Doris Dale, a frequent contributor to the literature on the learning resources center, asks, "Why is there a library in the community college?"[4] Surely others are asking or will soon be asking the same question. Dale offers tradition as the answer. Her answer will not sustain us.

Learning resources center administrators must develop and publish mission statements so that our colleagues will understand how learning resources services contribute to academic excellence. We must respond in this manner so that when Rouche and Baker revise their book, *Access and Excellence: The Open-Door College*, there will be a chapter on learning resources centers.[5] ■■

ness of Campus Services, New Directions for Institutional Research, no. 41 (San Francisco: Jossey-Bass, 1984), 61.

[4]Doris Cruger Dale, "The Learning Resources Center's Role in the Community College System," *College & Research Libraries* 49 (May 1988): 232.

[5]As discussed in the closing paragraphs of Dale's article.

A case study in audio tape transfer

By Martin L. Levitt

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How to preserve the sounds when the audio tape starts to go bad.

The Library of the American Philosophical Society is an independent research library with significant manuscript holdings in colonial history, history of science and technology, and materials related to the American Indian. In the latter category in particular, the Library has developed a large collection, much of which originates from its administration of a fund endowed in 1895, called informally the Phillips Fund. This anthropological grant was established to fund scholarly research in native American ethnohistory and linguistics.

The annual influx of materials to the Library resulting from Phillips Fund research has included hundreds of audio recordings, dating from the 1920s. These are primarily field recordings of native American chants, songs, dances, languages, and folk tales. Some tapes are believed to represent the only known recordings of certain obscure dialects, while others are considered invaluable linguistic and ethnological oral records. The Library is also the repository for numerous other audio collections, including oral histories, which are not related to the anthropological collections.

In the fall of 1986, members of the Phillips Fund Committee expressed concern that the audio collections might be deteriorating. The librarian responded by directing that a survey of the collections be undertaken, to determine the physical

state of the tapes and what steps toward preservation might be necessary. Since the Library had never developed a formal acquisitions policy with respect to audio tape format, the survey was also to be used for collecting data on the types of recordings held in the Library, to ascertain whether ever changing technology presented problems in the playback and maintenance of these tapes, to assign restoration priorities for individual collections, and to make recommendations for the preservation of their intellectual content.

Surveying the collections

It was initially estimated that the collections consisted of well over 1,400 separate audio tapes in some 135 collections. (A previous effort at audio conservation in the 1970s had sent the earliest cylinder and wire recordings to the Library of Congress, where specialists re-recorded these formats onto open-reel tape.) This translated into thousands of hours of recorded material, so it was obvious that some sampling technique would need to be employed.

It was decided that at least one tape from each collection would be "auditioned" (a term adopted to signify a listening check), and several from large collections. The process for selection was not totally random, since collections could contain widely disparate formats, and it seemed desirable to try to listen to some from each type. Thus, the surveyor had considerable latitude in selecting the tapes to be auditioned after the initial inspection of the collection was complete, with the goal to uncover and identify any problems with their physical condition.

Of particular interest was such information as tape format (reel-to-reel, cassette), speed, number of tracks, tape type (paper, acetate, polyester), reel size, and tape thickness (measured in mils). The surveyor also looked for such obvious physical problems as warp, embrittlement, uneven windings, and flaking of the magnetic material. Tapes which were determined to be sufficiently stable were then auditioned. The surveyor was asked to note defects in the program material or in the recording technique, such as ambient noise, hum or hiss, print-through, under- or overmodulation, and other problems. This information was then recorded on a special data collection form, which was designed to organize the survey findings into a computer database.

It seemed desirable to be able to manipulate the data from the survey, in order to quantify generalizations about the findings and to group collections by various criteria. Thus, a database was designed using the IBM software *pfs:file* and *pfs:report*, in which the data from each collection surveyed became one file record. This step would later prove invaluable in identifying those collections with similar preservation problems.

Summary of the survey findings

As was suspected, many of the audio collections in the Library were determined to be deteriorating, and in need of conservation or preservation. Based on criteria established in audio conservation literature (especially Jerry McWilliams, *The Preservation and Restoration of Sound Recordings*, Nashville: American Association for State and Local History, 1979), at least eighty-four collections were found to be in some need of preservation.

Problems included unstable base material (paper, acetate), various types of environmental damage (warp, embrittlement), and unsuitable formats (cassettes). It developed that other, more surprising problems were also in evidence: for example, some open reel tapes were recorded at the mostly obsolete speed of 1 7/8 ips. The Library had no capability for playback at this speed. Nonstandard reel sizes and hub types were often a problem. Other tapes were found to have been recorded in the most inhospitable field conditions, which often meant an unreliable power source. Thus, inexact electrical generators and dying batteries produced tapes recorded at very odd speeds. In short, the collections could be characterized as a heterogeneous mix of formats, recording problems, and physical problems.

The greatest conservation problem proved to be the paper-backed tapes, which were in fragile condition. Like most pulp paper, the backing of these tapes was brittle with age, often causing flaking of the magnetic surface above it. It was believed that in some cases, the tapes could withstand only one play-through, and that any re-recording would have to be accomplished on the first attempt.

Alternatives

Once it was determined that the Library's audio collections were in need of conservation, the questions which arose were basically who would do the work, and how much it would cost. Some thought was given to commercial re-recording, but this seemed prohibitively expensive ($60 to $100 per hour). There are few studios who cater to archival institutions in any event. A more logical approach was to try and enlist the participation of a sister institution with an already established audio lab. However, this approach met with a number of snags.

There are just a few archives and other institutions with the facilities for large-scale audio preservation projects. Those that do exist tend to be swamped by their own projects, and by the requests of outside institutions who, like the American Philosophical Society, are attempting to control tape deterioration. Moreover, these institutions must also charge a high hourly rate for re-recording to pay for equipment, personnel, space, and other overhead.

A hypothetical budget for doing the job in-house indicated that the project could be undertaken

much more cheaply by APS staff than by outside institutions. An in-house project also carried the advantage of total control over all conservation steps, and eliminated the necessity of moving and shipping the tapes to an off-site facility. After carefully weighing the negatives, the decision was made to proceed with a formal budget, and to seek funding from the Phillips Fund administration for an in-house restoration project.

An in-house project allowed for total control over all conservation steps.

Budget approval, cost projections, and equipment acquisition

By the late fall of 1987, a grant had been given by the Phillips Fund to support the audio conservation program at the APS. Preliminary estimates indicated that the project would cost roughly $35,000, and would take three years to complete, with an audio technician working at approximately half-time. The goal was to re-record every tape in the Library onto a long-lasting format, while simultaneously applying conservation measures to the original tapes. The best format seemed to be compact disks, but unfortunately no recorders are commercially available in the consumer market. (It is still not established beyond any doubt that compact disks will prove to be the best method of audio signal storage, but the prospect seems excellent.)

Conventional wisdom held that the tapes should be re-recorded on 1/4" polyester-backed 1.5 mil reel-to-reel tape, on 7-inch reels with standard EIA hubs, at a speed of 7 1/2 ips, and then securely boxed and stored in an environmentally controlled area. However, a consultation with IBM audio engineers produced a more radical recommendation: the engineers recommended a brand new technology, called Rotary Digital Audio Tape (RDAT). The technology was unavailable in the United States at the time it was recommended, but was receiving rave reviews in Japan and Europe. It offered the capability of digitizing audio signals, a virtually distortion-free method of signal storage with a signal-to-noise ratio similar to compact disks. Importation to U.S. markets was largely blocked by record companies who feared the capability of RDAT recorders to exactly duplicate commercial compact disks and other RDAT recordings. Recently, however, importation of RDAT recorders has commenced despite these protestations.

These machines record using a sophisticated digital sampling method, rather than the conventional analog method now employed by most commercially available recorders. The result, according to *Consumer Reports*, is that for the recorder they tested, "frequency response was close to ideal.... Noise was inaudible under any safe and reasonable playback condition.... Recordings made from FM radio, LP records, and tape cassettes showed no audible degradation. The sound that went in was the sound that came out."[1]

In fact, RDAT's digital technology is superior to analog recording methods; since the anticipated permanency of the compact disk format is not as yet available to consumers, RDAT offered a more desirable alternative to conventional recording. The signals could be stored in a digitally encoded package until such time as the compact disk could be employed as a permanent format. RDAT decks are not significantly more expensive than good analog decks (about $2,100), and are very simple to use. They also offer the capability of inaudibly indexing recorded material using digital cues.

The two main drawbacks with RDAT are that as a new technology, it is possible that the archival durability necessary for the recordings might prove inadequate, and that tapes will initially have little compatibility with other institutional labs. However, the risks seemed small enough compared to the benefits: the heads of an RDAT recorder are similar to those on a VCR, which have well-documented characteristics. And since the copies are intended to last only until transfer to compact disk is viable, the risk seemed minimal while the benefits seemed great. As for the issue of compatibility, the lab would be able to duplicate RDAT tapes in the reel-to-reel or standard cassette format, thus mitigating that problem.

Thus, after weighing the alternatives it was decided to adopt RDAT for the APS audio lab's mastering deck, and the Aiwa model XD-001 was purchased. Other equipment, to be used primarily for playback of the original tapes and for signal processing, comprised a far more conventional list. This included an Otari 5050B-II reel-to-reel tape deck, a Technics dubbing cassette deck with Dolby B and C, a Rane stereo 1/3 octave graphic equalizer, a Tascam six-channel mixing board, a Tascam power amplifier, JBL Control 1 monitor speakers, and a variety of ancillary equipment.

The Otari 5050B-II has a reputation as a reliable recorder. It was particularly suited for the Library's needs because of its versatility: it will play large or small reels at 3 3/4, 7 1/2 and 15 ips, and offers a selectable two- or four-track playback head configuration. The mixer, a Tascam (which is the commercial division of Teac) model 106, was selected as a simple central control area for signal processing and monitoring. One particularly use-

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[1]"Digital Audio Tape," *Consumer Reports*, May 1988, p.292.

ful piece of ancillary equipment is the Permag Corp. magnetic viewer (about $50). This device permits the technician to determine the number of tracks on a tape before playing it, which is useful for tape in fragile condition. Total cost to outfit the lab was roughly $6,000.

The lab was located in an office adjacent to the photographic lab in the Library's basement. This area was selected because it is quiet, secure, and was fitted with library shelving. Most office furnishings were supplied by the Library, though a large table was purchased to serve as the primary work station in the lab.

Establishing procedures and hiring an audio technician

Once the equipment was acquired, the lab was set up and each piece was tested. As might be expected with so many complex devices, there was much to learn about the most effective way to utilize the equipment. For example, the graphic equalizer required special wiring to connect it to the mixer. We soldered together some custom wiring guided by a schematic diagram provided by Tascam. When we were through, we could connect the equalizer to individual channels of the mixer, or to the output of the mixer itself.

It was obvious that a guide to the operations of the lab would be required, both from a technical point of view and for procedural conventions which would document the conservation process. The guide which was written was based in part on other institutional guides, which were adapted for our purposes. Of particular use was the guide provided by the sound archives at the University of Indiana.

The guide established procedures for the transfer of the audio programs to the new format. A form was designed, called the Tape Processing Case File, which the technician uses to document the transfer of audio signals. Each collection has a separate case file, and all steps taken for each individual tape are documented in the file. The guide also establishes conventions for on-tape announcements, sets procedures for the permanent disposition of the original tape after transfer, and describes the duties of the audio technician.

Preparations having been made, a collection in good condition was re-recorded as a prototype. The recording and documentation went relatively smoothly, though small details in the forms were changed to better describe the transfer process.

Finally, in April 1988, an audio technician was hired and the conservation program was begun in earnest. Some 70 hours of material has been re-recorded, and the project is running apace: no technical problems have been encountered so far. Meanwhile, standards have been established for new Phillips Fund audio accessions, which will prevent problems of format from occurring in the future.

Conclusion

In the end, it is believed that the Library's prime concern with the deterioration of its sound recordings will be adequately addressed. This will have been done in a manner which is inexpensive compared to other methods of conservation, and which is technologically superior to conventional techniques. At the conclusion of the project, the Library will be left with an excellent permanent audio conservation capability and an archival audio collection which should survive for a very long time indeed.

Further, the Library will benefit from ownership of its own audio lab by acquiring the means to duplicate tapes in-house. Using the RDAT tapes as masters, it is relatively easy to reverse the process of recording, and provide scholars with standard cassette or open reel duplicates. Thus, the preservation of the collections will be well served, as will the needs of scholars for which access is the primary concern.

■■

The Sibelius saga: A Sibley Library thesis is returned 50 years late

As ACRL approaches its 50th birthday, we begin to reflect on what academic and research librarians have accomplished over the past half century. One minor achievement, announced by the Sibley Library of the Eastman School of Music at the University of Rochester, New York, was the return of a doctoral thesis on the Finnish composer Jean Sibelius, which had been missing from the library since 1937. Imagine the surprise of the Sibley library staff when they received the following letter (accompanied by the missing thesis) last July:

"Dear Keepers of the Tomes:

"In honor of the Fourth of July and the 50th Reunion of the Class of 1939, October next, I am returning a long-lost gift to the Sibley Library. This gift disappeared mysteriously in February 1937, approximately 51.42 years ago. Before revealing the sparse knowledge I have, a large part of which is conjecture, I shall state that I had no official connection with the misdemeanor involved. Neither did [Professor X], the last signer of the library card.

"Apparently the thesis enclosed was mislaid and

reported lost. At some time later, when it was found by a graduate student, it was not returned to the library. Rather, because it was so accurately tabulated, it became a Sibelius handbook passed around quietly to whomever needed it most. This process continued from February 1937 to June 1940 when I was asked by a departing student to return 'a book' to the library which was then closed. Since I was not leaving until mid-morning on the following day, I promised to return the book. It so happened, however, that my folks came to pick me up on that same evening—twelve hours ahead of schedule. With five years worth of souvenirs to stow in the car, I stuffed extra goodies—including 'the book'—into my trunk to be shipped.

"By strange chance the trunk was lost in transit and finally delivered in late August 1940.

"At that time, my brother, a student at [a university in Canada], needed an extra trunk. When I finished unpacking mine for him to use, I looked *inside* the Sibelius for the first time and discovered that it was 3.5 years overdue! What a surprise! So—in exchange for the use of the trunk, I asked a serious favor of my brother: to mail the book back to Rochester pronto, from Canada, as anonymously as possible.

"Several years later, after finishing medical school in [an American city], my brother returned the trunk—empty except for the Sibelius.

"Since that long-ago time, at yearly inventory I have greeted this thesis with chicken-hearted regret; and, although I have become particularly enlightened in the field it treats, the pressure of unpardonable procrastination is reaching quasi-psychotic proportions.

"Please accept this belated offering with as cheerful grace as possible. Thanks a million, close to a thousand dollars of which would cover the overdue fine. Keep the change for good luck!"

The letter was signed by a 1939 graduate of the Eastman School of Music, who had also enclosed a million-dollar "Special Issue Note" in play money to amuse the library staff.—*Reprinted, with the author's permission, from* The Sibley Muse *11, no.3/4 (September/November 1988). All references to particular persons have been removed.* ■■

Books and bytes

By Sara Eichhorn

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A successful electronic document delivery service for books and journal articles.

At first glance, books and bytes seem to share no common ground. One is print and hard-copy, the other electronic. One is associated with Gutenberg, scribes, and the Bible, the other with MTV, Big Brother and thermonuclear global war.

But in today's libraries, books and bytes are beginning to intertwine. New electronic media are taking over the old manual methods of libraries and, as with everything else in our society, revolutionizing them.

Today's libraries use computers to check out books, issue fines and even deliver books. In computerese, this process is known as document delivery but it has its roots in plain old recordkeeping and the rural tradition of checking out books through the postal mail service. As with manual