start to answer that question, Mr. Chairman. Really, the need or the problem has not been known for any great length of time. It has only been in recent years, in the past 10 to 20 years, that this has become a problem. And the problem still is with budgets. Most major resource libraries are struggling to have enough money to acquire materials, to catalog them, and to service them, and do not really have the money to provide this sort of service to their collections, even though they are aware of it. Many university presidents have met on this subject, and an attempt is being made, but there is not enough effort yet in the private sector to warrant this. It will come to pass, I am certain.

The CHAIRMAN. And, you think, not enough private demand.

Mr. STRONG. That is right, sir.

The CHAIRMAN. Do any other members of the panel want to add to that?

Mr. STRONG. I would support that. I think it is primarily our public institutions that are charged with the collecting and organizing and preserving of the record of mankind, that are facing the problem. Others collect as a hobby or acquire printed material that they intend to, frankly, put out in the garbage the next morning

because they have read it and they have consumed the information in it. As public agencies, we are faced with collecting and preserving a long record of the growth and development of our civilization, so we singularly face a problem that few other agencies do.

The CHAIRMAN. Senator Ford?

Senator FORD. Thank you, Mr. Chairman.

The questions you have asked, Mr. Chairman, basically fit those I would ask. I am not sure this question has been asked yet.

Is there any kind of an estimate of loss by deterioration that we are faced with? Do you have any idea of what has been lost over a period of time of valuable manuscripts and so forth, that just have not been saved? Is there any way we can grasp that, a ballpark figure, or anything—I do not want to put you on the spot.

Mr. SPARKS. Senator, probably one measure of that at the Library of Congress is that 25 percent of our law and general collections—which is on the order of 13 million volumes—has reached this brittle stage, and they are in jeopardy if we cannot have our microfilming program transfer them rapidly enough to another format. This is on the order of 3 million volumes and, as we keep waiting, that 25 percent is going to grow. And therein lies the urgency.

Senator FORD. There is basically no dollar figure that can be placed on it, I suspect.

Ms. HARRIS. At Columbia, we are microfilming a lot of volumes. And I had always assumed that you would always have something to film, you know, that they would be brittle around the edges, but it would still be there. We are more and more finding things where enough text has been lost that there is nothing to film, and that is beginning to really frighten me. That is something I had not expected to be happening.

Senator FORD. This is a strange group, the Congress. When you ask for help, we begin to look at costs—what is the quid pro quo; what will be saved. And usually, the best estimate or best judgment can be rendered by an offset in what will the savings be. And here, you have to go beyond the dollars, and it is very difficult to put that into perspective—even though I feel, basically, after sitting next to this gentleman for sometime now, I have been indoctrinated. He even quotes former Kentucky scholars—he has a hard time finding them, but he has been able to quote them.

So, I have been indoctrinated, and I understand. I do not think we will have much trouble, hopefully, but I just wondered if there was any way we could reach out and grab a figure.

Ms. MARTIN. I would suggest, Senator, that it has really been only quite recently, within the last few years, that we have been able to do sufficient sampling to come up with a figure such as the 25 percent of the general collections that are embrittled. Given a bit more time, I think we could put more information into the formula that came up with that to come up with some kind of estimate as to not only loss, but loss and replacement costs.

Ms. HARRIS. You talk about $50 a volume to film it, and we are talking about how many million volumes in research libraries—I mean, you could do it that way, take a percentage of the number of volumes——

Senator FORD. Well, I guess most States have the microfilming program going on as it relates to, can I say, courthouse documents—deeds, et cetera, in the courthouses around the country. Are they basically doing all that—they started microfilming, and then they had to go behind that and to pick all of those papers up.

Mr. STRONG. There is a greater movement toward that. There are still a number, however, that are not. And through our advisory program in the archives in the State of California, we are spending a great deal of time working particularly in the smaller county areas to really get them to even begin addressing that kind of preservation program at the local level. In the newspaper collections—and we have very extensive newspaper holdings published in the State of California—we started a program some 25 years ago beginning to deal with this particular problem. We are finding, even at the rate that we started at that point, we need to accelerate that microfilming by 10 times in order to keep up and catch up just with newspapers. That does not even enter into the State document materials or the other kinds of manuscripts, diaries, letters, the kinds of materials that are very, very unique to the libraries' collections.

Senator FORD. Just recently, in Lexington, where the microfilming was going on on governmental paper, discoveries are being made almost every day. And I believe just in the last few weeks, the original letter designating the prosecutor for that area before we became a State, by the Attorney General of the United States, just became a fantastic find, and it is just revealing so many things that are peculiar to our State and so significant to our history, that it is just a joy to see it going on, with these documents that you can look at. And they are now being preserved and that sort of thing—and it is amazing how they have been preserved—when you look behind old filing cabinets and in desk drawers and things like that, all these things are revealed—and it reminds me of my closet, Mr. Chairman. But it is a very exciting time. Some people could not care less about it, but it is very exciting to the history of the State, and I am very keen on this, and admire you for your tenacity and interest and concern about this, and particularly the chairman's interest Not many people would be so involved and dedicated to this, when so many other important things are here today, and he does not forget how we got started and those things that need to be preserved.

So I compliment him and am very pleased to support him in his effort. Hopefully, we can accomplish some of these things, Mr. Chairman.

The CHAIRMAN. Well, I am grateful to Senator Ford for his support on this measure, as well as for his kind words. I think it is perfectly obvious to everyone here today that he did not need much indoctrination in this committee. So we are grateful to him for his help.

Let me ask the panel just one final question. What do you foresee—you not only buy a lot of books and lend a lot of books, but you are in touch with the whole publishing industry in a very intimate way. If the Library of Congress facility is established, and if it becomes well-known throughout the country that this process is available, will there ever be a need—for instance, Senator Ford and

I each might have a few books that we would like to have preserved someday; will there be a place where private citizens could send a few books of special personal value to be treated? Do you think that will someday come about?

Ms. HARRIS. One of the things I have predicated is that commercial library binders would be a good place to have a facility like this. The books are already out of the library. We have a way of sending things, and they do private work, as well, so I feel that that would be a strong possibility.

Mr. STRONG. I think the other thing that I have learned in visits with the Library of Congress people is that other facilities would not have to have the magnitude of size or cost of investment, because the dimension of the problem may be different than the Library of Congress is facing, so that as the research develops and as the methodologies proceed, in fact, those costs might be such that smaller facilities located in different spots across the country would make it, from a business sense, feasible to invest in them.

The CHAIRMAN. Thank you very much for being here. We appreciate your testimony.

We have one final witness for the day, Mr. Steve Linger, president of the Frederick County Chamber of Commerce.

TESTIMONY OF STEVEN W. LINGER, PRESIDENT, CHAMBER OF COMMERCE OF FREDERICK COUNTY, INC., FREDERICK, MD

Mr. LINGER. Thank you, Mr. Chairman, for giving me this opportunity to speak briefly before your committee. We want to thank you for your support of this legislation.

The Chamber of Commerce of Frederick County represents 364 businesses in Frederick County, and you asked several questions about the viewpoint of the public and private sector, and basically, I am here today from a personal perspective and from a business viewpoint.

I have submitted some written testimony, and I will be very brief in summing up my statement.

I graduated from the University of Maryland with a degree in history, and my concentration was early American history and the Renaissance. In addition, I attended Wesley Seminary at American University, where I studied early American church history.

From my research during those years, I found out very quickly that this problem has been in existence for many, many years, and I am seeing that we are finally taking some action in that area. My testimony alludes to the process, and I will skip over that. But basically, preservation of the books in their actual form means that the American public would be left with an actual history of events and lives of the early builders of our American democracy. It means that by preserving these books, future generations will not be susceptible to a rewrite of history that may distort important events simply because the primary resources are no longer in existence.

It means preserving the footprints and struggles that we have taken over the last 200 years in building our democracy.

From a personal viewpoint, this past week on CBS, I listened with dismay concerning the author who recently reported verbal testimony of a former President concerning 38 hours of tapes, in

terms of his term in the office, and basically, this author, whose name I cannot recall, stated that in 20 years, books will be a thing of the past. I disagree with that.

From a historical perspective, we need those primary resources.

From a business viewpoint, Fort Detrick, I feel, is a logical choice for building the first national book preservation facility. As Representative Byron has already testified, we are 1 hour from Washington, but even more important, we are only 1 hour from three major airports. Fort Detrick is the home of two Army laboratories, the Medical Research Institute of Infectious Diseases and the Medical Engineering Research and Development Laboratory. In addition, Fort Detrick, as some of us know, is internationally recognized with the Frederick Cancer Research Center, which works along with the National Institutes of Health. Fort Detrick employs approximately 3,200 people.

I believe that they would handle adequately, as they have done with an excellent record over the last 25 years, any toxic or hazardous materials involved in this particular process.

Basically, there are seven major tenant organizations involved in the health sciences and communications for defense, including the Hotline, so we feel that Fort Detrick is a magnet for advanced research in those areas.

The construction of this National Book Preservation Center would mean excellent security for our important historical books and, also, the ease of shipment in and out of Washington, D.C.

Finally, building this preservation facility at Fort Detrick, combined with the significant research in cancer and the biomedical/chemical sciences, would symbolize again that the American Government can transform a military facility which is not only essential for national defense, but also beneficial for the solving of the remaining mysteries of diseases affecting mankind and reporting the preservation of our democracy.

The development of such an advanced research facility adds a realistic meaning to the words from the scripture of "beating our swords into plowshares."

I might add, from a business viewpoint, you were asking the question—I think in the last several years, a lot of the problems about private enterprise getting into areas such as this is that there are so many State and Federal regulations and red tape in terms of selling such a process to the public, that it would help if we got a little better tax breaks in terms of that type of research.

Thank you very much for the opportunity of being here.

The Chairman. Well, thank you very much for being here, Mr. Linger.

[The prepared statement of Mr. Linger follows:]

PREPARED STATEMENT OF STEVEN W. LINGER, PRESIDENT, CHAMBER OF COMMERCE OF FREDERICK COUNTY, INC., FREDERICK, MD

My support for the construction of a National Book Preservation Center stems from a personal perspective and from a business viewpoint.

First, I graduated from the University of Maryland with a major in History. My concentration was early American history and the Renaissance. In addition, I attended Wesley Seminary at American University where I studied Early American Church History.

My research in history during my college and graduate years required many hours at the Library of Congress studying material that went back to the 1700's. Beginning in the 1850's paper was produced by applying acid to wood pulp. The paper made in this fashion had a high acidic content. This acidic content has resulted in approximately twenty percent of the books currently in the Library of Congress being beyond restoration by any process. The paper in these books from the 1800's and even 1900's has become fragile, brittle and is disintegrating.

This process of paper manufacturing is cheaper than rag paper. There are now literally millions of volumes of books which need to be deacidified. The possibility of reducing the acid content in books could mean preserving the life of these books up to 500 years.

Preservation of the books in their actual form means that the American people would be left with the actual history of events and lives of the early builders of this American democracy. Preserving these books means that future generations will not be susceptible to a rewrite of history that may distort important events simply because the primary resources are no longer in existence.

Preserving our books means preserving the paths and footprints we have taken over the last 200 years in building our American democracy. From a business viewpoint, Fort Detrick is a logical choice for building a national book preservation facility.

Located in Frederick, Maryland, we are one hour away from Washington, D.C. and from three major airports.

Fort Detrick is the home for two Army laboratories: Medical Research Institute of Infectious Diseases and the Medical Engineering Research and Development Laboratory. In addition, Fort Detrick has the internationally recognized Frederick Cancer Research Center, which works with the National Institute of Health. Fort Detrick employs approximately 3200 people.

In total there are seven major tenant organizations involved in the health sciences and communications for defense, including the Hotline link between Washington and Moscow.

Fort Detrick is a magnet for the location of new biomedical industries in Frederick County.

The construction of the National Book Preservation Center on the 1200 acre area of Fort Detrick would mean excellent security for our important historical books and ease of shipment in and out of Washington, D.C.

Finally, building this preservation facility at Fort Detrick combined with the significant research in cancer and the biomedical/chemical sciences would symbolize again that the American government can transform a military facility which is not only essential for national defense but also beneficial for the solving of the remaining mysteries of diseases effecting mankind and the preservation of our great democracy.

The development of such advanced research facilities at Fort Detrick adds a realistic meaning to the words from the Scripture of "beating our swords into plowshares".

The CHAIRMAN. I was interested in your comment and concern about the future of the book, and you will be happy to know that the Library of Congress is also active in that area and has convened a very distinguished group of scholars to consider just what the future of the book will be, and I anticipate that they will be publishing a report in the near future.

At what time, Dr. Boorstin, do you think that report will ultimately be completed?

Dr. BOORSTIN. We hope to have that report by this fall, Mr. Chairman. Under the Concurrent Resolution of Congress, we are required to submit it by December, but we hope it will be before then.

The CHAIRMAN. But my guess is that these thoughtful people will conclude that the book has a future after all.

Mr. LINGER. Well, we hope so, and from a business viewpoint, the Chamber of Commerce of Frederick has no problems with the proposed facility.

The CHAIRMAN. And just one further question. Have you heard any criticism or complaint or concern expressed in the Frederick community about this facility?

Mr. LINGER. Not one complaint.

The CHAIRMAN. Good. Thank you very much. We appreciate your coming down.

That will conclude the hearing on this bill.

The committee will stand adjourned, subject to the call of the Chair.

[Whereupon, at 3:30 p.m., the committee was adjourned, subject to the call of the Chair.]