

# **AUDIO PRESERVATION**

**A Selective Annotated Bibliography and  
Brief Summary of Current Practices**

American Library Association  
Association for Library Collections & Technical Services  
Preservation and Reformatting Section  
Photographic and Recording Media Committee  
Audio Preservation Task Force

Robin Dale  
Janet Gertz  
Richard Peek  
Mark Roosa

Chicago 1998

## **ACKNOWLEDGMENTS**

The Association for Library Collections & Technical Services (a division of the American Library Association) wishes to acknowledge the generous contribution from the Research Libraries Group of Mountain View, California, for its generous contribution in support of this publication and the associated preconference.

## CONTENTS

**Acknowledgments 2**

**Introduction 4**

**Annotated Citations 5**

**Bibliography 8**

General Works 8

Description of Media and Formats 12

Storage, Housing and Handling 15

Disaster Response 17

Reformatting and Transfer Re-recording 18

Technical Studies 19

Bibliographies 20

**Standards 21**

**Relevant Journals 23**

**Organizations and Acronyms 24**

**Sound Archives 27**

Belfer Audio Laboratory and Archive, Syracuse University 27

Library of Congress Magnetic Recording Laboratory 29

Marr Sound Archives, University of Missouri-Kansas City 31

Rodgers and Hammerstein Archives of Recorded Sound, The  
New York Public Library for the Performing Arts 33

Stanford Archive of Recorded Sound 35

Yale Collection of Historical Sound Recordings 36

**Index 37**

## INTRODUCTION

The Audio Preservation Task Force was charged in 1995 with producing a short, selective bibliography of works covering the preservation of sound recordings of all types, from cylinders through digital, although the emphasis is on analog formats. The intended audience is librarians and archivists who are not specialists in caring for sound recordings but whose collections contain audio materials that should be preserved. Since many, if not most, of the important articles in the field lie outside the usual library journals, we have attempted to bring them together here. We have provided annotations to the nine most-significant items but have included citations to many other titles for further reading that may be of use to anyone coping with a collection of sound recordings.

A number of the articles cited were authored by consultants or vendors whose opinions might also support the products or services they offer to the business world. *Caveat lector*. It is not the intention of this bibliography to advertise professional services or products; rather the Task Force feels that despite some possible shortcomings, these articles contain useful information that, when taken in context of other articles on the same subject, will provide important facts needed to fully understand the many complex issues involved in the preservation of audio materials.

The bibliography is divided into several subject areas: general works, description and history of media and formats, storage and handling, disaster response, reformatting/re-recording, technical studies, and bibliographies. Following the subject sections are a list of applicable standards, a list of useful journals, and a list of relevant professional organizations and institutions. The final content section describes six sound archives that participated in the Association for Recorded Sound Collections' Associated Audio Archives (ARSC/AAA) National Endowment for the Humanities-funded planning study of 1988, the *de facto* guideline for preservation of audio materials. The bibliography concludes with an author/subject index.

## ANNOTATED CITATIONS

**Association for Recorded Sound Collections, Associated Audio Archives Committee. *Audio preservation: A planning study*. 1988. Silver Spring, Md.: Association for Recorded Sound Collections.**

This lengthy publication was produced by the ARSC Associated Audio Archives Committee as the final report for an NEH-supported audio preservation planning study (January 1986–December 1987). The committee was given the charge of developing prioritized recommendations, procedures, and standards intended to guide the custodians of audio collections in the development of preservation strategies. As might be expected for a publication of this size (860 pages, including a 326-page bibliography, a 106-page index, and a 49-page glossary), a broad range of general and specific audio preservation topics are covered. Particularly useful information is offered on bibliographic control for preservation, audio equipment considerations, environmental control for disc and cylinder recordings, and the establishment of preservation priorities for sound collections. The report also includes the results of a worldwide survey on institutional audio preservation activities.

**Brown, D. W., R. E. Lowry, and L. E. Smith. 1986. *Prediction of the long-term stability of polyester-based recording media*. NBSIR 86-3474. Washington, D.C.: National Bureau of Standards.**

This technical report was prepared for the National Archives and Records Administration to predict quantitatively and qualitatively the expected useful lifetime of polyester-based recording media. The Polymers Division of the Institute for Materials Science and Engineering (NBS) tested magnetic tapes containing recorded data at several temperatures and relative humidities. After accelerated aging, attempts were made to read the data previously on the tapes. Any inability to read the data was used to make preliminary estimates of tape life expectancy. Based upon the criteria established through testing, the authors estimate a useful tape lifetime of twenty years when the tapes are stored at ambient conditions. The Division is, however, careful to point out that during the course of testing, tape failures occurred at the equivalents of both less than and more than twenty years. The findings of this report provide guidelines and factors that one should take into account when planning reformatting projects or selecting materials for audio preservation. The report also provides recommendations for use and storage that will stabilize and possibly increase a tape's useful life expectancy.

**Cassaro, James P. 1989. *Planning and caring for library audio facilities*. Canton, Mass.: Music Library Association.**

This Music Library Association technical report will prove particularly helpful to anyone given the responsibility for selecting furniture and equipment and designing the overall space of an audiovisual library. Other topics of interest include considerations for enhancing audio playback and proper storage and handling procedures for the "new" technologies of compact discs and videos.

**Cuddihy, Edward F. 1980. Aging of magnetic recording tape. *IEEE Transactions on Magnetics* 16, no. 4: 558-68.**

Cuddihy reports on an experiment that examined the effects of hydrolysis on magnetic tape. The experiment exposed samples of one type of back-coated polyester instrumentation recording tape to varying combinations of relative humidity and temperature in open air and in nitrogen; other samples were hermetically aged. The author concludes that relative humidity, rather than oxygen, is the primary factor in oxide degradation and infers that at a certain temperature and relative humidity tape does not chemically age. He notes in particular that it is the chemical age of the tape rather than the calendar age that is most important in predicting tape life since environmental conditions have such a profound impact on tape degradation. The experiment did not address lubricant breakdown or other forms of physical aging, nor did it deal specifically with audiotape. The article, while technical in nature, is readable and provides readers with a clear understanding of the experiment and its results.<sup>1</sup>

**Gibson, Gerald. 1988. Decay and degradation of disc and cylinder recordings in storage. In *Audio preservation: A planning study*. Silver Spring, Md.: Association for Recorded Sound Collections, 186-99.**

Gibson explores what is known about how discs and cylinders age in storage. A general overview of disc and cylinder formats is provided, and their inherent preservation problems are discussed. Factors that contribute to the physical deterioration of these formats are cited, including inappropriate handling—such as touching the grooves of a wax cylinder with oily fingers—as well as storage that can lead to other kinds of damage. The author notes that instantaneous disc recordings (acetates)—one of the most fragile formats—are susceptible to surface delamination in which the information contained in the grooves literally peels off. Many chemically induced forms of deterioration are caused by poor storage conditions in which the temperature and humidity fluctuate, accelerating and encouraging the natural aging process of discs and cylinders. Cleaning procedures for discs are covered, and commercially available products for this purpose are discussed. Finally, guidelines are proposed regarding the use of digital recording for preservation, based on recommendations prepared by the Association of Recorded Sound Collections, Associated Audio Archives Committee. Appended to the paper are recommendations for the storage of cylinders, discs, and magnetic media.

**Paton, Christopher Ann. 1991. Preservation of acetate disc sound recordings at Georgia State University. *Midwestern archivist* 16, no. 1: 11-20.<sup>1</sup>**

The author discusses entry into the field of audio preservation vis à vis personal experience with a collection donated to the Popular Music Collection at Georgia State University. When the collection was donated to Georgia State, archivists discovered instantaneous (acetate or lacquer) disc sound recordings among the material. The archivists were unprepared to properly identify and preserve such materials. Searches of relevant literature failed to turn up the needed information, a common complaint among librarians and archivists searching for such material. The author relates the journey of the next few years spent by archivists researching a solution. The

---

<sup>1</sup> This annotation originally appeared in *Midwestern Archivist* 16, no. 1: 31-47.

It is reprinted here with the permission of the author, Christopher Ann Paton.

last half of the article not only provides the “happy ending” to Georgia State’s “adventure,” but also provides information on identifying types of acetate recordings (sizes, appearances, etc.); problems inherent to the different formats; and guidance for cleaning, storage, and reformatting of the rare and fragile discs.

**Pickett, A. G., and M. M. Lemcoe. 1991. *Preservation and storage of sound recordings*. Washington, D.C.: Library of Congress, 1959. Reprint, Association for Recorded Sound Collections, Associated Audio Archives Committee; Kansas City, Mo.: Lowell.**

This is the final report of an investigative study into the manufacture and deterioration of sound recordings supported by a grant from the Rockefeller Foundation. Researchers at the Department of Engineering Mechanics at the Texas Southwest Institute, Pickett and Lemcoe produced a report outlining the many factors affecting the longevity of audio materials. The highlights of the report are those sections detailing the chemical deterioration of phonograph discs and magnetic tape. Despite the age of the study, the recommendations for environmental controls and proper shelving practices for sound collections are still relevant today.

**Van Bogart, John. 1995. *Magnetic tape storage and handling: A guide for libraries and archives*. Washington, D.C.: Commission on Preservation and Access; St. Paul, Minn.: National Media Laboratory.**

Van Bogart, the principal investigator of media stability studies for the National Media Laboratory, produced this report addressing proper care and handling of magnetic media to prevent information loss and maximize life expectancies. Titles for sections of the report include: “What Can Go Wrong?” (binder degradation, magnetic particle instabilities, substrate deformation, format issues, and magnetic tape recorders); “Preventing Information Loss”; “Life Expectancy”; “How Can You Prevent Magnetic Tape from Degrading Permanently?” (care and handling, storage conditions, standards, and refreshing of tapes); and a glossary. In comparing magnetic media as a format to paper and film, the author is careful to emphasize that magnetic media have special storage needs if they are to be preserved for longer than ten years. If the information is to be preserved indefinitely, periodic transcription (his word) or reformatting from old media to new will be necessary, not only because the media are unstable, but because the recording technology will become obsolete. The report provides librarians and archivists—those who are familiar with magnetic media and those who are not—with technical information and recommended procedures. Finally, the report is a useful tool for decision-making and cost-benefit analyses for librarians, archivists, and administrators who have responsibility for the long-term preservation of information stored on magnetic media.

**Ward, Alan. 1990. *A manual of sound archive administration*. Brookfield, Vt., and Aldershot, Eng.: Gower.**

Ward provides a good overview of the basics of archival information management and sound collections preservation and frequently draws comparisons between sound archives and textual archives. The information management section covers such topics as acquisition and documentation, copyright, and equipment and facilities planning. The preservation section offers brief histories of the production of sound disc and magnetic media; useful information on disc properties and longevity; and recommendations for handling, cleaning, copying, and storage procedures. The ARSC *Audio preservation: A planning study* glossary is reprinted.

## BIBLIOGRAPHY

### General Works

- Allen, J. S. 1990. Some new possibilities in audio restoration. *ARSC Journal* 21, no. 1:39-44.
- Alten, Stanley. 1986. *Audio in media*. 2d ed. Belmont, Calif.: Wadsworth.
- Ampex Corporation. 1989. *A guide to media and formats*. 2d ed. Redwood City, Calif.: Ampex Corporation.
- . n.d. *Magnetic tape glossary*. Redwood City, Calif.: Ampex Corporation.
- Archiving the audio-visual heritage: A joint technical symposium; FIAF, Fédération Internationale des Archives du Film; FIAT, Fédération Internationale des Archives de Télévision; IASA, International Association of Sound Archives; May 20-22, 1987*. 1988. Edited by E. Orbanz, H. P. Harrison, and H. Schou. Berlin: Stiftung Deutsche Kinemathek.
- Archiving the audio-visual heritage: Third joint technical symposium: May 3-5, 1990, Canada Museum of Civilization, Ottawa, Canada*. 1992. Paris: UNESCO.
- Association for Recorded Sound Collections, Associated Audio Archives Committee. *Audio preservation: A planning study*. 1988. Silver Spring, Md.: Association for Recorded Sound Collections.
- Audio Engineering Society. 1994. AES Standards Committee news. *Journal of the Audio Engineering Society* 42, no. 11:934.
- Banks, Joyce M. 1987. *Guidelines for preventative conservation*. Ottawa, Can.: Committee on Conservation/Preservation of Library Materials.
- Blank, Sharon. 1990. An introduction to plastics and rubbers in collections. *Studies in Conservation* 35, no. 2:53-63.
- Borwick, John, ed. 1980. *Sound recording practice*. 2d ed. London: Oxford University Press.
- Casey, Mike. 1992. It's now or never: A framework for making decisions about sound recordings. In *Preservation papers of the 1991 SAA annual conference*. Chicago: Society of American Archivists, 22-8.
- Cassaro, James P., ed. 1989. *Planning and caring for library audio facilities*. Canton, Mass.: Music Library Association.

## Audio Preservation Bibliography

---

- Child, Margaret S., comp. 1993. *Directory of information sources on scientific research related to the preservation of sound recordings, still and moving images and magnetic tape*. Washington, D.C.: Commission on Preservation and Access.
- Chen, Ching-Chih. 1992. Computer technology to preserve and access endangered oral history recordings in Alaska. *Microcomputers for Information Management* 9, no. 3:191–5.
- Committee on Preservation of Historical Records. 1986. *Preservation of historic records: Magnetic recording media*. Washington, D.C.: National Academy Press.
- Cook, Warren. n.d. Paper and plastic. *Record Exchanger* 3:4; 4:1, 4–5.
- Cowan, Jean C. 1958. The care and treatment of long-playing records in public libraries. *Librarian* 47:76–9.
- Cunha, George Martin, and Dorothy Grant Cunha. 1971. *Conservation of library materials: A manual and bibliography on the care, repair, and restoration of library materials*. Metuchen, N.J.: Scarecrow.
- Darling, Pamela W. 1988. *Preservation planning program resource notebook*. Rev. ed. Washington, D.C.: Association of Research Libraries, Office of Management Studies.
- DePew, John N. 1991. *A library, media, and archival preservation handbook*. Santa Barbara, Calif.: ABC-CLIO.
- Easton, Roger. 1989. Conservation of film, television, and sound records. In *Proceedings of conservation in archives: International symposium, Ottawa, Canada, May 10–12, 1988*. Paris: International Council on Archives, 163–72.
- Eiler, Delos A. 1993. Audio magnetic tape preservation and restoration. *IASA Journal* 1:11–19.
- Engel, Friedrich Karl. 1988. 1888–1988: A hundred years of magnetic sound recording. *Phonographic Bulletin* 51:8–20.
- Fox, Barry. 1989. German research damns digital audio tape. *New Scientist* 122:29.
- Gibbs, John R. 1982. *Listening center restoration and preservation project*. Seattle, Wash.: University of Washington Libraries.
- Gibson, Gerald. 1991. Preservation and conservation of sound recordings. In *Conserving and preserving materials in non-book formats*, edited by Kathryn L. Henderson and William T. Henderson. Urbana-Champaign, Ill.: University of Illinois, 27–44.
- . 1994. Preservation of moving images and sound recordings in the music library. In *Knowing the score: Preserving collections of music*. Compiled by Mark Roosa and Jane Gottlieb. MLA Technical Reports no. 23. Canton, Mass.: Music Library Association; Chicago: Association for Library Collections & Technical Services, 59–89.

---

---

## Audio Preservation Bibliography

---

---

- Gilmore, Valita, and William H. Leary. 1990. *Managing audiovisual records: Instructional guide series*. Washington, D.C.: National Archives and Records Administration Information Center.
- Griffin, Marie P. 1985. Preservation of rare and unique materials at the Institute for Jazz Studies. *ARSC Journal* 17:11–17.
- Hall, David. 1974. The Rodgers and Hammerstein Archives of Recorded Sound: History and current operation. *ARSC Journal* 6, no. 2:15–31.
- International Organization for Standardization. 1982. *Information transfer*. 2d ed. Geneva, Switz.: International Organization for Standardization.
- Kahn, Miriam. 1993. ARSC annual meeting, Chicago, May 1993. *Conservation Administration News* 55:10.
- Kohle, W. 1972. *Archives of motion pictures, photographic records, and sound recordings: Report at the VIIth International Congress on Archives*. Moscow: International Congress on Archives.
- Lesk, Michael. 1990. *Image formats for preservation and access: A report of the Technology Assessment Advisory Committee to the Commission on Preservation and Access*. Washington, D.C.: Commission on Preservation and Access.
- Line, Joyce. 1977. *Archival collection of non-book materials: A preliminary list indicating policies for preservation and access*. London: British Library.
- Lora, Pat. 1991. Preservation or global delete? What's the future of media? *Wilson Library Bulletin* 66, no. 3:59–60.
- Mallinson, John C. 1985. The next decade in magnetic recording. *IEEE Transactions on Magnetics* 21, no. 3:1217–20.
- . 1989. Magnetic tape recording: History, evolution, and archival considerations. In *Proceedings of conservation in archives: International symposium, Ottawa, Canada, May 10–12, 1988*. Paris: International Council on Archives, 181–90.
- McWilliams, Jerry. 1979. *The preservation and restoration of sound recordings*. Nashville, Tenn.: American Association for State and Local History.
- . 1983. Sound recordings. In *Conservation in the library: A handbook of use and care of traditional and nontraditional materials*, edited by Susan G. Swartzburg. Westport, Conn.: Greenwood, 163–84.
- Nelson-Strauss, Brenda. 1991. Preservation policies and priorities for recorded sound collections. *Notes* 48:425–36.
- Owen, Tom. 1983. Fifty questions on audio restoration and transfer technology. *ARSC Journal* 15:38–45.

## Audio Preservation Bibliography

---

- Pasquariello, Nicholas. 1994. Archival sound restoration. *Studio Sound and Broadcast Engineering* 36, no. 9:47–48.
- Paton, Christopher Ann. 1990. Whispers in the stacks: The problem of sound recordings in archives. *American Archivist* 53, no. 2:274–80.
- Peterson, George. 1993. *Tech terms: A practical dictionary for audio and music production*. Emeryville, Calif.: EMBooks.
- Pickett, A. G., and M. M. Lemcoe. 1991. *Preservation and storage of sound recordings*. Washington, D.C.: Library of Congress, 1959. Reprint, Association for Recorded Sound Collections, Associated Audio Archives Committee; Kansas City, Mo.: Lowell.
- Powell, James R., Jr. 1992. *The audiophile's technical guide to 78rpm transcription and microgroove recordings*. Portage, Mich.: Gramophone Adventures.
- Read, Oliver. 1952. *The recording and reproduction of sound*. 2d ed. Indianapolis, Ind.: H. W. Sams.
- Read, Oliver, and Walter L. Welch. 1976. *From tin foil to stereo: Evolution of the phonograph*. 2d ed. Indianapolis, Ind.: H. W. Sams.
- Record companies play for copyright protection. 1986. *New Scientist* 112:30.
- Ritzenthaler, Mary Lynn. 1993. *Preserving archives and manuscripts*. Chicago: Society of American Archivists.
- Roederer, Charlotte. 1992. Copyright status of historical recordings—protecting and promoting public domain. *ARSC Journal* 23, no. 1:30.
- Roosa, Mark. 1992. Preservation and reformatting issues for sound recordings. *Preservation papers of the 1991 SAA annual conference*. Chicago: Society of American Archivists, 16–21.
- Rushin, Don. 1989. Five decades of magnetic tape. *Broadcast Engineering* 31, no. 5:36-50.
- Sawka, Barbara. 1991. Audio preservation from tin foil to compact disc: An NEH planning study progress report. In *Abstracts of papers from the annual meeting*. Chicago: Society of American Archivists, 89–90.
- . 1991. Audio preservation in the United States: A report on the ARSC/AAA (Association for Recorded Sound Collections/Associated Audio Archives) planning study. *Midwestern Archivist* 16, no. 1:5–10.
- Schur, Susan E. 1977. Museum profile: The Museum of Broadcasting. *Technology & Conservation* 2, no. 1:14–19.
- Schweizer, Eduard Hansjorg. 1970. *Preservation of sound: A guidebook for the proper care, maintenance, and storage of records and audio tapes*. Minneapolis, Minn.: Schweizer Design of America.

---

---

## Audio Preservation Bibliography

---

---

- Silver, Jeremy, and Lloyd Stickells. 1988. Preserving sound recordings at the British National Sound Archive. *Library Conservation News* 13:1-3.
- Smolian, Steve. 1987. Preservation, deterioration, and restoration of recording tape. *ARSC Journal* 19:37-53.
- St. Laurent, Gilles. 1991. *The care and handling of recorded sound materials*. Washington, D.C.: Commission on Preservation and Access.
- . 1992. Preservation of recorded sound materials. *ARSC Journal* 23, no. 2:144-56.
- Stratton, John. 1970. Crackle. *Recorded Sound* 39:655.
- Van Tassel, Dennis. 1970. *Computer security management*. Englewood Cliffs, N.J.: Prentice Hall.
- Ward, Alan. 1990. *A manual of sound archive administration*. Brookfield, Vt., and Aldershot, Eng.: Gower.
- Welch, Walter L. 1972. Preservation and restoration of authenticity in sound recordings. *Library Trends* 21:83-100.

### **Description of Media and Formats**

This section includes works describing recording media and their composition, period of currency, and history.

- Alexandrovich, George. 1982. Phono cartridges and communications. *Broadcast Engineering* (Aug.): 16-36.
- American Library Association, Library Technology Project. 1962. *The testing and evaluation of record players for libraries*. Chicago: American Library Association.
- Association for Recorded Sound Collections, Associated Audio Archives Committee. 1981. *Survey of pre-"LP" sound recordings*. Silver Spring, Md.: Association for Recorded Sound Collections.
- Bertram, H. Neal, and A. Eshel. 1979. *Recording media archival attributes (magnetic)*. Redwood City, Calif.: Ampex Corporation.
- Camras, Marvin. 1988. *Magnetic recording handbook*. New York: Van Nostrand Reinhold.
- Committee on Preservation of Historical Records. 1986. *Preservation of historic records: Magnetic recording media*. Washington, D.C.: National Academy Press.
- Cuddihy, Edward F. 1980. Aging of magnetic recording tape. *IEEE Transactions on Magnetics* 16, no. 4:558-68.

## Audio Preservation Bibliography

---

- . 1989. Stability and preservation of magnetic tape. In *Proceedings of conservation in archives: International symposium, Ottawa, Canada, May 10–12, 1988*. Paris: International Council on Archives, 191–206.
- Currall, Henry F. J., ed. 1970. *Gramophone record libraries: Their organization and practice*. London: Crosby Lockwood.
- Davies, W. E. 1980. Close-up view of record wear. *Audio* 64, no. 9:38–42.
- Eastman Kodak Company. 1965. *Some plain talk about sound recording tape*. Rochester, N.Y.: Eastman Kodak Company.
- Engel, Friedrich Karl. 1988. 1888–1988: A hundred years of magnetic sound recording. *Phonographic Bulletin* 51:8–20.
- Erlichman, J. 1988. Compact discs fade out after eight years of use. *Guardian* 29:1.
- Fontaine, J. - M. 1987. *Dégradation de l'enregistrement magnétique audio: Processus de détérioration de l'enregistrement analogique*. Paris: Phonothèque Nationale.
- Fox, Barry. 1988. Tests prove CDs can self destruct. *New Scientist* 119:37.
- . 1989. German research damns digital audio tape. *New Scientist* 122:29.
- . 1990. Master tapes come to a sticky end. *New Scientist* 127:31.
- . 1994. The origins of FFRR and the problems with CD-ROM. *Studio Sound* 36, no. 11:106.
- Frow, George L., and Albert Sefl. 1978. *The Edison cylinder phonographs*. Sevenoaks, Eng.: George L. Frow.
- Geller, Sidney B. 1972. *The effects of magnetic fields on magnetic storage media used in computers*. National Bureau of Standards technical note 735. Washington, D.C.: National Bureau of Standards.
- Gibson, Gerald. 1988. Decay and degradation of disc and cylinder recordings in storage. In *Audio preservation: A planning study*. Silver Spring, Md.: Association for Recorded Sound Collections, 186–99.
- Hall, David. 1971. Phonorecord preservation: Notes of a pragmatist. *Special Libraries* 62:357–62.
- Jaffe, Lee David. 1987. Phonograph records. In *Nonbook media: Collection management and user services*, edited by John W. Ellison and Patricia Ann Coty. Chicago: American Library Association, 236–61.
- Kent, Scott. 1988. Binder breakdown in back-coated tapes. *Recording Engineer/Producer* 19:80–81.

## Audio Preservation Bibliography

---

- Lechleitner, Franz. 1988. The construction of cylinder replay machines. In *Archiving the audio-visual heritage: A joint technical symposium; FIAF, Fédération Internationale des Archives du Film; FIAT, Fédération Internationale des Archives de Télévision; IASA International Association of Sound Archives; May 20–22, 1987*, edited by E. Orbanz, H. P. Harrison, and H. Schou. Berlin: Stiftung Deutsche Kinemathek, 79–80.
- Lesk, Michael. 1990. *Image formats for preservation and access: A report of the Technology Assessment Advisory Committee to the Commission on Preservation and Access*. Washington, D.C.: Commission on Preservation and Access.
- Mallinson, John C. 1989. Magnetic tape recording: History, evolution, and archival considerations. In *Proceedings of conservation in archives: International symposium, Ottawa, Canada, May 10–12, 1988*. Paris: International Council on Archives, 181–90.
- Paton, Christopher Ann. 1991. Preservation of acetate disc sound recordings at Georgia State University. *Midwestern Archivist* 16, no. 1:11–20.
- Pisha, B. V. 1976. Record cleaners revisited. *Audio* 60, no. 5:40–50.
- Poulos, Arthur. 1972. Audio and video cassettes: Friend or foe of the librarian? *Special Libraries* 63:222–6.
- Read, Oliver, and Walter Welch. 1976. *From tin foil to stereo: Evolution of the phonograph*. 2d ed. Indianapolis, Ind.: H. W. Sams.
- Reitman, Valerie. 1990. High-fidelity digital audio tape is stuck on slow forward in U.S. *Philadelphia Inquirer* 18 Feb.: 1F, 9F.
- Roosa, Mark S. 1989. Audio tape transfer. *College & Research Library News* 50:312–13.
- Rushin, Don. 1989. Five decades of magnetic tape. *Broadcast Engineering* 31, no. 5:36–50.
- Smith, Leslie. 1991. Factors governing the long-term stability of polyester-based recording media. *Restaurator* 12:201–18.
- Storm, William. 1988. Audio equipment considerations for sound archives. In *Audio preservation: A planning study*, Silver Spring, Md.: Association for Recorded Sound Collections, 99–106.
- Waites, J. B. 1982. Care, handling, and management of magnetic tape. In *Magnetic tape recording for the eighties*. NASA reference publication 1075. Edited by Ford Kalil. Washington, D.C.: NASA, 45–69.
- Wheeler, Jim. 1988. Increasing the life of your audio tape. *Journal of the Audio Engineering Society* 36, no. 4:232–36.
- Wile, Raymond R. 1982. The Edison invention of the phonograph. *ARSC Journal* 14, no. 2:5–24.

## Audio Preservation Bibliography

---

———. 1990. Etching the human voice: The Berliner invention of the gramophone. *ARSC Journal* 21, no. 1:2–22.

Wilson, Percy. 1972. Care of records. *Audio* 56:30–32.

Zahn, Wilfried. 1976. Preservation and storage of tape recordings. *Phonographic Bulletin* 15:5–6.

———. 1978. About the reproduction problems of Edison cylinders. *Phonographic Bulletin* 21:28–29.

### **Storage, Housing, and Handling**

This section contains materials that discuss standards, guidelines, and best practices for environmental controls, shelving, enclosures, and handling of various media as well as describing causes of media degradation.

Ampex Corporation. 1987. *Increasing the life of your audio tapes*. Redwood City, Calif.: Ampex Corporation.

———. 1990. *Care & handling of magnetic tape*. Redwood City, Calif.: Ampex Corporation.

Bertram, H. Neal, and Edward F. Cuddihy. 1982. Kinetics of the humid aging of magnetic recording tape. *IEEE Transactions on Magnetics* 18, no. 5:993–9.

Bertram, H. Neal, and Michael K. Stafford. 1980. The print-through phenomena. *Journal of the Audio Engineering Society* 28, no. 10:690–705.

Brown, D. W., R. E. Lowry, and L. E. Smith. 1986. *Prediction of the long-term stability of polyester-based recording media*. NBSIR 86-3474. Washington, D.C.: National Bureau of Standards.

Bubbers, John J. 1972. What you can do to minimize record wear. *High Fidelity Magazine* 22, no. 9:54–5.

Cowan, Jean C. 1958. The care and treatment of long-playing records in public libraries. *Librarian* 47:76–9.

Doesburg, Cor L. 1989. Costs of storage in sound archives. *Phonographic Bulletin* 54:4–14.

Flood, Per R., Tor Kummen, and Oystein Wendelbo. 1983. The restoration of storage-damaged Decelith grammophone records. *Phonographic Bulletin* 35:10–15.

Fox, Barry. 1990. Master tapes come to a sticky end. *New Scientist* 127:31.

Geller, Sidney B. 1983. *Care and handling of computer magnetic storage media*. NBS special publication 500-101. Washington, D.C.: National Bureau of Standards.

## Audio Preservation Bibliography

---

- Gibson, Gerald. 1988. Decay and degradation of disc and cylinder recordings in storage. In *Audio preservation: A planning study*. Silver Spring, MD: Association for Recorded Sound Collections, 186–99.
- Harkness, Clifford. 1988. Criteria for air conditioning in audio-visual archives. In *Archiving the audio-visual heritage: A joint technical symposium; FIAF, Fédération Internationale des Archives du Film; FIAT, Fédération Internationale des Archives de Télévision; IASA International Association of Sound Archives; May 20–22, 1987*, edited by E. Orbanz, H. P. Harrison, and H. Schou. Berlin: Stiftung Deutsche Kinemathek, 34–41.
- Heckman, Harold. 1987. Storage and handling of audio and magnetic materials. In Vol. 2, *Preservation of library materials*, edited by Merrily A. Smith. München; New York: Saur, 1987, 67–73.
- Hendley, A. M. 1983. *The archival storage potential of microfilm, magnetic media, and optical data disks: A comparison based on a literature review*. Bayfordbury, Eng.: National Reprographic Centre for Documentation.
- Isom, W. Rex. 1972. How to prevent and cure record warping. *High Fidelity Magazine* 22, no. 9:50–3.
- Kalil, Ford, ed. 1982. *Magnetic tape recording for the eighties*. NASA reference publication 1075. Washington, D.C.: NASA.
- Knight, G. A. 1977. Factors relating to the long term storage of magnetic tape. *Phonographic Bulletin* 18:15–45.
- Line, Joyce. 1977. *Archival collection of non-book materials: A preliminary list indicating policies for preservation and access*. London: British Library.
- Maier, Bruce R. 1972. In search of the perfect record cleanser. *High Fidelity Magazine* 22, no. 9:52–5.
- McWilliams, Jerry. 1977. Storage, care, and preservation of sound recordings: A bibliography. *ARSC Journal* 9, no. 2:3–10.
- Mohrlant, Victor A. 1961. Tips on tape storage. *Broadcast Engineering* (July): 28–9, 39.
- Reilly, James. 1993. *IPI storage guide for acetate film*. Rochester, N.Y.: Image Permanence Institute.
- Saffady, William. 1997. Stability, care, and handling of microforms, magnetic media, and optical disks. *Library Technology Reports* 33, no. 6:613–752.
- Schüller, Dietrich. 1986. Handling, storage, and preservation of sound recordings under tropical and subtropical conditions (presented at the 1984 IFLA conference). *Fontes Artis Musicae* 33:100–4.

## Audio Preservation Bibliography

---

- . 1989. The costs of storage and preservation: Format-specific preservation costs—a first attempt. *Phonographic Bulletin* 54:15–19.
- Schweizer, Eduard Hansjorg. 1970. *Preservation of sound: A guidebook for the proper care, maintenance, and storage of records and audio tapes*. Minneapolis, Minn.: Schweizer Design of America.
- Spence, John. 1989. Mould: A growing problem too big to ignore. *Phonographic Bulletin* 55:21–5.
- Van Bogart, John. 1995. *Magnetic tape storage and handling: A guide for libraries and archives*. Washington, D.C.: Commission on Preservation and Access; St. Paul, Minn.: National Media Laboratory.
- Van Tassel, Dennis. 1970. *Computer security management*. Englewood Cliffs, N.J.: Prentice Hall.
- Waites, J. B. 1982. Care, handling, and management of magnetic tape. In *Magnetic tape recording for the eighties*, edited by Ford Kalil. NASA reference publication 1075. Washington, D.C.: NASA, 45–69.
- Warren, Richard, Jr. 1994. Handling of sound recordings. *ARSC Journal* 25:139–62.
- Wilson, Percy. 1972. Care of records. *Audio* 56:30–2.

### **Disaster Response**

- Barton, John P., and Johanna G. Wellheiser, eds. 1985. *An ounce of prevention: A handbook on disaster contingency planning for archives, libraries, and record centres*. Ontario, Can.: Toronto Area Archivists Group Education Foundation, 71.
- Freeze-drying of tapes. 1992. *Library Conservation News* 34:4–5.
- Lundquist, Eric G. 1986. *Salvage of water damaged books, documents, micrographic and magnetic media*. San Francisco, CA: Document Reprocessors of San Francisco.
- Schüller, Dietrich. 1983. Preliminary recommendations for fire precautions and fire extinguishing methods in sound archives. *Phonographic Bulletin* 35:21–3.
- Spence, John. 1989. Mould: A growing problem too big to ignore. *Phonographic Bulletin* 55:21–5.
- Upton, M. S., and C. Pearson. 1978. *Disaster planning and emergency treatments in museums, art galleries, libraries, archives, and allied institutions*. Canberra, Australia: Institute for the Conservation of Cultural Materials.

**Reformatting and Transfer Re-recording**

This section contains works that discuss standards, guidelines, and best practices for both analog and digital re-recording.

- Audio Engineering Society, Standards Committee. 1992. Report of the meeting of AESSC Subcommittee SC-3, Audio Preservation and Restoration, with ANSI IT9.5. *Journal of the Audio Engineering Society* 40, no. 10:820.
- Bertram, H. Neal, and Michael K. Stafford. 1980. The print-through phenomena. *Journal of the Audio Engineering Society* 28, no. 10:690-705.
- Deutsch, Werner, and Anton Noll. 1986. The restoration of historical sound recordings by means of digital signal processing: Psychoacoustical aspects. *Phonographic Bulletin* 45:36-9.
- Emergency restoration for Rosengarten tapes. 1990. *Sounds of the South* 2:1-2.
- Flood, Per R., Tor Kummen, and Oystein Wendelbo. 1983. The restoration of storage-damaged Decelith grammophone records. *Phonographic Bulletin* 35:10-15.
- Gibson, Gerald. 1994. Preservation of moving images and sound recordings in the music library. In *Knowing the score: Preserving collections of music*. Compiled by Mark Roosa and Jane Gottlieb. MLA Technical Reports no. 23. Canton, Mass.: Music Library Association; Chicago: Association for Library Collections & Technical Services, 59-89.
- Isom, W. Rex. 1972. How to prevent and cure record warping. *High Fidelity Magazine* 22, no. 9:50-3.
- Juneau, Ann, and Nancy Gwinn. 1986. *SIL preservation planning program, June 4, 1985-May 1, 1986: Final report of the study team*. Washington, D.C.: Office of Management Studies, Association of Research Libraries.
- Lechleitner, Franz. 1988. The construction of cylinder replay machines. In *Archiving the audio-visual heritage: A joint technical symposium; FIAF, Fédération Internationale des Archives du Film; FIAT, Fédération Internationale des Archives de Télévision; IASA International Association of Sound Archives; May 20-22, 1987*, edited by E. Orbanz, H. P. Harrison, and H. Schou. Berlin: Stiftung Deutsche Kinemathek, 79-80.
- Lotichius, Dietrich. 1981. Measures for the preservation and for the protection of archived program property on sound carriers. *Phonographic Bulletin* 31:37-9.
- McCormick, Don, and Seth Winner. 1989. The Toscanini legacy. *ARSC Journal* 20:182-90.
- McCrary, Ellen. 1990. A treatment for brittle flaking tape recordings. *Abbey Newsletter* 14:123.
- Peterson, George. 1993. *Tech terms: A practical dictionary for audio and music production*. Emeryville, Calif.: EMBooks.
- Polon, Martin. 1994. Analog versus digital: Why the war must stop! *Studio Sound* 36, no. 11:81.

## Audio Preservation Bibliography

---

- Rosello, Ramon. 1987. Evolution of recording standards and their incidence in archives. In *Minutes and working papers of the FIAT/IFTA 6th general assembly, 29 September–1 October 1986–Montreal (Canada)*. Madrid: International Federation of TV Archives (FIAT/IFTA), 50–3.
- Schüller, Dietrich. 1991. Ethics of preservation, restoration, and reissue of historical sound recordings. *Journal of the Audio Engineering Society* 31, no. 12:1014–16.
- Storm, William. 1983. A proposal for the establishment of international re-recording standards. *ARSC Journal* 15:26–37.
- . 1984. Construction and rationale of building the Belfer Audio Laboratory and Archives at Syracuse University. *Phonographic Bulletin* 39:9–14.
- . 1988. The implementation of proposed standards for copying audio recordings. In *Archiving the audio-visual heritage: A joint technical symposium; FIAF, Fédération Internationale des Archives du Film; FIAT, Fédération Internationale des Archives de Télévision; IASA International Association of Sound Archives; May 20-22, 1987*, edited by E. Orbanz, H. P. Harrison, and H. Schou. Berlin: Stiftung Deutsche Kinemathek, 105–8.

### Technical Studies

This section includes works describing various research and development efforts investigating the longevity of audio materials and equipment.

- American Library Association, Library Technology Project. 1962. *The testing and evaluation of record players for libraries*. Chicago: American Library Association.
- Audio Engineering Society, Standards Committee. 1992. Report of the meeting of AESSC Subcommittee SC-3, Audio Preservation and Restoration, with ANSI IT9.5. *Journal of the Audio Engineering Society* 40, no. 10:820.
- Bertram, H. Neal, and E. F. Cuddihy. 1982. Kinetics of the humid aging of magnetic recording tape. *IEEE Transactions on Magnetics* 18, no. 5:993–9.
- Bertram, H. Neal, and Michael K. Stafford. 1980. The print-through phenomena. *Journal of the Audio Engineering Society* 28, no. 10:690–705.
- Brown, D. W., R. E. Lowry, and L. E. Smith. 1986. *Prediction of the long term stability of polyester-based recording media*. NBSIR 86-3474. Washington, D.C.: National Bureau of Standards.
- Deutsch, Werner, and Anton Noll. 1986. The restoration of historical sound recordings by means of digital signal processing: Psychoacoustical aspects. *Phonographic Bulletin* 45:36–9.
- Falk, Howard. 1991. Tape backup for file preservation (Use of digital audio tape and data compression techniques). *The Electronic Library* 9:344–7.

---

## Audio Preservation Bibliography

---

- Geller, Sidney B. 1972. *The effects of magnetic fields on magnetic storage media used in computers*. National Bureau of Standards technical note 735. Washington, D.C.: National Bureau of Standards.
- Hendley, A. M. 1983. *The archival storage potential of microfilm, magnetic media, and optical data disks: A comparison based on a literature review*. Bayfordbury, Eng.: National Reprographic Centre for Documentation.
- Kent, Scott. 1988. Binder breakdown in back-coated tapes. *Recording Engineer/Producer* 19:80-1.
- Knight, G. A. 1977. Factors relating to the long term storage of magnetic tape. *Phonographic Bulletin* 18:15-45.
- Liu, Guoqiang. 1990. Phonomatrix corrosion and its prevention in China. *Phonographic Bulletin* 56:26-30.
- McCrary, Ellen. 1990. A treatment for brittle flaking tape recordings. *Abbey Newsletter* 14:123.
- Michaels, Jan. 1993. The condition survey of sound recordings at the National Library of Canada: Implications for conservation. In *Saving the twentieth century: The conservation of modern materials*, edited by David W. Grattan. Ottawa, Can.: Canadian Conservation Institute, 13-23.
- Reilly, James. 1993. *IPI storage guide for acetate film*. Rochester, N.Y.: Image Permanence Institute.
- Schüller, Dietrich. 1989. Sound tapes and "vinegar syndrome." *Phonographic Bulletin* 54:29-31.
- UNC archivists bake some tapes: University of North Carolina at Chapel Hill faced with rapidly deteriorating sound recordings. 1992. *Wilson Library Bulletin* 66:11.
- Woodward, J. G. 1968. The scanning electron microscope: A new tool in disc-recording research. *Journal of the Audio Engineering Society* 16:258-65.

### **Bibliographies**

- Child, Margaret S., comp. 1993. *Directory of information sources on scientific research related to the preservation of sound recordings, still and moving images, and magnetic tape*. Washington, D.C.: Commission on Preservation and Access.
- Davison, P. S., P. Giles and D. A. R. Matthews. 1968. Aging of magnetic tape: A critical bibliography and comparison of literature sources. *Computer Journal* 11, no. 3:241-6.
- McWilliams, Jerry. 1977. Storage, care, and preservation of sound recordings: A bibliography. *ARSC Journal* 9, no. 2:3-10.
- Paton, Christopher Ann. 1991. Annotated selected bibliography of works relating to sound recordings and magnetic and optical media. *Midwestern Archivist* 16, no. 1:31-47.

## STANDARDS

<b>AES22-1997</b>	AES Recommended Practice for Audio Preservation and Restoration: Storage of Polyester-Base Magnetic Tape
<b>AES28-1997</b>	AES Standard for Audio Preservation and Restoration: Method for Estimating Life Expectancy of Compact Discs (CD-ROM), Based on Effect of Temperature and Relative Humidity
<b>ANSI IT9.21-1996</b>	Life Expectancy of Compact Discs (CD-ROM): Method for Estimating, Based on Effect of Temperature and Relative Humidity
<b>ANSI IT9.23-1997</b>	Polyester Base Magnetic Tape: Storage
<b>ANSI IT9.25-1997</b>	Optical Disc Media: Storage
<b>ANSI IT9.26-1997</b>	Life Expectancy of Magneto-Optical (MO) Disks: Method for Estimating, Based on Effect of Temperature and Relative Humidity
<b>ANSI S1.1-1994</b>	Acoustical Terminology
<b>ANSI S1.6-1981 (R1994)</b>	Preferred Frequencies, Frequency Levels, and Bands for Acoustical Measurements
<b>ANSI S1.8-1989</b>	Reference Quantities for Acoustical Levels
<b>ANSI S1.9-1996</b>	Instruments for Measurement of Sound Intensity
<b>ANSI S1.11-1986 (R1993)</b>	Specifications for Octave-Band and Fractional Octave-Band Analog and Digital Filters
<b>ANSI S1.13-1995</b>	Methods for Measurements of Sound Pressure Levels
<b>ANSI S4.3-1982 (R1992)</b>	Methods for Measurements of Weighted Peak Flutter of Sound Recording and Reproducing Equipment
<b>ANSI S4.43-1991</b>	AES Recommended Practice for Digital Audio Engineering Serial Multichannel Audio-Digital Interface (MADI, AES-10)
<b>ANSI S4.44-1991</b>	AES Recommended Practice for Digital Audio Engineering Recommendations for the Synchronization of Digital Audio Equipment in Studio Operations (AES-11)

## Audio Preservation Bibliography

---

- ANSI/EIA RS-338-1967**      Unrecorded Magnetic Tape for Reel-to-Reel Instrumentation  
Applications  
**(R1987)**
- ANSI/EIA 518-1986**      Tape Recorder Measurement Standard
- NAB-1965**                  Standard for Magnetic Tape Recording and Reproducing (Reel-to-Reel)

## RELEVANT JOURNALS

*American Archivist*

ISSN: 0360-9081

Chicago: Society of American Archivists

*ARSC Journal*

ISSN: 0004-5438

Fairfax, Va.: Association for Recorded Sound Collections

*IEEE Transactions on Magnetics*

ISSN: 0018-9464

New York: Institute of Electrical and Electronic Engineers for the Magnetics Group

*Journal of the Audio Engineering Society*

ISSN: 0004-7554

New York: Audio Engineering Society

*Phonographic Bulletin*

ISSN: 0253-004x

Utrecht: International Association of Sound and Audiovisual Archives

*Studio Sound*

ISSN: 0144-5944

Croyden, UK: Link House Publications

## ORGANIZATIONS AND ACRONYMS

**AES — Audio Engineering Society, Subcommittee on the Preservation and Restoration of Audio Recordings**

60 East 42nd Street, Room 2520  
New York, NY 10017 USA  
Tel: (212) 661-8528  
Fax: (212) 682-0477  
Web site: <http://www.aes.org>  
Primary contact: Chair, Subcommittee on the Preservation and Restoration of Audio Recordings

**ALA/ALCTS/PARS — American Library Association, Association for Library Collections & Technical Services, Preservation and Reformatting Section**

ALCTS/PARS  
50 East Huron Street  
Chicago, IL 60611 USA  
Tel: (312) 280-5035  
Fax: (312) 280-5033  
Web site: <http://www.ala.org/alcts/organization/pars/>  
Primary contact: Chair, Preservation and Reformatting Section

**ANSI — American National Standards Institute**

11 West 42nd Street, 13th Floor  
New York, NY 10036 USA  
Tel: (212) 642-4900  
Fax: (212) 398-0023  
Telex: 424296 ANSI UI  
Web site: <http://www.ansi.org>  
Primary contact: President

**ARSC, AAA — Association for Recorded Sound Collections, Associated Audio Archives Committee**

P. O. Box 543  
Annapolis, MD 21404-0543 USA  
Tel: (410) 757-0488  
Fax: (410) 349-0175  
(Telephone and Fax numbers change with the election of the Executive Director)  
Web site: <http://199.75.220.16/aacommg/arsc/arsc/arsc.htm>  
Primary contact: Chair, Associated Audio Archives Committee

**AVICOM — Comité International de l'Audiovisuel et des Nouvelles Technologies de l'Image et du Son (International Committee for Audiovisual & New Technology in Sound and Vision)**

34 quai du Louvre  
Paris cedex 01 FRANCE  
Tel & Fax: 33 1 40205787

**IASA — International Association of Sound and Audiovisual Archives**

c/o Albrecht Haefner  
Südwesfunk Baden-Baden  
Postfach 820 D-76522  
Baden Baden, GERMANY  
Fax: +49 7221 922094  
Web site: <http://www.llgc.org.uk/iasa/>  
Primary contact: Secretary General (changes yearly; see Web site for current contact)

**IEEE — Institute of Electrical and Electronic Engineers**

345 East 47th Street  
New York, NY 10017 USA  
Tel: (212) 705-7900  
Fax: (212) 705-4929  
Web site: <http://www.ieee.org>  
Primary contact: General Manager

**ISO — International Organization for Standardization**

(International name: Organisation Internationale de Normalisation)  
1, rue de Varembe  
Case Postale 56  
CH-1211 Geneva 20, SWITZERLAND  
Tel: 41 22 7490111  
Fax: 41 22 7333430  
Telex: 41 22 05 ISO CH  
E-mail: [central@isocs.iso.ch](mailto:central@isocs.iso.ch)  
Web site: <http://www.iso.ch>  
Primary contact: Secretary General

**MLA — Music Library Association, Preservation Committee**

P.O. Box 487  
Canton, MA 02021 USA  
Web site: <http://www.musiclibraryassoc.org>  
Primary contact: Chair

**NAB — National Association of Broadcasters**

1771 N Street NW  
Washington, DC 20036 USA  
Tel: (202) 429-5300  
Fax: (202) 429-5343  
Web site: <http://www.nab.org>  
Primary contact: CEO/President

**NARA — National Archives and Records Administration**

8th at Pennsylvania Avenue NW  
Washington, DC 20408 USA  
Tel: (301) 713-7060 at branch

---

---

Audio Preservation Bibliography

---

---

Fax: (301) 713-6904 at branch  
E-mail: [inquire@arch2.nara.gov](mailto:inquire@arch2.nara.gov)  
Web site: <http://www.nara.gov>  
Primary contact: Assistant Branch Chief, Motion Picture, Sound and Video Branch

**NML — National Media Laboratory**

Building 235-3A-20  
St. Paul, MN 55144-1000  
Tel: (617) 736-4969  
Web site: <http://www.nta.org> (*site administered by National Technology Alliance-NTA*)  
Primary contact: NTA encourages contact via Web site

**SAA — Society of American Archivists, Preservation Section**

600 South Federal Street, Suite 504  
Chicago, IL 60605 USA  
Tel: (312) 922-0140  
Fax: (312) 347-1452  
Web site: <http://www.archivists.org>  
Primary contact: Chair, Preservation Section

**SMPTE — Society of Motion Picture and Television Engineers**

595 West Hartsdale Avenue  
White Plains, NY 10607 USA  
Tel: (914) 761-1100  
Fax: (914) 761-3115  
Web site: <http://www.smpte.org>  
Primary contact: Executive Director

## SOUND ARCHIVES

Information was solicited from six sound archives that participated in the ARSC/AAA NEH-funded planning study of 1988, the de facto guideline for preservation of audio materials. The authors of the bibliography wish to thank the staffs of the archives who made available the information provided below.

### **Belfer Audio Laboratory and Archive, Syracuse University Library**

Syracuse University Library  
222 Waverly Avenue  
Syracuse, New York 13244-20

Tel: (315) 443-3477  
Fax: (315) 443-9510  
E-mail: [ststinso@library.syr.edu](mailto:ststinso@library.syr.edu)  
Web site: <http://web.syr.edu/~libweb/aboutsul/depts/belfer/index.htm>

#### Contact persons:

Susan T. Stinson, curator, Belfer Audio Laboratory and Archive, for  
reference and research information about the archive  
collections

Martha Hanson, preservation administrator/director, Belfer  
Audio Laboratory and Archive, for information on  
administrative policy for the archive

Tel: (315) 443-1947  
Fax: (315) 443-9510  
E-mail: [mjhanson@library.syr.edu](mailto:mjhanson@library.syr.edu)

#### *Description:*

The function of the Belfer Audio Laboratory and Archive is to maintain a historical collection of sound recordings to support the university curricula, especially in the areas of music industry and the performing arts, and other areas of research and teaching. In addition, staff focus attention on preserving the archive's content by using optimum storage and handling procedures as well as preservation reformatting where necessary and appropriate.

Availability of materials for use by faculty, staff, students, and researchers is subject to meeting legal-use requirements either by fair-use or by express permission of copyright owners.

#### *Primary clientele:*

- students, faculty, and staff of Syracuse University
- researchers in need of items held by the archive

---

---

## Audio Preservation Bibliography

---

---

*Services offered to other institutions:*

consultancy/advisory services to other institutions regarding identification, storage, and handling of audio materials

Archive staff will fill requests from others for private research on a fee-based and time-available basis. Although the archive generally does not accept requests for tape reproductions of recordings from a user's private collection, it may make exceptions if the material is needed to support Syracuse University classroom or research needs.

*Rates:*

- \$40 per hour for Syracuse University personnel for nonacademic purposes
- \$75 per hour (minimum charge of 1/2 hour) for research and re-recording for nonuniversity individuals and institutions
- additional charge to cover the cost of tape and other materials used

*Preservation approaches taken:*

- Masters: 1/4" analog 10.5" reels at 7.5 ips, full track or 2-track; no splices or leadering; no noise reduction in the re-recording process; recordings are cleaned, and any necessary repairs are made to allow optimum playback
- User copies: copies made to analog cassettes or to 1/4" tape reels if specified; user copies are used in the library or classrooms and returned to the archive for retention. Any use other than classroom use requires appropriate copyright clearance for the recording.

*Equipment used:*

- professional analog tape decks
- 12" and 16" turntables with variable speed and assorted styli sizes
- equalization and noise reduction: analog filters, Packburn Transient Noise Suppressor and Continuous Noise Suppressor

**Library of Congress Magnetic Recording Laboratory**

Magnetic Recording Laboratory  
Motion Picture, Broadcasting and Recorded Sound Division  
Library of Congress  
Washington, DC 20540-4696

Tel: (202) 707-9077  
Fax: (202) 707-2371  
E-mail: amcc@loc.gov

*Contact person:*

Allan McConnell, head

For general information on preservation policy for a/v materials  
contact:

Gerald D. Gibson  
Audio and Moving Image Preservation Specialist  
Preservation Research & Testing Division  
Library of Congress  
Washington, DC 20540-4560  
Tel: (202) 707-1055  
Fax: (202) 707-6449  
E-mail: ggib@loc.gov

*Description:*

The purposes of the Library of Congress Magnetic Recording Laboratory (the audio preservation reformatting facility) are twofold:

- to make preservation transfer copies of those audio and video items in the library's collections in danger of loss because of deterioration
- to make copies of the materials from the library's collections for researchers and scholars once necessary legal clearances are in-hand (fair-use, permissions, etc.)

*Primary clientele:*

- the managers of collections at the Library of Congress
- researchers who use the library's collections.

*Services offered to other institutions:*

none, other than limited consultative information and copies of collections, as noted under Description

*Rates:*

- \$74 per hour, minimum of 1/4 hour, plus raw materials

*Preservation approaches taken:*

- Masters: recorded flat, with editing limited to removal of physical damage to original carrier (clicks, pops, etc.), onto 10.5" diameter, precision reels, 1/4" open-reel analog, 7.5 ips, 2 track
- Service copies: flat transfer copies onto either standard audio cassettes or R-DAT

## Audio Preservation Bibliography

---

- For customers, within potential legal restrictions and on a per-hour fee basis, the laboratory will make any reasonable editing changes that a customer may request; copies may be made onto a wide assortment of analog and digital media (open reel or cassette tapes; CD-R; R-DAT; open-reel digital).

### *Equipment used:*

- professional analog and digital tape decks
- multispeed turntables with wide range of styli
- various noise suppression and digital editing systems (CEDAR, Sonic-Solutions)

**Marr Sound Archives, University of Missouri-Kansas City**

5100 Rockhill Road  
Kansas City, MO 64110-2499

Tel: (816) 235-2798 or 235-1679

Fax: (816) 333-5584

E-mail: [chaddix@cctr.umkc.edu](mailto:chaddix@cctr.umkc.edu)

Web site: [http://www.umkc.edu/lib/onsite/00\\_media.htm#marr](http://www.umkc.edu/lib/onsite/00_media.htm#marr)

*Contact persons:*

Charles Haddix, sound recording specialist  
Laura Gayle Green, music/media librarian

*Description:*

The focus of the collection is the American experience as reflected in recorded sound. The archives collects primarily American popular music recorded before 1955, jazz, historic voices, vintage radio programs and newscasts, and authors reading their own works as well as opera and classical music. Past corporate patrons include Merchant-Ivory Films, Capitol Records, Disney/EMM, CBS News, and National Public Radio. Notable projects include *Ain't Seen Nothing Like It Since*, a documentary about the Kansas City Monarchs of the Negro Baseball Leagues for KCPT, Kansas City's public television station; a complete reissue of the recordings of Julia Lee on the Bear Family label of Germany; and reference services for Robert Altman's film *Kansas City*.

*Primary clientele:*

Public service is available by appointment Monday through Friday from 8:00 am to 5:00 pm. The faculty, staff, and students of the University of Missouri-Kansas City are the primary users of the archives' facilities, but the archives also serves the public and scholarly communities. The archives also provided archival recording services for St. Olaf College by re-recording all of their choir recordings.

*Services offered to other institutions:*

- on-site listening
- duplication of materials for research purposes, within the provisions of United States Copyright Law
- preservation services for a fee
- recording services for a fee for noncommercial recordings

*Rates:*

Three price tiers exist for those with different research or corporate needs. Prices are stated according to studio hours, including the time needed to prepare and duplicate the item. One half-hour of studio time is the minimum charged. The staff reserves the right to submit bids for phonoduplication projects and may negotiate total project prices accordingly.

- \$30 per hour of studio time for UMKC students, faculty, and staff

## Audio Preservation Bibliography

---

- \$60 per hour of studio time for nonprofit organizations and non-UMKC researchers (for example, researchers affiliated with other higher education institutions, public radio, public television, and PBS)
- \$75 per hour of studio time for other corporate users (for example, recording labels, commercial producers)

### *Preservation approaches taken:*

- Masters: recorded onto open-reel analog tape (AGFA 468)
- Service copies: recorded onto cassette (BASF TPII)

### *Equipment used:*

- Technics SP 15 turntable with SME model 3012-R tone arm that are mounted on a base that allows sufficient clearance to play 16" discs
- Stanton 500 cartridges with a variety of styli ranging from microgroove to 3.7 truncated elliptical, for most 78s, 3.0 to 3.3 TE; for lacquers, 1.5 to 1.9 TE
- Stanton model 310B preamplifier with flat mode
- 2 Owl One restoration modules
- Orban parametric equalizer/notch filter model 642B
- Urei 565 filter set
- Packburn audio noise suppressor model 323A
- Mackie CR-1604 16 channel MC/line mixer
- 2 Aphex model 120A distribution amplifiers
- 3 -10/+4 audio interfaces model 124A
- 2 Furman PB 40 patch bays with 1/4" cables
- 2 Trip Lite AC voltage regulators with AC spike and line noise filters
- 2 Panasonic 3700 DAT machines with remotes
- 2 Tascam 122 mk II cassette machines with remotes
- Otari MX 55 open-reel tape machine with stand and remote
- Otari 5050 open-reel tape machine with stand and remote
- Leader 20 MHz oscilloscope 8020

**Rodgers and Hammerstein Archives of Recorded Sound, The New York Public Library for the Performing Arts**

40 Lincoln Center Plaza  
New York, NY 10023-7498

Tel: (212) 870-1663

Fax: (212) 870-1720

E-mail: [rha@nypl.org](mailto:rha@nypl.org)

Web site: <http://www.nypl.org/research/lpa/rha/rha.html>

*Contact persons:*

Don McCormick, curator  
Mark Tolleson, assistant chief

*Description:*

Holdings include approximately 500,000 sound recordings in all subjects and books, periodicals, and catalogs on all aspects of recorded sound. The archives is open to the general public for on-premises listening and study. It is a division of The New York Public Library Research Libraries. Professional and technical staff are very involved with preservation of deteriorating audio recordings, especially relatively rare, unpublished, and noncommercial materials.

*Primary clientele:*

- general public (college-age or higher) for on-premises listening/viewing
- international public by mail, telephone, or e-mail reference

*Services offered to other institutions:*

- training to institutional staff involved in audio preservation transfer work
- limited preservation transfer services for small amounts of materials (cylinder or acetate disc primarily) for professional fees
- personal tape copies of out-of-print, published recordings provided for a fee

*Rates:*

- \$40 per hour plus materials for analog recording from standard sources
- \$50 per hour plus materials for analog recording from nonstandard sources
- \$60 per hour plus materials for digital recording (DAT)

*Preservation approaches taken:*

- Analog re-recording to archival open-reel tape (7.5 ips or 15 ips).
- Service copies: analog audio cassettes; also currently experimenting with recording onto CD

*Equipment used:*

- Technics SP-15 variable speed turntable
- Custom-made base for 16" transcriptions
- SME 3012 tone arm
- Stanton 500-AL cartridge

## Audio Preservation Bibliography

---

- Owl One restoration module
- Urie 565 notch/pek filter
- Orban 642B parametric filter
- Otari MX-55 1/2" track, reel-to-reel
- Panasonic SV-3900, R-DAT recorder
- Marantz CDR-610 MK-II CD recorder
- Tascam 122 MK-III cassette recorder

**Stanford University Archive of Recorded Sound**

Braun Music Center  
Stanford University  
Stanford, CA 94305-3076

Tel: (415) 723-9312

Fax: (415) 725-1145

E-mail: [rn.str@forsythe.stanford.edu](mailto:rn.str@forsythe.stanford.edu)

Web site: <http://www-sul.stanford.edu/depts/ars/ars.html>

*Contact persons:*

Barbara Sawka, head, Music Library and Archives of Recorded Sound

Richard Koprowski, librarian, Archived of Recorded Sound

*Description:*

The archive houses more than 200,000 recordings and more than 4,000 print and manuscript items. Almost every format developed to record sound may be found here: wax cylinders, shellac and vinyl discs, acetate and aluminum transcription discs, magnetic wire recordings, tapes (analog, digital, and audio cassette), compact discs, and laser discs.

*Clientele:*

- Stanford University students, faculty, and staff
- outside researchers

*Services offered to other institutions:*

- on-site playback
- duplication of selected material for research/teaching purposes
- photocopying
- Yamaha Disklavier
- Midi-keyboards

*Rates:*

Consult archive staff

*Preservation approaches taken:*

- For master materials: analog, reel-to-reel tape.
- For service copies: generally analog cassette, some DAT.

*Equipment used:*

Consult archive staff

**Yale Collection of Historical Sound Recordings**

Yale University Library  
P. O. Box 208240  
New Haven, CT 06520-8240

Tel: (203) 432-1795  
E-mail: Rwarren@pantheon.cis.yale.edu  
Web site: <http://www.library.yale.edu/histsoun.html>

*Contact person:*  
Richard Warren Jr., curator

*Description:*  
The Yale Collection is an audio archive that documents performance practice in Western concert music, jazz, American musical theater, drama, literature, and history from the beginning of the recording era to the present day. The collection was founded by Mr. and Mrs. Laurence C. Witten II and has been expanded from their collection of recordings of nineteenth-century singers into other areas through others' donations. Its purpose is to collect, preserve, and make these materials available for study.

*Primary clientele:*

- Yale University faculty and students
- scholars conducting serious discographical research

*Services offered to other institutions:*  
Staffing limits permit no such services.

*Rates:*  
N/A.

*Preservation approaches taken:*

- Originals are re-recorded onto open-reel analog tape in one direction only, stored end-out; originals themselves are kept in the safest possible conditions
- Service copies: on open-reel, audio cassette, or DAT cassette

*Equipment used:*  
Revox, McIntosh, Shure, Panasonic, Packburn, Tandberg, Lane Audio, UREI, Orban, Thorens, Pioneer, Fons, and Thiel, among others, to maintain capability to play back and re-record as many types of early recordings as possible

## INDEX

### A

AES22-1997, 21  
AES28-1997, 21  
Alexandrovich, George, 12  
Allen, J. S., 8  
Alten, Stanley, 8  
American Library Association, Association for  
Library Collections & Technical Services,  
Preservation and Reformatting Section  
(ALA/ALCTS/PARS), 24  
American Library Association, Library  
Technology Project, 12, 19  
American National Standards Institute  
(ANSI), 24  
Ampex Corporation, 8, 15  
ANSI IT9.21-1996, 21  
ANSI IT9.23-1997, 21  
ANSI IT9.25-1997, 21  
ANSI IT9.26-1997, 21  
ANSI S1.11-1986 (R1993), 21  
ANSI S1.1-1994, 21  
ANSI S1.13-1995, 21  
ANSI S1.6-1981 (R1994), 21  
ANSI S1.8-1989, 21  
ANSI S1.9-1996, 21  
ANSI S4.3-1982 (R1992), 21  
ANSI S4.43-1991, 21  
ANSI S4.44-1991, 21  
ANSI/EIA 518-1986, 22  
ANSI/EIA RS-338-1967 (R1987), 22  
Association for Recorded Sound Collections,  
Associated Audio Archives Committee, 5, 6,  
7, 12, 23, 24  
Audio Engineering Society, 8, 18, 19, 23, 24  
AVICOM — Comité International de  
l'Audiovisuel et des Nouvelles  
Technologies de l'Image et du Son, 24

### B

Banks, Joyce M., 8  
Barton, John P., 17  
Belfer Audio Laboratory and Archive, 19, 27

Bertram, H. Neal, 12, 15, 18, 19  
Bibliographies, 20  
Blank, Sharon, 8  
Borwick, John, 8  
Brown, D. W., 5, 15, 19  
Bubbers, John J., 15

### C

Camras, Marvin, 12  
Care and handling, 15-17  
Casey, Mike, 8  
Cassaro, James P., 5, 8  
Chen, Ching-Chih, 9  
Child, Margaret S., 9, 20  
Committee on Preservation of Historical  
Records, 9, 12  
Cook, Warren, 9  
Cowan, Jean C., 9, 15  
Cuddihy, Edward F., 6, 12, 13, 15, 19  
Cunha, Dorothy Grant, 9  
Cunha, George Martin, 9  
Currall, Henry F. J., 13

### D

Darling, Pamela W., 9  
Davies, W. E., 13  
Davison, P. S., 20  
DePew, John N., 9  
Disaster response, 17  
Deutsch, Werner, 18, 19  
Doesburg, Cor L., 15

### E

Eastman Kodak Company, 13  
Easton, Roger, 9  
Eiler, Delos A., 9  
Engel, Friedrich Karl, 9, 13  
Erlichman, J., 13  
Eshel, A., 12

**F**

Falk, Howard, 19  
Flood, Per R., 15, 18  
Fontaine, J. - M., 13  
Formats, media, 12-15  
Fox, Barry, 9, 13, 15  
Frow, George L., 13

**G**

Geller, Sidney B., 13, 15, 20  
Gibbs, John R., 9  
Gibson, Gerald, 6, 9, 13, 16, 18, 29  
Giles, P., 20  
Gilmore, Valita, 10  
Griffin, Marie P., 10  
Gwinn, Nancy, 18

**H**

Hall, David, 10, 13  
Harkness, Clifford, 16  
Heckman, Harold, 16  
Hendley, A. M., 16, 20

**I**

Institute of Electrical and Electronic Engineers  
(IEEE), 6, 23, 25  
International Association of Sound and  
Audiovisual Archives (IASA), 8, 14, 16, 18,  
19, 23, 25  
International Organization for  
Standardization (ISO), 10, 25  
Isom, W. Rex., 16, 18

**J**

Jaffe, Lee David, 13  
Juneau, Ann, 18

**K**

Kahn, Miriam, 10  
Kalil, Ford, 16  
Kent, Scott, 13, 20  
Knight, G. A., 16, 20  
Kohle, W., 10  
Kummen, Tor, 15, 18

**L**

Leary, William H., 10  
Lechleitner, Franz, 14, 18  
Lemcoe, M. M., 7, 11  
Lesk, Michael, 10, 14  
Library of Congress Magnetic Recording  
Laboratory, 29  
Line, Joyce, 10, 16  
Liu, Guoqiang, 20  
Lora, Pat, 10  
Lotichius, Dietrich, 18  
Lowry, R. E., 5, 15, 19  
Lundquist, Eric G., 17

**M**

Maier, Bruce R., 16  
Mallinson, John C., 10, 14  
Marr Sound Archives, 31  
Matthews, D. A. R., 20  
McCormick, Don, 18, 33  
McCrary, Ellen, 18, 20  
McWilliams, Jerry, 10, 16, 20  
Media, types of, 12-15  
Michaels, Jan, 20  
Mohrlant, Victor A., 16  
Music Library Association (MLA), 5, 25

**N**

NAB-1965, 22  
National Archives and Records  
Administration (NARA), 5, 25  
National Association of Broadcasters (NAB), 25  
National Media Laboratory (NML), 7, 26  
Nelson-Strauss, Brenda, 10  
New York Public Library for the Performing  
Arts, 33  
Noll, Anton, 18, 19

**O**

Organizations, 24-26  
Owen, Tom, 10

**P**

Pasquariello, Nicholas, 11  
Paton, Christopher Ann, 6, 11, 14, 20  
Pearson, C., 17  
Peterson, George, 11, 18

## Audio Preservation Bibliography

---

Pickett, A. G., 7, 11

Pisha, B. V., 14

Polon, Martin, 18

Poulos, Arthur, 14

Powell, James R., Jr., 11

### **R**

Read, Oliver, 11, 14

Reformatting, 18-19

Reilly, James, 16, 20

Reitman, Valerie, 14

Re-recording, 18-19

Ritzenthaler, Mary Lynn, 11

Rodgers and Hammerstein Archives of  
Recorded Sound, 10, 33

Roederer, Charlotte, 11

Roosa, Mark, 11, 14

Rosello, Ramon, 19

Rushin, Don, 11, 14

### **S**

Saffady, William, 16

Sawka, Barbara, 11, 35

Schüller, Dietrich, 16, 17, 19, 20

Schur, Susan E., 11

Schweizer, Eduard Hansjorg, 11, 17

Sefl, Albert, 13

Silver, Jeremy, 12

Smith, L. E., 5, 15, 19

Smith, Leslie, 14

Smolian, Steve, 12

Society of American Archivists, (SAA), 23, 26

Society of Motion Picture and Television  
Engineers (SMPTE), 26

Spence, John, 17

St. Laurent, Gilles, 12

Stafford, Michael K., 15, 18, 19

Standards, 21-22

Stanford University Archive of Recorded  
Sound, 35

Stickells, Lloyd, 12

Storage, 15-17

Storm, William, 14, 19

Stratton, John, 12

Syracuse University Library, 27

### **T**

Technical Studies, 19-20

Transfer, 18-19

### **U**

University of Missouri - Kansas City, 31

Upton, M. S., 17

### **V**

Van Bogart, John, 7, 17

Van Tassel, Dennis, 12, 17

### **W**

Waites, J. B., 14, 17

Ward, Alan, 7, 12

Warren, Richard, Jr., 17, 36

Welch, Walter L., 11, 12, 14

Wellheiser, Johanna G., 17

Wendelbo, Oystein, 15, 18

Wheeler, Jim, 14

Wile, Raymond R., 14, 15

Wilson, Percy, 15, 17

Winner, Seth, 18

Woodward, J. G., 20

### **Y**

Yale Collection of Historical Sound  
Recordings, 36

### **Z**

Zahn, Wilfried, 15