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Preserving and Enhancing Access to Non-Commercial Sound Recordings at the Harry Ransom Center

Project Overview

The release of the National Recording Preservation Plan in 2012 has rallied and united many individuals, organizations, and institutions toward a common goal of saving the unique and rare sound recordings that are actively deteriorating in private and public collections. In addition, the National Endowment for the Humanities' increased outreach toward funding audiovisual preservation projects motivated the Ransom Center to take action. As part of a 2015-2016 NEH Preservation and Access Planning Grant, the University of Texas at Austin's Harry Ransom Center conducted a one-year project to develop and complete a preservation survey of the Center's non-commercial sound recordings in order to prioritize preservation digitization based on condition and research value. The Center's audiovisual lab has been reformatting various audio formats since 2003; however, the Center has not developed a strategic audio preservation plan that takes into account the most at-risk *and* the most significant recordings. Limited resources necessitate that the Ransom Center prioritize recordings that have *both* the highest *condition needs* and the highest *usefulness* to research, public programming, and other creative endeavors. This inaugural project will form the foundation upon which future projects will build to enhance and expand access to the Ransom Center's rich body of audiovisual cultural heritage material.

Overview of Sound Recordings Collection

The Ransom Center's Sound Recordings Collection contains both commercial and non-commercial audio recordings in a variety of formats including wax cylinders, phonograph records, wire recordings, dictation discs and belts, reel-to-reel audio tapes, audiocassettes, microcassettes, compact discs, and other digital audio formats. The Center doesn't actively collect recordings; rather, they are received in the personal papers and organizational records acquired for the Center's archival collections. Recordings in the collection belonged to some of the 20th and 21st century's most notable writers, artists, and performers including Stella Adler, Neal Cassady, Andre Dubus, David Douglas Duncan, Norman Bel Geddes, Spalding Gray, Denis Johnson, Ernest Lehman, Norman Mailer, Bernard Malamud, Gerard Malanga, David Mamet, Nicholas Ray, Ross Russell, David and Jeffrey Selznick, Anne Sexton, Isaac Bashevis Singer, Warren Skaaren, Ted Spagna, Gloria Swanson, and Leon Uris.

The non-commercial recordings are unique and rare and were most often made for private use. The content varies widely, but include literary spoken word, conference proceedings, dictated notes and letters, field recordings, structured interviews, lectures and readings, musical performances, rehearsals, telephone conversations, dictated drafts of writings, radio broadcasts, even therapy sessions and psychic readings. As of January 2017, there are 14,682 audio recordings cataloged in the Ransom Center's Sound Recordings Collection database; of these, 3,226 have been digitized and are available streaming onsite in the Reading and Viewing Room (RVR).

Researchers across disciplines have made wide and varied use of the Ransom Center's sound recordings. The following are just a small selection of more recent examples.

Anne Sexton sound recordings. 44 audiocassette and open reel-to-reel tapes.
Sexton was a young mother and housewife when her psychiatrist, Dr. Martin Orne, suggested she start writing as an exercise to inform her therapy. Sexton went on to become a Pulitzer Prize

winning poet. The small, but highly used, collection of Sexton tapes includes poetry readings, interviews, conversations, and nine "therapy tapes." The bulk of Dr. Orne's psychotherapy tapes are housed at Harvard's Schlesinger Library, but these nine remained in Sexton's possession and are now at the Ransom Center. Access to these tapes was previously restricted by Sexton's oldest daughter and literary executor, who recently decided to open them to the public. These few tapes provide a more complete picture of Sexton and offer unique insight into a crucial point in her life.

In 2013, Dr. Chris Grobe, a Ransom Center visiting research fellow used the recordings of poet Anne Sexton to study confessional performance for his upcoming book *Performing Confession: Poetry, Performance, and New Media since 1959*. Grobe completed a fascinating comparison of Sexton's readings from early and late in her career. Not only did Sexton's voice change (Sexton was a heavy smoker and her voice deepened with age), but her voice modulation and presentation reflected the changes in her poetic style.

Erle Stanley Gardner sound recordings. 3,446 wax cylinders, dictation belts and discs, phonograph records, open reel-to-reel and cassette tapes, and wire recordings (about 2,480 of these have not been cataloged). Gardner was a lawyer and author best known for his popular detective series *Perry Mason*, represented in more than eighty novels, a radio series, and a television series. Gardner also initiated a project called "The Court of Last Resort," in which he reviewed cases against criminal defendants believed to be wrongfully convicted. Gardner seemed to enjoy having the latest audio recording equipment, as his collection includes all major formats used in the early to mid-twentieth century. The sheer volume of recordings indicates that he used the technology frequently and for many purposes. Recordings include Gardner drafting and editing his writings, dictated correspondence between Gardner and others including his publisher Thayer Hobson at William Morrow, field recordings, legal recordings related to The Court of Last Resort, and dialogue from the Perry Mason radio program.

Richard Williams, an independent scholar from England, was awarded a visiting fellowship in 2012 and continues to visit the Ransom Center to use the massive volume of Gardner papers and recordings. Williams discovered some dictated letters recorded in sound that do not appear to have page equivalents in his papers. Since the majority of the Gardner sound recordings are not digitized and most of the dictation discs are not individually cataloged, it's possible that there is a wealth of information trapped in the unpreserved recordings.

Most recently, the producers at Earwolf and Northern Light Productions used the Center's Gerold Frank audio recordings in episodes of their popular podcast series *Stranglers*, a contemporary audio investigation of the Boston Strangler story. Frank collected these recordings in the course of researching his 1966 book *The Boston Strangler*. Tapes include interviews with detectives, attorneys, victims' families, and other key individuals in the case against Albert DeSalvo, including DeSalvo's taped confession.

I. Project Activities

This one-year project ran from September 2015 to October 2016 and consisted of five major tasks: 1) evaluating available audio survey tools; 2) conducting a visual inspection of selected individual recordings; 3) assessing the potential research value of recordings; 4) analyzing results; and 5) developing recommendations for next steps. Because of the issues described in this report, a two-

month no-cost extension was requested and granted by the NEH (See Appendix A for a timeline of major events accomplished).

Since the success of the project was incumbent on the survey tool, it is necessary—and beneficial to other institutions considering a similar project—to delve deeply into the Center's tool selection process and some of the issues encountered.

A. The Survey Tool

The audiovisual preservation landscape is ever-changing. As funding entities increasingly fund audiovisual preservation projects, such as the development of new software, standards, best practices, and tools, the amount of resources available to institutions continues to grow. Frequently, the survey tools that are available have not been widely tested or implemented outside of their original instance; therefore, there is often little documentation or few—if any—case studies describing an institution's unique experience actually using those tools. As a result, it is challenging for institutions to select the most appropriate tool for their collections; particularly, if institutions lack dedicated staff trained in and knowledgeable about audiovisual preservation.

In the grant proposal, the Ransom Center selected one of four available tools recommended by the National Recording Preservation Plan, the Audiovisual Self-Assessment Program (AvSAP), with the caveat that the Center would assess three forthcoming tools to be released in 2015 and select the one that best fit the Center's needs. AvSAP was developed by the University of Illinois at Urbana-Champaign and is an open source software program that helps institutions identify and prioritize AV collections for future preservation based on three factors: format type, physical condition, and storage conditions. AvSAP was additionally appealing to the Center because its use required no prior knowledge about AV materials or their preservation (See Appendix B for a table which guided our decision).

In 2015, the University of Illinois at Urbana-Champaign released a beta version of the Preservation Self-Assessment Program (PSAP) which was actually an expansion, refinement, and replacement of AvSAP (the tool originally selected). PSAP is a web-based application which now includes assessment tools for photographic materials and paper objects, as well as AV materials. In 2015, Indiana University Bloomington and AVPreserve released MediaRIVERS and MediaSCORE, which can be used in conjunction to assess condition, technical risk, and obsolescence, as well as research and instructional value—a major component of this project. In addition, Indiana University is well-respected in the sound recordings preservation community and is known for its past contributions to the field.[1] After researching each available tool and communicating with Mike Casey at the Indiana University and Jennifer Hain Teper at the University of Illinois, the Ransom Center selected MediaSCORE for the condition survey and MediaRIVERS to assess intellectual value.

MediaRIVERS and MediaSCORE appeared very promising; but unfortunately, the Ransom Center's implementation of the MediaSCORE software didn't work, although MediaRIVERS did operate as expected. Specifically, after entering asset groups in MediaSCORE, the calculated score for each asset always resulted in zero. In other words, the software seemed unable to calculate a score. Since the University's IT Department set up the Center's install of the tools, the project team could not

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[1] Previous work includes the Sound Directions project (http://www.dlib.indiana.edu/projects/sounddirections/) and tool FACET (http://www.dlib.indiana.edu/projects/sounddirections/facet/index.shtml), as well as numerous helpful reports documenting the process at Indiana University.

determine if the problem lay in the software or the install. Since MediaRIVERS operated, it seemed unlikely that the tools were installed incorrectly. After unsuccessfully trouble-shooting with the software developers and the University's IT Department for over a week, the Center's Project Manager (PM) decided to change course and the Center switched to the PSAP tool.[2]

The Center did not originally select PSAP because during initial tool testing, project staff became concerned that the criteria used to calculate a PSAP score, as they pertain *specifically* to the Ransom Center's non-commercial recordings, would result in scores clustering in the "average" risk category and not across the full range of possible scores.[3] At the Ransom Center, responses to many questions posed by PSAP for each individual item will always have the same answer regardless of the format or condition. For example, the Center's non-commercial sound recordings have all been cataloged at the item-level in a locally-created database, every recording is rehoused if necessary at the time of cataloging, they are stored in good environmental conditions, and the recordings are restricted from circulation or playback until reformatted. Project staff feared that the data gathered in PSAP would not prove useful for informing future steps; or, would only confirm what is widely known—that magnetic media is a priority for preservation. In addition, assessing the intellectual value of the Center's recordings was a major component of this project, and though PSAP does provide an optional field for recording whether or not a recording is significant, that field has no bearing on the overall score.

At the conclusion of conducting a condition assessment of sound recordings, most existing audio survey tools provide a numerical score which signifies the condition of a recording's carrier on a continuum from bad to good. For the Ransom Center, this "magic" number doesn't convey much information. For example, it may tell us that the Center has 3,722 open reel tapes in "fair condition," but what does that actually mean? That number doesn't convey which tapes are off-brand stock, have mold, have tape pack problems, or exhibit signs of sticky shed syndrome. If the Center needed to prioritize open reel tapes within that 3,722 in "fair condition," how would that be accomplished? For these reasons the Center initiated a system to capture this necessary level of detail.

At the outset of the project, the Ransom Center already had an internally-developed database used to catalog non-commercial sound recordings at the item level. Though the sound recordings database (SRdb) includes fields for recording condition and format-specific details, these fields were seldom used and cataloging focused primarily on recording descriptive metadata. The Center decided to use PSAP to calculate a preservation score, so recordings could be grouped at a broad level in easily identifiable categories, and rather than record condition information directly into the PSAP database, it was entered into the Center's sound recordings database (SRdb). The Project Archivist (PA) made significant changes to the format and condition fields allowing for more robust data queries and an improved and more efficient workflow (See screenshots of database user interface in Appendix C).

B. Item-level Condition Inspection

Before assessing each recording format, the PA investigated the collection care process for the Center's sound recordings. This included understanding how recordings are organized and who in

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[2] The Center later learned that the Perry–Castañeda Library, the main central library of the University of Texas at Austin library system, was also unsuccessful in implementing MediaRIVERS and MediaSCORE.
[3] The formula for calculating the final resource score using PSAP is: PSAP Final Resource Score = Format (40%) + Condition (50%) + Storage Location (5%) + Temperature (2.5%) + Relative Humidity (2.5%)

the building is aware of their arrangement, housing, and cataloging status. As a result, the PA discovered additional non-commercial recordings that were uncataloged, rehoused some formats, and repaired of some playback equipment in the Center's AV lab. These efforts allowed the PA to anticipate the scope of each format and understand institutional practices. The PA further streamlined workflow by improving database functions like batch editing multiple records, systematically separating problematic materials such as those contaminated by mold, and predicting treatments and supplies necessary for future reformatting.

At an early stage in the survey process, the PA connected with the Ransom Center's Preservation and Conservation Department (recently under new leadership) and initiated discussions that would prove valuable for the remainder of the survey. Understanding the conservation discipline's survey methodology and how to effectively present results to different institutional audiences proved beneficial to the project.

The PA developed a survey workflow which allowed for gathering detailed information about the recording carrier, while minimizing handling. Item-level visual inspection is a process of dialing in on details while also considering the big picture and overall goal. The PA also noted trends within major collections. This provided an opportunity to note any information that could impact the perception of research value or physical issues that would impact preservation and reformatting. For example, author and journalist Frank Gerold stuck paper notes into the wind of reel-to-reel tapes that he recorded, suggesting that these recordings were personal working materials, as opposed to final works. These ephemeral annotations will pose a challenge to the digitization process.

Drawing inspiration from Suzanne Keene's visualization on the uses of collection surveys, the PA drew diagrams after assessing each recording format.[4] These diagrams provided an overview of the factors identified for each recording format and how those factors might inform future stewardship of non-commercial sound recordings; for example, predicting preservation requirements and estimating resources for conservation and digitization. These diagrams will also be valuable tools for conveying the significance of observations toward planning and prioritization.

Appendix D gives detailed observations, reactions, and recommendations made by the PA at the conclusion of the item-level assessment.

C. Intellectual Value

Over a decade ago, the International Association of Sound and Audiovisual Archives (IASA) released a report that stated it is "imperative" for institutions with audio holdings to have "a clearly defined hierarchy of priorities for digitizing to avoid, for example, stable materials being transferred first, while in the meantime, unstable materials deteriorate to the point where they become irretrievable."[5] Although the Ransom Center was pleased that Indiana University translated the vague concept of "prioritization" into a concrete model that informed the development of their MediaSCORE and MediaRIVERS tools, as previously stated, at the time of this survey's implementation, MediaSCORE and MediaRIVERS didn't provide an adequate solution for the Center.

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[4] Keene, Suzanne. "Audits of Care: a framework for collections condition surveys." In *Care of Collections*, ed. Simon J. Knell, 64. London and New York: Routledge, 1994.

[5] International Association of Sound and Audiovisual Archives. *Task Force to Establish Selection Criteria of Analogue and Digital Audio Contents for Transfer to Data Formats for Preservation Purposes*, October 2003.

After implementing PSAP, the project team needed to develop a method for capturing intellectual value that would not be too complex, take too long to complete, or require scoring each individual recording.

Determining intellectual value for sound recordings is particularly challenging; not only because it's a subjective process, but also because assessment requires enough information about a recording to make an informed judgment. Although the Ransom Center's recordings are cataloged, the descriptions are often taken verbatim from the labels on the recordings, resulting in descriptions that can be misleading, incomplete, inaccurate, vague, and sometimes non-existent. A great (and extreme) example is a description taken from a reel-to-reel belonging to film director Nicholas Ray: "Good sounds of feet in mud." Or, a description by poet, artist, and Andy Warhol-collaborator Gerard Malanga: "Drug party." Even with coherent and informative labeling, one cannot truly be certain of the content until the recording is actually played and heard. Because of the Center's policy of playing a recording only once—during reformatting—listening to each recording was not a practical or scalable option for this project.

The project team looked at the research value rubrics for both MediaRIVERS and Columbia University's AVdb assessment tool to see how either could be modified for the Center's use.[6] There were a number of survey design considerations:

- How should collections be grouped or defined? By format? By creator? By content?
- Should content genres within a specific recording collection be considered? For example, if the creator is Gloria Swanson, should all of her recordings have equal importance, regardless of the actual content, because they were Gloria Swanson's, resulting in one score for the entire collection? Or, should her singing recordings be valued differently than her appearance on a radio program, resulting in separate scores for each genre within the collection?
- In evaluating usefulness, is it important to consider what has already been digitized in a creator's collection? Is the Center interested in using completeness as a desirable condition for establishing a priority list? In other words, is the Center striving to preserve all recordings in a Collection, resulting in higher rankings for collections that are mostly digitized?

Developing a tool was an iterative process and after a lot of thought, discussion, testing with an internal focus group, and multiple versions, a survey tool was developed based on Columbia University's AVdb assessment (See Appendix E for an example of the Center's version).

Selecting staff to query in the survey was another issue that needed to be decided. The Ransom Center is fortunate to have a dedicated curator for most of the Center's primary collecting areas: Performing Arts, Film, Art, Photography, and Medieval Manuscripts; however, gathering data regarding research value presumes that the institution has staff with deep and broad knowledge of the collections, the creators, and their creative works; which may not be true for some of the more obscure individuals represented in the Center's collections. Additionally, two of the Center's curators have been in their positions for less than five years (and one for only a year), one curatorial position

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[6] MediaRIVERS: http://www.avpreserve.com/wp-content/uploads/2015/03/IU_mrivers_intro.pdf;
AVdb: http://library.columbia.edu/services/preservation/audiosurvey.html

is vacant, one curator retired during the project, and there is not currently a curator dedicated to literary collections (though literary manuscript collections are the source of approximately 69% of sound recordings). Further complicating issues, the type of collections the Ransom Center acquires often overlap and collections don't always fall neatly into one curatorial column. For example, writer David Mamet works in both film and stage, but his materials are housed in the Literary Manuscripts Collection. For these reasons, the project team asked each curator to score the collections falling under their purview; the Performing Arts curator additionally scored the literary collections, since many of those creators often overlapped in performance; and 11 staff from Archives Cataloging, Public Services, Exhibitions and Public Engagement, and Education units, as well as several Associate Directors, were also asked to score the literary collections. There was concern that curators might inflate the scores of collections under their purview, so the Project Manager and PA met with the curatorial team and created a PowerPoint presentation to guide curators on factors to consider when scoring a sound recording collection.

Over the course of handling and inspecting 7,568 audio recordings, the PA began to develop a deeper understanding of the relationship between the creative process and the creator's use of sound recording technology. The type of recordings at the Center tend to fall into two broad categories: 1) recordings that are integral to the creative process and 2) recordings that document some aspect of the creator's life and work. Examples that might fall into the first category are Norman Mailer's dictated edits to his novel *The Executioner's Song* sent to his secretary to transcribe; or, *New York Times* critic Mel Gussow's numerous interviews with emerging and established actors, writers, producers, and directors used for his *New York Times* column; or, the story sessions between screenwriter Ernest Lehman and director Alfred Hitchcock. Examples that might fall into the second category are Gabriel Garcia Márquez's Nobel Prize speech; or, novelist Denis Johnson's appearance on KCRW's *Bookworm* broadcast; or, the music photographer David Douglas Duncan listened to while working.

By noting the creators, subjects, quantities, and levels of degradation, the PA was able to make inferences that provided additional context to assist curators score recordings. By focusing not only on the content, but the physical carrier, critical questions arose such as: Why would a creator use a particular format of sound recording media? What can that decision tell us about the research value of a recording? What indications of past use and wear carry valuable information? How can that information be preserved or represented? How can representing that be incorporated into the preservation reformatting process? How should the Center evaluate dubs and copies versus versions—primarily based on labeling—through the prioritization process?

D. Analyzing Results

At the conclusion of the project, the Ransom Center used the Preservation Self-Assessment Program (PSAP) developed by the University of Illinois at Urbana-Champaign, as well as in-house tools, to assess and record the physical condition of 7, 568 individual non-commercial sound recordings and the research value for 224 collections of archival sound recordings (See Appendix F for various data reports).[7]

The good news is, results indicate that only 14% of the Ransom Center's non-commercial sound recordings are in "Poor" condition. The bad news is, only 0.7% of the sound recordings are in

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[7] For the purposes of this project, collections were defined by collection provenance. For example, the 648 recordings from the Norman Mailer papers constitute one collection.

"Good" condition. As feared, 86% of the sound recordings surveyed fall into the "Fair" category resulting in a gray area making condition-based prioritization decisions difficult.

When research value is considered, only 24% of surveyed recordings are actually right in the middle; that is, in "Fair" condition and with "Pertinent" research value. Recordings in "Poor" condition with "High" or "Unique" intellectual value makeup 8% of surveyed recordings; while 54% of surveyed recordings in "Fair" condition have "High" or "Unique" intellectual value. This additional research value information moves these from average to a higher priority.

Audiocassette tapes, reel-to-reel tapes, and microcassette tapes make up 85% of total items in the "Fair" condition category. The audio preservation community considers magnetic media to be at the greatest risk. A report estimates that cultural heritage institutions have a deadline of 2025 to preserve magnetic media; after that, the content may be lost.[8] This information perhaps moves all magnetic media from average to high priority.

Very brief overview of results by format:

Wax Cylinders
- 100% of them are in poor condition
- Make-up less than 1% of the entire collection
- Oldest format present
- No playback equipment in-house
- Biggest issues: Extremely fragile (some are broken), mold
- Were rehoused in proper cylinder boxes during the project
- If a priority, OUTSOURCE

Wire Recordings
- 100% of them are in poor condition
- Make-up less than 1% of the entire collection
- Refurbished playback equipment in-house
- Overall, a stable format
- Biggest issues: Breakage, loose winds, and tangling
- ARSC recommendation: "should be preserved by a professional"
- If a priority, OUTSOURCE

Phonograph Discs
- 83% of them are in poor condition
- Make up 5% of the entire collection
- 348 recordings are **lacquer discs**
  - "Archivists agree that lacquers represent the highest priority format for preservation transfer because of their inherent instability and the rapid, catastrophic way in which they deteriorate."[9]

[8] National Sound and Film Archive of Australia. "Deadline 2025: Collections at Risk." October 2015.
[9] Casey, Mike. *FACET: The Field Audio Collection Evaluation Tool*, 58, 2007.

- o Biggest issues: Plasticizer exudation (plasticizer is breaking down and develops on the surface as a white coating called palmitic acid), delamination, cracks, broken
  - o "Because of their unique content and fragility, they should be preserved by an experienced audio engineer whenever possible."[10]
- 23 are **shellac discs**
  - o Considered a relatively stable format
  - o Biggest issues: cracks; most in good shape
- 69 are **vinyl discs**
  - o Considered a very stable format
  - o Biggest issues: scratches
- Ability to determine correct stylus size may require advanced skills that may not be available in house
- Have the ability to reformat in-house, but determine what conditions the Center won't attempt (perhaps those with palmitic acid and certainly those delaminating) and outsource those

Open Reel-to-Reel Tapes
- 91% of them are in fair condition; 9% are in poor condition
- Makes up 28% and 3% (respectively) of the entire collection
- 997 recordings have a **cellulose acetate base**
  - o Biggest issues: Tape pack problems (popped strands, windowing, cinching), splice issues, dirty tape, cupping
  - o Some vinegar syndrome
  - o "IASA-TC 03 states that acetate tapes should be considered unstable and a high priority for copying."[11]
- 1146 have a **polyester base**
  - o Biggest issues: Tape pack problems (popped strands, windowing, cinching), splice issues, dirty tape, back-coated, warped reels
  - o Some Soft Binder Syndrome (requires baking tapes to remedy)
- 130 have a **PVC base**
  - o In relatively good shape
- 12 have a **paper base**
  - o Biggest issues: Tape pack issues (popped strands, windowing, cinching)
- Tape thickness from 1.5 mil (most stable) to 0.5 mil triple play (least stable) can impact stability
- Have the ability to reformat in-house
- Content should probably guide reformatting decisions
- If a priority, DETERMINE in-house or vendor (due to quantity)

Cassette and Microcassette Tapes
- **Cassette** Tapes:
  - o Biggest issues: Shell problems (cracked, deformed), lost pressure pads, dirty (dust, insect casings); mostly in good condition. Most issues can be resolved by "re-shelling"
- **Microcassette** Tapes:
  - o Biggest issues: Loose, twisted tape; mostly in good condition

[10] Brylawski, Sam, Maya Lerman, Robin Pike, Kathlin Smith, Eds. ARSC Guide to Audio Preservation, 21, 2015.
[11] Casey, Mike. *FACET: The Field Audio Collection Evaluation Tool*, 8, 2007.

- Have the ability to reformat in-house
- Content should probably guide reformatting decisions
- If a priority, DETERMINE in-house or vendor (due to quantity)

Compact Discs and MiniDiscs
- Biggest issue: Dirty, scratches, some disc rot
- Visual inspection of CDs isn't the best method of determining deterioration because damage isn't always visible; it can look fine, but won't play
- Because of inherent vice in the dye layer, data on optical media—especially recordable/re-writable—is subject to loss over time
- Have the ability to reformat in-house
- Content should probably guide reformatting decisions
- If a priority, handle IN-HOUSE

E. Future Recommendations

In November 2016, the project team presented the results to internal stakeholders, including the Associate Director and Head of Preservation and Conservation, Associate Director for Acquisitions and Administration, Head of Digital Initiatives, Associate Director and Hobby Foundation Librarian, and Head of the Audiovisual Lab. As a result of the meeting, leadership at the Center is interested in forming an interdisciplinary working group charged with identifying issues surrounding the use, preservation of, and access to the Center's sound recordings; formulating solutions; and identifying appropriate digitization projects and funding sources for preservation activities.

II. Accomplishments

At the conclusion of the project, the Ransom Center used the Preservation Self-Assessment Program (PSAP) developed by the University of Illinois at Urbana-Champaign, as well as in-house tools, to assess and record the physical condition of 7, 568 individual non-commercial sound recordings and the research value for 224 collections of archival sound recordings.

With concrete data about the Center's sound recordings at hand, the Center is well-positioned to begin formulating a sound recording preservation plan. To that end, an interdisciplinary team of Ransom Center staff met in December 2016 to discuss possible preservation reformatting projects. As an initial step, the Center has identified a collection of rare and unique open-reel tapes of high scholarly value that would be appropriate for the Council on Library and Information Resources' (CLIR) *Recordings at Risk* (RaR) pilot call for proposals. The Center also plans to submit an implementation proposal to the NEH in 2017.

Additionally, completing this survey forced the Center to update and improve its Sound Recording Database. The changes made to the format and condition fields allow for more robust data queries and an improved and more efficient workflow during cataloging. As an example, the Center is now able to submit a multifaceted query into the SRdb and retrieve relevant results; such as, identifying all open reel recordings with an acetate base exhibiting signs of Vinegar Syndrome and with a PSAP score of 45 (poor) and a research value of 4.8 (unique). This increased functionality has already been

of use on multiple occasions and will continue to be as the Center prioritizes recordings for digitization.

Furthermore, the project team experienced some unanticipated and indirect benefits of completing this survey. This project has brought the sound recordings collection to the forefront of the institution's attention. Though the Ransom Center has allocated resources to the cataloging and reformatting of audiovisual material, it has not been a strong focus of Center activities; the AV material that accompanies many archival collections is often seen as peripheral and not the primary "texts" of study. Throughout the process, the PA enthusiastically reached out across the institution and formed relationships with curators, conservators, public service staff, and interns in order to familiarize them with and promote this unique material. This intense focus can only help elevate the needs of the audiovisual material within the Center.

III. Audiences

Since this survey was a foundational project, there is not an external audience at this time. The project is intended to be the first of many that will enhance and broaden access to the Center's sound recordings, and will undoubtedly benefit researchers, faculty, students, internal, education and exhibition staff, as well as other artists interested in incorporating audio into their projects.

IV. Evaluation

Throughout the project, the Project Manager and Project Archivist conferred weekly to discuss progress, issues, and to informally evaluate the data, the process, the tool, and the overall experience. A question asked throughout the process was "is doing this survey worth the time?" Initially, the project team had concerns that the PSAP scores wouldn't result in enough differentiation to enable prioritization of recordings. Similarly, the project team was concerned that the results would only confirm what the sound recording preservation community has already determined about at-risk media formats; and therefore, wouldn't it have been advantageous to proceed with reformatting those specific formats without the delay of surveying?

The fact that almost every recording was reviewed individually has provided the Ransom Center a broader understanding of our sound recording collections, which is immensely valuable. Additional information about the recording carrier has been added to the database, which will allow the Center to query the data in robust ways. This has already been of great use as the Center begins to estimate the total hours of recording in need of reformatting.

One potential drawback is that the item-level inspection was conducted by a temporary staff position hired specifically for this project. Meaningful information gleaned from this intense study of the collection could have been lost when the project ended, unless a plan was created to transfer that information. That issue was an additional incentive for modifying fields in the Center's sound recordings database in order to retain everything learned about the recording during the assessment.

The project team also had concerns about determining the research value of recordings; not only because it's a subjective process, but also because assessment requires enough information about a

recording to make an informed judgment. In addition, the manner in which collections were defined for the purpose of scoring research value was problematic. Originally, the team planned to group collections by collection provenance (for example: Norman Mailer), then create subcategories of recording genres for the collection (for example: Norman Mailer's dictation recordings, Norman Mailer's appearance on radio programs, etc.). The idea was to acknowledge that simply because the recording belonged to an important creative person, doesn't mean that an individual recording may have enough value to preserve. After creating lists, for a variety of reasons, it became evident that strategy wasn't going work.[12] So, the project team indeed asked eleven curators and selected staff to score the entire collection of a creator. Going forward, the Center will need to determine how to prioritize within a collection. One idea is to approach reformatting based on subject areas as opposed to creator collections. That will allow the Center to focus on those recordings most at-risk and most valuable within a highly ranked collection.

This intense study also shed light on issues requiring future attention, including some which would have been beneficial to have addressed before the project commenced:
- Metadata issues (inconsistent practices over time have introduced errors in our metadata records, such as incorrect provenance, incorrect curatorial area assigned, etc.)
- Many commercial recordings were cataloged in the SRdb, often causing confusion (since these were not within the scope of this project)
- A previously unknown cache of non-commercial phonodiscs were located within commercial recordings and had never been cataloged

At the conclusion of the project, the team and internal stakeholders met to discuss the answers to the crucial questions: was this survey worth doing? and did it provide results that will help establish preservation priorities? Absolutely was the consensus. Gathering this data is necessary to fully understand the sound recordings collection. Because of the modifications made to the Center's sound recordings database, staff are able to complete very specific queries of the data, which will prove immeasurably valuable when prioritizing digitization and preparing future funding requests.

V. Continuation of the Project

Completion of this NEH-funded planning project was a necessary first step to establishing a sustainable, data-driven Sound Recordings Preservation Plan which builds upon the collection care and digitization standards already practiced at the Ransom Center. The ultimate goal of enhancing and expanding discovery of and access to a significant, but largely hidden and underutilized, collection of research materials will guide the Center from the planning phase to various implementation projects.

At the November 2016 meeting with internal stakeholders, the project team presented the survey results to various members of the Ransom Center's leadership team. In addition, the project team provided a macro-level view of the current status of the Center's sound recordings preservation

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[12] The project team often had difficulty assigning individual recordings to a content genre (examples include: Readings, Field Recordings, Lectures, Dictation, Correspondence, Rehearsals, Class Lectures, etc.) due to cryptic labeling on the recording and unfamiliarity with the creator and his/her work. Additionally, the lists were complex and time-consuming to complete and scoring would be challenging for the project team.

program and issues that need to be considered as the Center moves forward with future implementation projects. Many staff at that meeting were unfamiliar with the Center's sound recordings collection and current internal digitization practices, so the project team recommended that it would be advisable to assess the current audio digitization program and determine the Center's level of commitment to maintaining and appropriately staffing the Center's audiovisual lab. To that end, completing this survey has shed much-needed light on collection material that has been largely overlooked.

It is important to remember that this survey and the results are not frozen in time. The Center continues to receive audio recordings in the collections it acquires and it is unlikely each will receive the same level of detailed analysis and recording of condition. There is currently not a plan in place to capture this level of detail for recently acquired audio. Moreover, new recordings might be acquired that will shift the Center's priorities.

Furthermore, there are several categories of recordings that were not included in this survey project—either because they were outside of the original scope or they were discovered during the middle of the project—and they should be addressed in some fashion in the future.

A. Commercial Recordings
    Three significant commercial record collections are not fully cataloged. It's important to keep in mind that simply because these recordings aren't unique, they may still be rare and should perhaps be preserved. It may be worth researching to determine if they are duplicated in any major audio collections (such as the Library of Congress, etc.) to assess rarity.

B. Uncatalogued Items
    a. Items discovered after survey was in progress
    b. Items that were acquired after the survey concluded
    c. Approximately 1,821 Erle Stanley Gardner dictation discs are not individually cataloged in the SRdb

C. Dictabelts and Dictation Disc Formats (brand names: Audograph and SoundScriber)
    These formats are not included in PSAP survey tool; however, some condition information was recorded. Though often considered vinyl-grooved discs, these formats have unique characteristics that make them "at-risk" and they should be evaluated and included in any discussion regarding preservation.

D. Items already "Preserved"
    A basic assumption of the project was recordings that have been digitized by the Ransom Center are considered preserved and the condition of the original item is no longer relevant; however, that may not be the case. Since the AV Lab began reformatting sound recordings in 2003, standards, knowledge, best practices, and technical capabilities have evolved. The approximately 3,226 items already digitized and available via the SRdb may not be considered properly "preserved" according to current standards as defined by the audio preservation field. Some examples of problematic issues: capture at substandard bit and sample rates; certain handling and other best practices may not have been followed; equipment and hardware issues; inconsistent quality control practices; loss of preservation files; and varying levels of audio preservation knowledge and skill by student technicians.

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Digitized sound recordings remain hidden and inaccessible without quality metadata. In addition to reformatting prioritized audio recordings, the Center outlined additional steps in an effort to improve access. Some of these include:

- Correcting metadata issues (inconsistent practices over time have introduced errors in our metadata records, such as incorrect provenance, incorrect curatorial area assigned, etc.)
- Improving existing metadata by expanding descriptions following the cataloging template implemented by the Center's Metadata Steering Group
- Place a version of the Center's Sound Recordings database on the public research portion of the Center website, so the public can browse holdings remotely, thus allowing visiting researchers the opportunity to better plan their research visits (due to copyright restrictions, most audio content will necessarily be suppressed and only the metadata will be displayed)
- Exploring and experimenting with different technologies for generating content description such as crowdsourcing, user-supplied natural language tags, and speech-to-text software (such as the Pop Up Archive's voice-to-text transcription service or implementing recently released source code to pilot generating transcripts in-house)[13]
- Cataloging commercial recordings in the University Library catalog

The Center has already formed a small committee to identify appropriate reformatting projects and possible funding sources, including NEH as well as CLIR's Recordings at Risk program. As part of this, the Center will determine which formats and collections the Ransom Center will digitize internally and which formats should be outsourced to a vendor.

In the original grant proposal, the Center planned to complete a similar survey for moving image material. Due to a multitude of audio formats and the differing and complex ways audio can deteriorate, the Center believes that completing a survey of sound recordings was beneficial; however, for the moment, the Center has decided against completing a similar survey for moving image materials.

VI. Long Term Impact

Completion of this NEH grant-funded project is a necessary first step to building a sustainable, data-driven Audiovisual Preservation Plan which builds upon the collection and digitization standards already practiced at the Ransom Center. The Center is committed to preserving the most at-risk and most important sound recordings, enhancing discoverability, and within the confines of copyright law, making them as freely and openly available as possible (particularly for off-site patrons).

In order to accomplish these goals, the Center has already initiated activity to apply for CLIR funding under the Recordings at Risk program. Additionally, the Center intends to apply for a National Endowment for the Humanities implementation grant to complete the digitization of

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[13] Pop Up Archive has been used by other cultural heritage institutions, such as New York Public Library, to transcribe oral history recordings and have recently made their source code available at GitHub: http://blog.popuparchive.com/pop-up-shares-source-code-for-public-media-speech-to-text-software/, https://github.com/popuparchive/american-archive-kaldi/

priority sound recordings and undertake other activities to make the recordings more visible to the public. The Center also plans to submit a grant to the Grammy Foundation to assist with the cost of digitization.

VII. Grant Products

The Ransom Center intends to share its findings as a case study for other similarly-sized and resourced institutions interested in completing audiovisual collection assessments, but lacking a dedicated audiovisual archivist with extensive audio preservation experience. With that goal in mind, the Center will publicize the project and its results through appropriate professional conferences and scholarly publications such as the Society of American Archivists Recorded Sound Roundtable newsletter *Recorded Sound* and the Association of Recorded Sound Collections newsletter. In December 2016, the Center submitted a presentation proposal to the Association of Recorded Sound Collections (ARSC) for the upcoming 2017 conference to be held in San Antonio, Texas. In addition, the Center will produce a "behind the scenes" story for the Center's blog *Cultural Compass*. The Center is hopeful that other cultural heritage institutions will benefit from sharing best practices, workflows, lessons learned, and solutions and will follow recommendations outlined in the National Recording Preservation Plan.

VIII. Appendices

A. Timeline of Project
B. Comparison of Survey Tools
C. Screenshots of Enhanced Sound Recording Database fields
D. Visual Inspection by Project Archivist
E. Example of Ransom Center's Intellectual Value Survey
F. Survey Result Reports
G. Photographs

Appendix A. Timeline of Project

The following table outlines the project timeline and the major activities the Center accomplished.

Projected Deadlines	Activity	Notes
March 23, 2015	HRC Received Notification of award	Test and evaluate newly released collection assessment tools before position begins in Sept: PSAP, MediaRIVERS / MediaSCORE
September 4, 2015	Project staff began position	
Early September 2015	Began creating asset groups in MediaSCORE / MediaRIVERS.	MediaSCORE didn't function and a physical assessment score could not be calculated. MediaRIVERS did work and an intellectual score could be calculated. After emailing Mike Casey and AVPreserve for about a week, the Center switched to PSAP. This tool is not as robust and doesn't calculate intellectual value. Though MediaRIVERS did work, we didn't want to use more than one tool.
September-October 2015	Assessed wire recordings and wax cylinders	Overall Condition of Wire: Good

Overall Condition of Cylinders: Bad |
| **October-November 2015** | PA created mock-ups of new Preservation and Format tabs to modify SRdb for phonodisc and audiocassette formats

Assessed grooved phonodiscs | Overall Condition of Discs: Fair

An uncatalogued cache of unique instantaneous discs were discovered interfiled with the commercial phonodiscs. PA cataloged a few so they could be assessed, but it quickly became clear there were too many and it was taking away from the primary task. PM is cataloging these on an ongoing basis; as a result, most weren't included in the survey. |

November 2015-February 2016	Assessed cassettes and microcassettes	Overall Condition of Audiocassettes: Good Overall Condition of Microcassettes: Good
March-August 2016	Assessed open-reel magnetic media	Overall Condition of Reels: Fair
July 2016	Assessed optical media	Overall Condition of Compact Discs: Good Overall Condition of Minidiscs: Good
August 5, 2016	All preservation formats outlined in the grant proposal have been visually inspected, conditions recorded, and PSAP score calculated	
August 2016	Visual inspection of dictation discs (Audographs and SoundScriber) and dictation belts Begin creating a tool to capture intellectual values Met with internal focus group to get feedback Distributed tool and met with curators and other staff completing the survey	1,619 discs (plus 1,821 uncatalogued Erle Stanley Gardner discs) 379 uncatalogued dictation belts Condition: Fair
Late August 2016	Recorded preservation score for each collection into the SRdb	
September 2016	Made additional modifications to the SRdb and started analyzing results	
October-November 2016	Created various reports and analyzed findings; presented findings to internal stakeholders	

Appendix B. Comparison of Survey Tools

Tool	Institution	Assessment Level	Available	DOB	Cons	Pros
AvSAP	UI-UC	Item	yes, technically	2010	• Limited capability • Encouraged to use PSAP when released • Vague condition assessment • Clustering could make it difficult to make decision • Use value isn't factored into formula and is very basic: high, low, medium • Can't assess dictation belts • Many questions related to "Use Information" and "Storage Information" will be answered similarly	• Easy to use • Includes information kiosks • Includes moving image formats • Can do item or sample • Can host and modify • Can use hosted via web application
PSAP	UI-UC	Item	Beta: Feb 2015	in development	• Not yet available • Potentially same issues as identified with AvSAP	• Easy to use • Doesn't require knowledge of AV preservation • Will include additional formats, so may be able to use to survey moving image
FACET	Indiana Univ.	Collection	yes	2008	• Presupposes or works best if condition data	• Appears easy to use; haven't tested

FACET (cont.)					- has already been collected - Would have to subdivide collections multiple times to get worthwhile data - Can't assess dictation belts	- Good manual and guide - Known and respected in community - Robust
MediaRivers and MediaScore	Indiana Univ.	Collection; adaptable to Item	2015	in final testing	- Not yet available - Little documentation available	- Robust calculation of research value - Known and respected in community
AVDb	Columbia	Item	yes	2007	- Doesn't work well with current operating systems - Other practitioners had philosophical issues with how the score was derived - Didn't give proper attention to research value	Haven't tested
ViPIRS	NYU	Item--only magnetic media	yes	2006	- Requires playback of media - Only assesses magnetic media	Haven't tested

Appendix C. Screenshots of Enhanced Sound Recording Database Fields

Figure 1. Format screen for reel-to-reel tape

Figure 2. Condition screen for reel-to-reel tape

Appendix D. Visual Inspection by Project Archivist

The sequence for visual inspection was determined by the volume and/or complexity of an audio format: wire recordings, wax cylinders, phonodiscs, cassettes and microcassettes, reel-to-reel tape, optical media, and dictation recordings. This sequence was established in order to test the tool and workflow and to identify and work out any potential issues before getting too far into the assessment.

The visual inspection process began by establishing a workspace with a large table adjacent to the computer, nitrile gloves, a precision light source, and a loupe. For each format, a manageable group of recordings was brought to this workspace and each housing opened one at a time. The recording was visually scanned for physical issues, details recorded in the PSAP to generate a score, and observations entered in the database record for that recording. The process varied a bit for each format as challenges arose.

Wire Recordings

There are only 11 wire recordings in the Ransom Center's collection. Most are related in content, clean, and in proper housing. The main issue with these recordings are tangles, which pose a major challenge to the reformatting process.

Wax Cylinders

Wax cylinders were next for inspection, as there also are few in the Center's collection. The cylinders are all 6-inch dictation-style cylinders, designed to be re-recorded by shaving down the layer of wax with grooves. There was sparse information or historical documentation about these non-commercial cylinders. In order to better understand use and breakdown over time, the material composition was researched and recording devices in the Center's Personal Effects Collection that may have been used to record these cylinders were analyzed.

The process of assessing these cylinders started with removing them from their original boxes, homemade cardboard matrixes, and moving them into new housings specifically designed for cylinders. The cylinders were very dirty and many had mold bloom and white stearic acid powder covering the surface. Conservation treatment and special playback equipment will be required to preserve these recordings. These cylinders originated from an unprocessed manuscript collection, and are therefore deemed to have low research value; however, as a discrete component of that collection, these cylinders provide an intimate view to that creator's lifestyle and working methods in that—based on the labeling—some of them are field recordings from travel and conversations with collaborators.

Phonodiscs

Phonodiscs came next for assessment. Due to lack of standards and experimentation within the industry at the time of production, each non-commercial disc is unique. They're made of different materials and are of varying size, groove shape, equalization, and therefore each may have different deterioration issues. It was through observation of this diversity that the decision to modify the SRdb was made in order to record every feature of a recording.

The process of assessing discs involved using the senses with even more perception than cylinders; the smell, weight, and sound of a disc reveal the specs of that disc beyond what the eye can perceive. Nitrile gloves proved better than cotton gloves, allowing more sensitivity and precision while handling discs that were cracking, delaminating, or covered in palmitic acid. Surprisingly, overall many of the discs appeared to be in perfect, clean condition.

Cassettes & Microcassettes

Cassette tapes make up the bulk of the Ransom Center's audio collection. Cassettes are ubiquitous in collections because they are purchased in bulk packs and they are easy to use. The challenges with non-commercial cassettes in large quantities are they are often low-quality recordings, there is minimal documentation on the cassettes due to lack of space, and often there's only a few minutes of actual recorded content or one side is left unused. A benefit to having large quantities of the same tape brand in a collection is that information about one tape can often be applied to all tapes of the same brand in the collection, allowing batch-editing of many SRdb records with additional edits needed only for those rare few tapes whose condition diverged from the others. Since the tape is enclosed in a shell it is difficult to detect issues until the tape is set in motion. The cassette enclosure also creates a welcoming microclimate for pests and mold. The most frequently encountered issue with cassettes relate to failing components, which is remedied by simply transferring the tape to a new shell.

The challenges posed by microcassettes are due to physical compromises that permit miniaturization. For example, the tape itself is such a thin ribbon that it twists very easily, and documentation is even less prevalent because the small surface of the object prohibits lengthy descriptions. The process of assessing the cassettes took a long time due to quality and the described challenges, but it reinforced the existing impression that preservation is manageable in-house.

Reel-to-Reel Tape

The assessment of reel-to-reel tape took much longer than expected for a number of reasons: tape was often loosely falling off the reels in their boxes, many boxes revealed old infestations of mold and needed to be quarantined, vinegar syndrome tapes needed to be separated from other tapes, the database records of some reels had cataloging issues, and reel-to-reel tape has many more intricacies and inherent problems than other audio formats. The Ransom Center's collections include all iterations of backing materials used in quarter inch tape: paper, acetate, PVC, and polyester. Since creators often reuse reel boxes, one can not assume that the brand information on the original box refers to the tape that is contained in that box. Through inspecting hundreds of reels, the PA became accustomed to recognize traits of certain tape stock, including which was likely to be too sticky for playback without preparation. Often the most problematic tapes are those which were originally marketed as higher quality.

Optical Media

Optical media posed a challenge for visual inspection because errors that deny playback are often invisible. Overall, CDs and minidiscs were very clean with no delamination. The materials that posed the most challenge were duplicates of magnetic media made in-house during the 1990s, when optical media was considered a preservation format. This challenge did lead to the important discovery that if a computer cannot read an audio CD, often a more powerful CD player-recorder used in an audio engineering studio was able to play the CD.

Dictation Formats

Dictation formats were the last to receive visual inspection because they are not included in the PSAP survey tool, but because the Ransom Center has a large volume of Dictabelts and SoundScriber and Gray Audograph discs, the PA completed a visual inspection and recorded condition information in the SRdb. Dictation formats are quite susceptible to damage and failure, but very little research and documentation about format characteristics and deterioration problems has been published. The Center's dictation belts are leeching bright red dye onto their archival envelopes, are extremely warped transparent thin vinyl discs, and some discs are scratched with what appear to be intentional marks to possibly render them unplayable. No Audiovisual survey tool considered for this project included this format. With the lack of guidance and obscurity of the format as well as the quantity of output from those who did use dictation, dictation recordings present an opportunity for more audio preservation research.

The audio preservation field has not resolved certain preservation challenges, such as the lack of standards for specific tasks, that could potentially stymie the ability to treat and preserve certain sound recordings. As already mentioned, there is little published literature about dictation discs and belts and these are frequently not included in survey tools. Additionally, an approved standard cleaning method for removing palmitic acid has not been recommended in the literature; the methods are often treated as "trade secrets" or are idiosyncratic. Additionally, little is published about best styli to use for playback of aluminum discs or re-equalization best practices. In an attempt to generate a discussion and reveal best practices, the PA initiated a conversation on the ARSCLIB listserve inquiring how other institutions house broken glass and shellac discs. Quite a few repositories shared their methods, often including photographs, which proved helpful and offered an opportunity to work with the Ransom Center's Preservation Department to create similar housings.

Appendix E. Example of Ransom Center's Intellectual Value Survey

Film Collection

See last page for guidance in scoring.
Skip any collection unfamiliar to you.

Format	Genre
	
	Use = # Aeon transactions from 8/1/10 - 8/1/16
	EAD = Is there a finding aid online?
	Dig = How many recordings have already been digitized
		Score

Example Collection (17) Use=126 EAD=yes Dig=9		
C, CD	Stage Performance, Research material	*5*
Allen, Lewis and Jay Presson Allen (17) Use=4 EAD=no Dig=0		
C	Stage Performance	
Allen, Lewis M. (31) Use=5 EAD=no Dig=3		
C, D, R	Stage Rehearsals (using published music) Film soundtrack Unknown	
Allen, Woody (1) Use=84 EAD=yes Dig=0		
D	Radio programs / Interview	
De Niro, Robert (8) Use=956 EAD=yes Dig=1		
C, CD	Bronx Tale focus group Research material Production material/ film soundtrack	
Lehman, Ernest (2) Use=266 EAD=yes Dig=67		
D	Theater rehearsals Music / Film soundtrack	
Ray, Nicholas (16) Use=29 EAD=yes Dig=247		
R	Production material / source material / field recordings	

Category	Key Questions	Action
Research Value	Does the collection: • Include materials whose usefulness for scholarship is expected to be long-term and continuing? • Include material on topics currently receiving high attention from scholars? • Include material in areas where scholars are just beginning to take interest? • Relate to topics previously documented primarily in paper? • Include material in areas otherwise not well covered? • Contribute to the overall understanding of the subject? • Serve as an important piece in a constellation of associated collections or substantially reinforce important collections? • Contain materials that provide unique insight into the topic?	Assign points on a 1-5 scale: 1 = None 2 = Limited 3 = Pertinent 4 = High 5 = Unique

Points	Research and Instructional Value Statement
4.5-5	*Unique*: The collection is unique in the quality, quantity, and value of materials about a subject that is of great research interest. Anyone interested in the subject covered in the collection would of necessity have to make extensive and primary use of the collection
3.5-4.4	*High*: The collection is of high research value: it contains quantities of unique and/or essential materials on a significant subject, thereby making it a priority for any research on the subject.
2.5-3.4	*Pertinent*: The collection has pertinent research value: it deals with a subject of proven interest to researchers and has the quality and/or quantity of materials sufficient to warrant consultation by a researcher.
1.5-2.4	*Limited*: The collection has limited research value either because of the topics covered or the paucity of information content and/or quantity/quality of material
0-1.4	*None*: The collection has no research value.

* Based on Columbia University's Audio/Visual Survey Tool (AVDb) available at:
http://library.columbia.edu/services/preservation/audiosurvey.html

Appendix F. Photographs

Image 1: Detail of Wax Cylinder
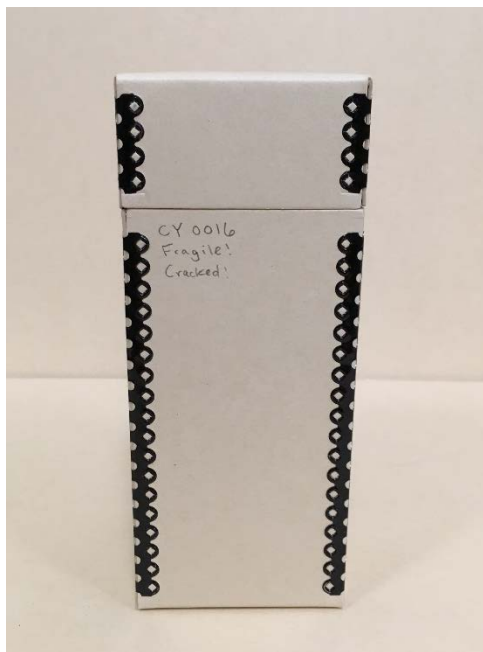

Image 2: Original housing for Wax Cylinders

Image 3: New Housings for Wax Cylinders

Image 4: New Housings for Wax Cylinders

Images 5 and 6: Lacquer disc and detail

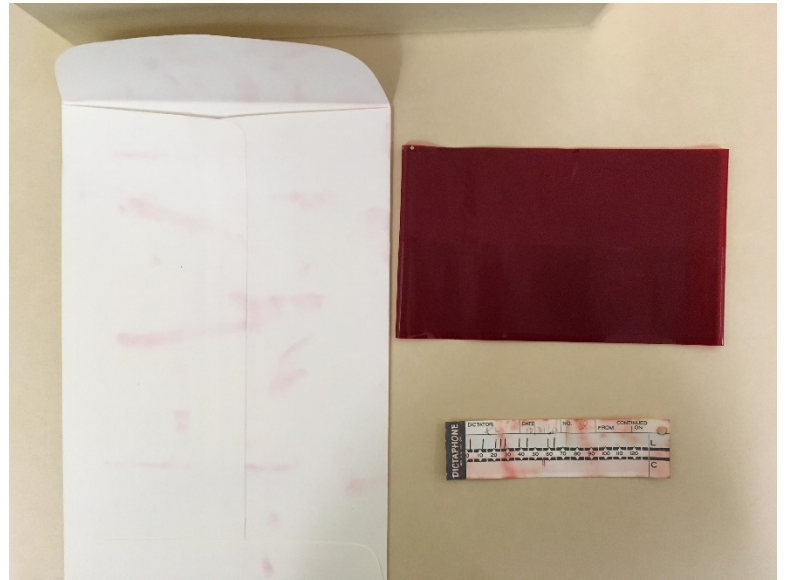*Image 7: Wire recording*

Image 8: Detail of the same wire recording

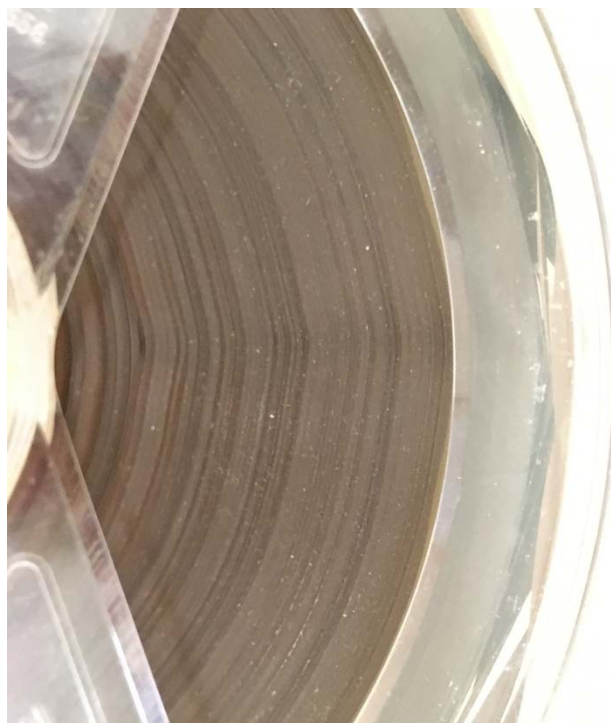*Image 9: Dictabelt. Notice leeching red dye migrating to acid free envelope housing*

Image 10: Dictabelt. Notice leeching red dye migrating to acid free envelope housing and original label
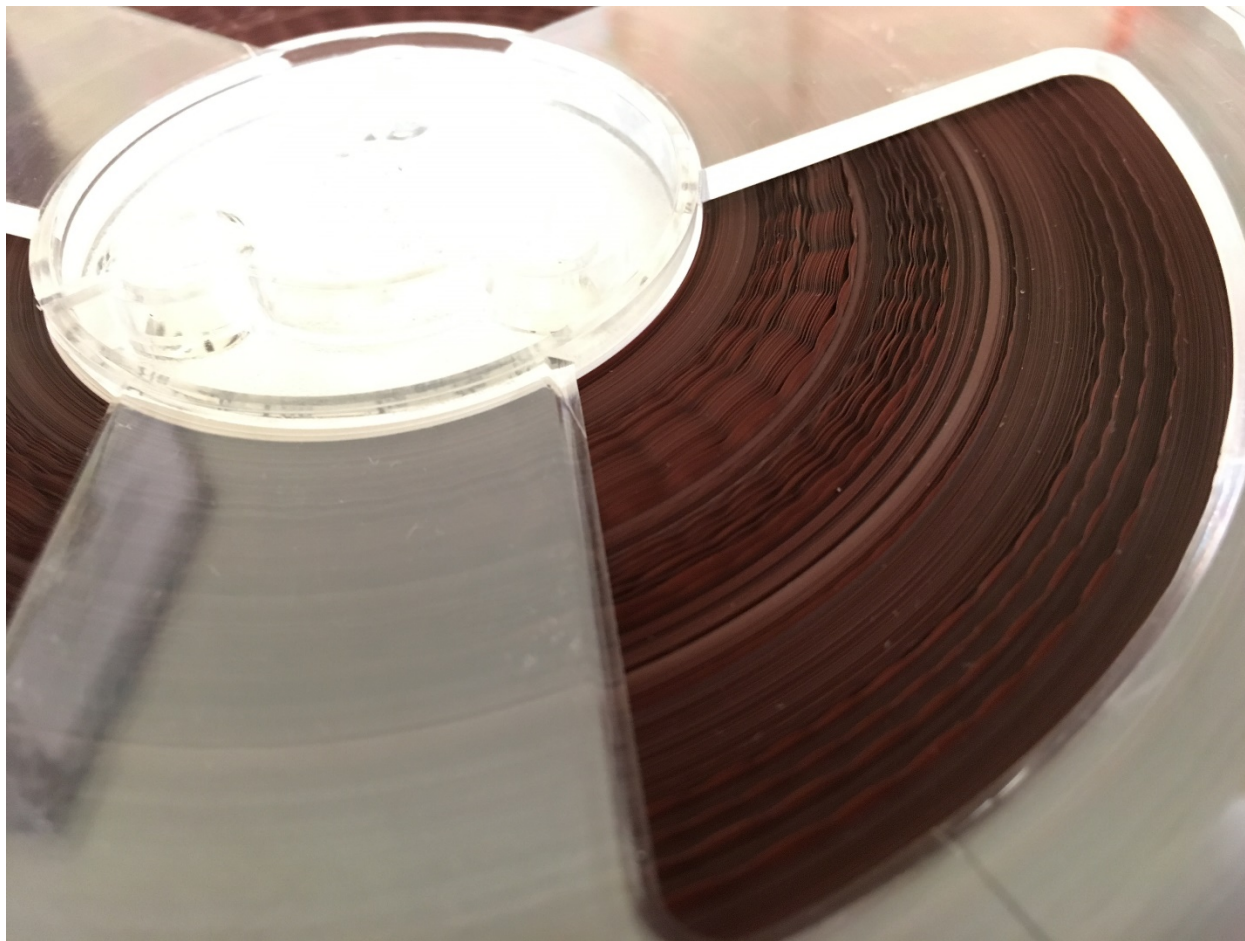

Image 11: Warped Dictation Disc

Image 12: Reel-to-Reel tape

Image 13: Reel-to-Reel tape detail

Image 14: Reel-to-Reel tape detail