Environment is putting books in intensive care

OSU Libraries is mounting a preservation effort to prevent deterioration of the books in its nearly 4 million volume collection.

The library environment is user-friendly to patrons but hostile to books and materials, said Wes Boomgaardren, who became preservation officer for the libraries three months ago.

"The root of the preservation problem is the books' storage environment," he said.

The 70-degree temperatures and bright lights that enable comfortable reading also promote decay of library materials.

Unlike the rag paper used for books before the Civil War, groundwood paper contains a high acid content, he said. The acid eventually causes pages to crumble and bindings to pull apart. Fluctuations of heat and humidity and exposure to light speed up this chemical process.

Storing the books at 60 degrees rather than at 78 degrees would double the life expectancy, he said.

Books are such a convenient, everyday part of life, people regard them as indestructible when in fact they are very fragile, Boomgaardren said.

Most OSU library books spend far more time on the shelf than in someone's hands, he added.

The sizing on a book's pages can also contribute to the book's decay. Sizing is a coating that prevents the ink from feathering, like it does when writing on a Kleenex with a felt tip pen, Boomgaardren said. Papers and sizings in today's books are more likely to be acid-free so the books will last longer.

However, modern advances in book papers and sizing will not help the thousands of books in the OSU collection that were published from 1850 to 1950, Boomgaardren said.

He is planning a survey of a random sample of the OSU library collection sometime this year to help determine the extent of its deterioration.

He fears that as much as 1/4 of the library's collection may be too brittle to handle.

There are a variety of ways to preserve books that have become brittle or are losing their bindings, he said.

A book can be copied onto microfilm for $80 to $80 per 250-page book.

Microfilm is a relatively permanent, cost effective storage material. The master negatives are stored under a mountain in Pennsylvania where a constant temperature and humidity will help them last 300 years.

Another preservation method is to neutralize the acid in old paper by dipping the pages in chemicals for $200 to $400 per book.

This cost is justified for items that are rare or irreplaceable, like OSU's collection of materials by writer James Thurber.

Thurber sometimes wrote on yellow legal paper which has a high acid content, Boomgaardren said. These drafts will have to be de-acidified in order to preserve them.

Fragile books can also be given temporary bindings to keep them from decaying further or the pages can be individually wrapped in mylar to protect them.

Boomgaardren is setting up a workshop where both sophisticated and minor book repairs will be done. This Collection Maintenance Treatment Facility will be in the old bindery in the Main Library's basement.

He has hired a conservator/book binder to begin work Mar. 18. New preservation equipment will be set up by April and will be fully operational by this fall.

To reduce the need for such book repairs, the Main Library is improving climate controls in its stacks.

Modifications of the library's heating, ventilating and air conditioning system will be begun in late May or early June, said Joseph Larebee, senior engineer for the university's energy management division.

The $576,000 update will allow more precise temperature and humidity control, he said.

The proposed book warehouse will also have climatic controls that will slow the deterioration process.

Another preservation program involves educating staff and readers to eliminate destructive practices, Boomgaardren said.

Preservation of library materials is not just a problem at OSU, he said.

The Library of Congress estimates that between 25 and 50 percent of its collection is at risk, he said. At the New York Public Library, where he was head of the preservation microfilming office, about 50 percent of the collection is too brittle to handle.

Deciding what should be preserved and what should not can be a cold-hearted decision, he said.

A library is both an information storehouse and a museum, he explained. Some library materials, such as art prints or rare books, deserve to be preserved in their original form because they are valuable as objects.

Other materials and books are thrown away after their information has been preserved on microform or another format.

The 20th century "democratic" approach of browsing in open stacks is wonderful for students but damages the books in addition to encouraging theft and vandalism, Boomgaardren said.

The practice of placing books in "people comfort" areas also came about in the United States early in this century. The book-friendly approach of closed stacks is still the rule in Europe, however.

Other modern conveniences that students and professors have come to take for granted, like photocopying and book drops, are very hard on books, he said.

Boomgaardren is not advocating closed stacks, and said the stacks are being well maintained.

However, one must take into account the negative effect of open stacks on OSU's collection.
Preserving books no easy task

By Bob Icsmann
Lantern staff writer

Repairing 800,000 deteriorating books will not be an easy task for the preservation office of the OSU libraries.

"It will be a job for many people over many years," said preservation officer Wesley L. Boomgaardan.

The collection-maintenance department, which will repair the books, should begin full operations by the first week of December, said Harry Campbell, head of collection-maintenance and bindery-preparation.

The department, which evaluates several hundred books a week, will repair 4,000 to 8,000 books a year.

"That number is small in comparison to the problem, but it is a realistic amount considering all the work is done by hand," he said.

The department, which employs four full-time staff and four student assistants, will also bind several thousand pamphlets a year, Campbell said.

Boomgaardan said books deteriorate because of inherent characteristics in the materials, the storage environment, and contact with people.

A new $507,000 heating, ventilation, and air conditioning system for the Main Library will be installed before June 30 of next year, he said. This system will make the library more suitable for the books.

Many of rarely used or outdated books have to be maintained and kept, Martin said, because that is the nature of a university research library.

Boomgaardan said damaged books are sorted through the circulation department and then sent to the collection-maintenance department for evaluation.

Librarians who are specialists in a specific area of study will work with the preservation office in determining the value of the damaged volumes and the repairs that should be done, Boomgaardan said. The preservation office has been working out of the Main Library since November of 1984.

Repairs include reproducing books on microfilm, placing protective enclosures on books, or sending them to be rebinded, he said.

The main obstacles facing the preservation office at this time are the organizational aspects and routines of the preservation efforts, Boomgaardan said.

Another problem affecting even books in good condition is lack of shelf space, Boomgaardan said. Because of the circulation and growth of library materials, a library is considered full at 80 percent capacity.

The Main Library is now operating at 98 percent capacity, which is an inefficient operating condition, Boomgaardan said.

Richard T. Martin, associate professor of English and a member of the library council, said the council has received encouragement that President Edward H. Jennings is elevating the priority for a new library building.

Martin added, however, that it would be premature to discuss specifics such as the size and location of the building.

OSU library books dying

By Bob Icsmann
Lantern staff writer

The gradual death and decay of OSU library books are being displayed in the showcases of the Main Library skylight area until Nov. 8.

Richard T. Martin, associate professor of English and a member of the library council, said the book exhibit is the first chance for students and the community to learn about the preservation task facing OSU Libraries.

"The exhibit tells a depressing story about the death of books," Martin said, "but we need to be aware of the way to treat books because they are outrageously expensive today."

Wesley L. Boomgaardan, preservation officer of OSU Libraries, said OSU Libraries holds a 4 million volume collection, but potentially 20 percent of that collection — 800,000 books — are in brittle and deteriorating condition.

"The purpose of the exhibit is to inform and educate book users of the challenges in preserving book collections," he said.

"The deterioration of books is a nationwide problem of tremendous scope."

"Books are extremely convenient methods to store information and ideas," he said, "but are more fragile than people think."

Preserving books is in everyone's interest, Boomgaardan said, because an excellent university cannot exist without an excellent library.

The exhibit is also trying to inform library users that they have something to do with book preservation themselves, he said.

Ohio State has the 16th largest collection in the Association of Research Libraries, which is composed of 120 of the largest research libraries in North America, Boomgaardan said.
OSU libraries to participate in book preservation program

By Ken Frazier
Lantern staff writer

The OSU library system is one of 10 chosen by the Association of Research Libraries to participate in a book preservation program.

For its self-evaluation program, the library received a $1,000 grant, and a $7,000 to $9,000 consultant expense account from the association.

Northwestern University is the only other Big Ten school chosen to participate in the book preservation program.

Wes Boomgaard, library preservation officer, said the library is currently examining the condition of the library's collection, user awareness programs and disaster contingency plans, as part of the three to five-year program.

Books are endangered by a combination of deteriorating pages, improper handling and environmental conditions, Boomgaard said.

Approximately 800,000 books are in danger of deteriorating due to residues left over from antiquated paper-making processes, Boomgaard said. An acidic sizing compound was applied to pages to ensure the ink stayed on the pages, and that years later the sizing chemically reacts with air to form sulfuric acid.

Approximately 800,000 books are in danger of deteriorating due to residues left over from antiquated paper-making processes.

— Wes Boomgaard

Boomgaard said the most cost-effective remedy is to transfer the material onto microfilm. Another alternative is to photocopy materials on acid-free paper and re-bind them.

The study also allows the library to evaluate its user awareness programs. Defacement and mutilation is a problem because users cut out information from pages instead of photocopying the material.

Boomgaard said.

The library also experiences problems with people who underline sentences with marking pens, steal, or handle books thoughtlessly, he said.

Temperature, humidity and ultra-violet light from fluorescent lights threaten library collections as well, Boomgaard said.

At the University of Iowa, work to preserve library books is aided by a consortium of 30 major libraries in the United States. They are attempting to transfer the library's materials to a central data base, said Helen Ryan, conservation officer at the university's libraries.

In addition, she said their library system recently hired a fine arts conservationist to develop the Center for the Book, a program designed to elevate book preservation to an art form.

The conservator, William Anthony, who studied book preservation in Ireland for seven years, will develop a book preservation apprenticeship program at the Iowa Libraries, Ryan said.
PRESERVATION OFFICER WES BOOMGARDEN displays a brittle page from an 1888 edition of *Don Quixote*, while an edition issued in 1605, front, remains in excellent condition.
Bad paper is main cause of most book deterioration

By David Tull

In the early morning hours of the coldest night last winter, disaster struck the Main Library.

A student studying in the second level of stacks apparently became too warm, opened a window, but forgot to shut it. Later that night, penetrating cold from outside froze the steam radiators, causing them to burst and spray dirty water over 2,400 library books.

The result presented the University Libraries preservation department with an immediate challenge. The library staff had to act quickly. Without proper treatment, the books would become unusable, with pages stuck together. In addition, mold would begin to grow within 48 hours.

The books were loaded into cartons and taken to the library roof, where zero temperatures quickly froze them, “to buy us time,” explains Wes Boomgaard, preservation officer. Then, 300 at a time, they were dried, using fans and paper towels.

“We were able to save most of them, but many were damaged,” Boomgaard says.

The incident is an extreme example of one cause of book damage.

Heat and humidity are the greatest environmental threats. Library staff carefully monitor the library’s temperature and dampness in selected areas. Mold can begin to grow when the temperature is above 70 degrees Fahrenheit and the humidity is above 65 percent, Boomgaard says.

Continued on page 4.
Poor paper

Continued from page 1.

The temperature ideal for book storage probably would be too cold for most students to use the books. Boomgaardens points out that each decrease in temperature of 10 degrees Celsius doubles the useful life of library material, if all other factors are equal.

Another hazard is ultraviolet light, which can damage library materials such as color photographs, newspapers and books. Wherever possible, these materials are protected from direct light.

The biggest cause of book deterioration is what librarians call "inherent vice." This has nothing to do with X-rated stories; it's flaws in the books' materials.

"It's because of the bad paper produced for the last 115 years," Boomgaardens says.

He illustrates by showing an early edition of Don Quixote, printed in 1605, which seems almost new. "This is magnificent paper and it is as strong, supple and stable today as it was 380 years ago," he says.

Another copy of the same book, printed in 1780, still is in excellent condition. A third copy, from 1888, and a fourth, from 1911, have brittle and broken pages that are no longer usable, Boomgaardens points out.

Before 1800, papers generally were treated gently by hand, using clean water and chemicals like sour milk and gentle bleach. Animal gelatin was used to coat or "size" the paper. Without sizing, ordinary paper would be like an ink blotter. It would be impossible to write on, Boomgaardens explains.

Since 1870, papers have been manufactured using harsh chemicals, some of which remain in the paper. In addition, an acidic alum-roin sizing is used. When chemicals in the paper combine with moisture, they create an
quality causes deterioration

Acid which causes paper to turn brittle.

Boomgaard says of modern paper, "This is failed technology."

University Libraries today house approximately four million volumes. Based on national averages, 20 percent to 30 percent are brittle, Boomgaard says. This means 800,000 volumes in the University Libraries may be damaged.

The dimensions of the problem can be seen by visiting the Main Library stacks. On nearly every shelf manila envelopes house books whose pages have become brittle.

When such a package is opened, bits of paper fall out onto the reading table. Instead of being crisp and straight, the outside of the book's pages look like a badly used deck of cards. When the pages are turned, some may break loose from the binding or crumble into pieces.

Such a book has become almost untouchable, Boomgaard points out. A book that is out of print may not be replaceable and, if steps are not taken to preserve it, its value as a research tool will be lost.

There are other kinds of "inherent vice." A common one is "red rot," improperly tanned leather bindings that deteriorate, covering the reader's hands with rust colored dust.

Impurities in the paper cause "foxing," the development of brown stains on pages. Copperplate engravings "offset," staining the facing page of type with ink from the engraved picture. Bindings break or tear loose.

Human carelessness also damages books. The stacks are full of volumes that have been underlined, cut, stained by spilled drinks or broken by flattening on a photocopier.

Even returning a book after the library closes can scar it. "Book drops and library preservation do not go well together," says Boomgaard, holding a badly scratched book.

Boomgaard joined the University staff in the new position of preservation officer in 1984. He was formerly with the New York Public Library.

The preservation office has many ways to repair damaged or deteriorating books. Microfilm and microfiche are good ways to preserve just the information. "But they're not entirely user friendly," Boomgaard says. "Also, of course, not all items are appropriate for preservation microfilming."

University Libraries has its own conservation facility headed by Harry Campbell. If a book is particularly valuable as a physical object, it may be restored, at a cost of up to $500. The pages are washed and de-acidified, the original binding restored or replaced, and the book re-bound.
OSU Libraries included in preservation program

By David Tull

Ohio State's Libraries is one of 10 in the nation chosen to participate in a preservation planning program.

The program is a self-study process directed to the preservation of important research collections.

Sponsored by the Office of Management Studies of the Association of Research Libraries, the program was developed with the assistance of the National Endowment for the Humanities. The 10 libraries participating in the program are all ARL members.

The project will involve an intensive study of the preservation needs of Ohio State Libraries and will develop a preservation program for the next three to five years, says Wes Boomgaard, Ohio State's preservation officer.

A preservation study team of eight library faculty and staff will review the extent of deterioration in library collections, will assess current preservation activities and develop approaches for expanding those activities, Boomgaard explains.

Collections in major research libraries throughout the nation are endangered by a combination of environmental conditions, improper handling, and such inherent problems as acidic papers, unstable films and weak bindings, he says.

National estimates are that perhaps 20 to 30 percent of library books are deteriorating because of chemical problems in the paper of their pages. At a library the size of Ohio State's, this means about 800,000 books are endangered, Boomgaard says. By the end of the century, he says, the figure may be as high as 50 percent. In part, the survey will determine how accurate these figures are for Ohio State's collection.

The study will focus on the condition of university collections and preservation methods, will look at disaster control measures, will evaluate user awareness programs that involve students, faculty and staff, and will consider implications for the library organization and the development of the collections.

Consultants from ARL's Office of Management Studies will provide program assistance. The ARL provides a stipend of $1,000 for the program at Ohio State and the NEH grant will provide consultation, travel and materials valued at from $7,000 to $9,000.

Each of the participating library systems already has begun preservation programs and demonstrated a willingness to share ideas with other libraries. Ohio State's preservation program was established in 1984 under Boomgaard's direction.

Other libraries chosen for the ARL program are the Smithsonian Institution, Center for Research Libraries, Colorado State University, Iowa State University, University of Missouri-Columbia, Northwestern University, University of Oregon, State University of New York at Stony Brook, and the University of Tennessee.
AMY ELEY FIAMINGO, assistant to the head of circulation at Main Library, is shown above in a photo taken last winter stuffing paper towels in one of 2,400 books damaged by water from a frozen radiator.
700,000 volumes are disintegrating
Cost to save library books in millions

By Todd A. Sedmak
Lantern staff writer

Nearly 700,000 volumes of the estimated two million books at the main library show deterioration, a recent report by the Ohio State Libraries shows.

"The acidic nature in the paper creates sulfuric acid, and the pages actually disintegrate," said Preservation Officer Wesley Boomgaardan. OSU Libraries can use several methods to preserve its books.

If a manuscript needs to be saved, it can be microfilmed for $50, photocopied for $65 or treated as rare and restored for $200 to $300, Boomgaardan said. Ninety percent of the main library books are printed on the acid-based paper.

"If we don't do something soon, we will have problems. Eventually, you will pull a book off the shelf and it will turn to dust or fall apart," said Daviss Menefee, who heads the department of Language Area Studies. "It will take an awful lot of money to upgrade the situation. We are talking millions."

Carolyn Morrow, preservation officer at the Library of Congress, said 80 percent of its books are on acid-based paper. "It's a national problem and is finally getting addressed."

The U.S. Congress recently appropriated $11.5 million for de-acidifying acid-based library books at the Library of Congress.

OSU is dealing with the problem by examining its storage areas and preservation processes. Characteristics of a storage area are temperature, relative humidity, light levels, dust and presence of snakes, rodents and insects, Boomgaardan said.

"Students (in the library) will cover air ducts when they get cold and this is not good for the books," he said.

A preferred temperature for library books is 65 degrees.

The OSU Libraries' report says national standards require 65 degrees and 50 percent humidity in a library. Frequent temperature and humidity changes are extremely harmful to library materials, the report also says.

None of the campus libraries meet these standards, Boomgaardan said. Many of the campus libraries have frequent and significant temperature and humidity changes, he said.

OSU Libraries began an organized effort to improve its preservation capabilities in 1984. In addition to preserving the books, new buildings are being planned.

"We are hoping for a storage facility of one to two million materials. We need space for 500,000 materials soon," Boomgaardan said. "Hopefully, we will have a new library. Ninety-eight percent of the main library is full and a library is recognized as full at 80 percent."
Books treated before they crumble

By Michael B. Lafferty

When paper in a book becomes yellowed and brown in decay, it can dissolve into what librarians call "yellow snow." The snow accumulating on the shelves of American libraries chills the hearts of the nation's librarians, who believe that a substantial number of the estimated 300 million volumes in American research libraries are at risk of imminent decay.

"Tens of millions of volumes are sitting on shelves and quietly self-destructing. A lot of items you can wrinkle in your hand a little, and they turn to dust," said William J. Studer, director of the Ohio State University Libraries. "Roughly 20 percent of our collection (4.5 million volumes) is brittle."

A 1984 survey at the U.S. Library of Congress found that a quarter of the 13 million volumes in the general and law collections were brittle, according to Merril Smith, assistant national preservation program officer at the Library of Congress.

The volumes aren't necessarily old. A book can turn brittle in just a few decades if the paper on which it was printed was manufactured using an acid process. The acid, which is still in the paper, eventually works with oxygen to destroy the paper.

Johns Hopkins printed the first Bible on acid-free paper.

"If you keep it well stored in climate-controlled condition, paper will last at least 500 years," Studer said. "A Gutenberg Bible, if properly stored, looks as good today as the day it came off the press. Modern editions of Don Quixote, printed in the '30s, '40s and '50s are at full apart. We have originals in much better condition." Many new editions now are printed on long-lasting alkaline paper. But librarians who want to protect the books molding on their shelves are searching for ways to remove the acid from the paper. Where that's not possible, they are recycling books on microfilm or searching for other ways to preserve them.

The brittle book story is not a particularly long one. Prior to the 19th century, book paper was manufactured with alkaline chemicals from linen rags. Publishers printing books on ray paper couldn't keep up with the demand for books that burgeoned with the dramatic jump in literacy in the 19th century, so papermakers began to make paper from cotton and later from trees, because it was cheaper.

McClady, editor of the newsletter Alkaline Paper Advocate in Provo, Utah, said, "Every development that speeds up paper production pushed quality down.

You can't tell the difference between acid and alkaline papers by looking at them. The difference is in the sizing, the chemical used to treat paper to keep ink from spreading through the paper fibers.

Alkaline sizes virtually disappeared from papermaking until chemists developed an improved alkaline size in 1955. However, alkaline sizes did not win wide acceptance until 1986, McClady said.

Today, nearly 60 percent of fine papers are alkaline based, she said.

There's a 50-50 chance a new best seller is printed on acid-free, alkaline paper, while most paperbacks still are printed on acid paper, said Wesley Boeungardera, historic preservation officer at the OSU Libraries.

Books from Third World countries and from Eastern Europe probably will be processed on acid stock for years and will continue to constitute a large part of the books American libraries purchase, experts say.

For books that are lost to decay, OSU tries to find reprint copies. Librarians also sometimes photocopy books and rebinding them on microfilm.

But few readers are likely to be chained to a microfilm machine. In addition, librarians are hesitant to record books on computer tape or other forms of electronic retrieval out of concern that data have been lost because tapes deteriorate and tape-reading equipment breaks or becomes obsolete.

One of the most promising techniques for de-acidifying books — using a dichromate time gas to neutralize the acids in the paper — was developed by the Library of Congress. Other processes use liquids to neutralize the acids.

"We think we're within a year or so of identifying the best way of doing this," Boeungardera said.

The process costs $6 to $11 for a book, a bargain considering current book prices. Neutralizing costs of up to $100 a book and many of the books are unavailability once they're out of print, Boeungardera said.

"We can extend the life of the paper by a minimum of three to five times," said Joe Millera, director of book and document preservation for Akzo Chemicals, a Dutch-based company that is offering the process to research libraries.

The technique raises the paper's pH level — a measure of acidity or alkalinity — to between 7 and 8 from between 4 and 5 and also leaves an alkaline residue to neutralize any remaining acid.

Akzo tests 350 books at a time in a stainless steel vacuum chamber. The company currently can treat 40,000 books annually and plans to boost production to 140,000 books next year, Millera said.

The nation's libraries already may be in a situation in which their books are crumbling faster than they can be restored, Millera said. "It takes as little as 30 years for a book to become brittle. At the rate we're likely to be operating, we're only going to scratch the surface.

The treatment is good only if the book is not yet brittle. For books with pages that will withstand book in half, Boeungardera said the best plan may be to turn them into baskets of books by electronically scanning them and then reprinting them on acid-free paper. Books for which the copyright has expired, mostly those older than 75 years, especially mathematics texts, are often scanned, he said.

Until recently, scanning resulted in many errors in the new text and was only about 75 percent accurate. Even the best technology only averages about 95 percent accuracy, Boeungardera said.

Two employees at Akzo prepare racks of books for treatment

Books aren't the only problem libraries face in protecting their treasures. Vicky tapes have their own problems that are even more frightening than acid paper, Boeungardera said. "We expect videos to have a life of not more than 20 years before they begin to dissolve into dust on your screen."
The Ohio State University's Administration provided funding to digitize the back issues of The Lantern that were previously available only on paper or microfilm. The Lantern Business Office provided the Libraries with a set of bound volumes which, while incomplete, are the only known paper copies of The Lantern for much of the publication's run. The University Archives provided original issues from the 1880s and 1890s, along with microfilm for the years unavailable on paper. The Libraries' Preservation and Reformatting Department did extensive work in preparing the bound volumes for scanning, making numerous paper repairs and ensuring that the volumes would be preserved after the project was completed. Amy McCrory, head of the Libraries Digital Imaging Unit, served as the project manager, coordinating work across the departments involved in the effort to digitize over 100 years’ worth of the student newspaper.

Chartered in 1881, The Lantern is one of the oldest college newspapers in the country. Today, with a daily circulation of 28,000 during the regular school year and a readership of about 75,000 per day, as well as a presence on the Internet at thelantern.com, The Lantern is the third-largest college newspaper in the country.

The Lantern has appeared continuously since 1881. Originally a monthly journal of two campus literary societies, it adopted a newspaper format in September 1892. At this time the title was also changed, briefly, to Wahoo, then a popular cheer for the University; after three months, the title reverted to The Lantern. It was published on a weekly basis until September 1914, when it became a daily newspaper.

According to retired University Archivist Rai Goerler, "Student culture is one of the most difficult to preserve because the documentation, where it exists at all, is so fleeting. A notable exception is the student newspaper."

"Its descriptions of events and customs, including disagreements and conflicts with institutional authorities, are a tremendous source of information about student culture... As a record of student culture at a major Midwestern public university with a lengthy history of broadly-based admissions, the newspaper has extraordinary value for social history."

In addition, the student newspaper offers documentation of journalists at the beginning of their careers; OSU's graduates have made their mark in the national press, including The New York Times and The Washington Post.

Currently, all years of the paper up to 1997 are available at The Lantern Online web site, except for September 1996 to June 1997, which will be added soon. The site will provide a complete archive up to 1997, the year that an online version of The Lantern was started.