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An Evaluation of the University of Illinois Experimental Music Studio's Tape Collection

This study seeks to understand the organization and context of the historic University of Illinois Experimental Music Studio's (EMS) tape collection and to assist in the long-term preservation of those materials. For this study, I spent seventeen weeks documenting the collection before it was moved from the EMS into the University of Illinois Archives.

Introduction

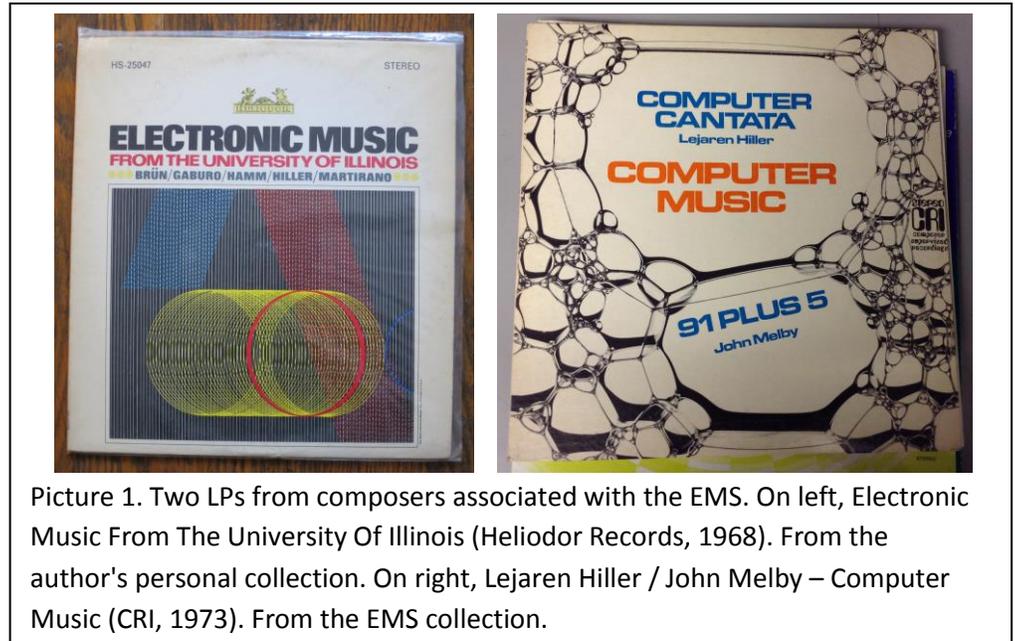
After the Second World War, new technologies led to unprecedented musical exploration from composers located around the world. The first recognized electronic music studio was organized by Pierre Schaeffer in France, during the span of 1948-1951. Other international studios soon followed. In 1955, the Columbia-Princeton Electronic Music Center was established as the first electronic music studio within the United States.

The technology most responsible for the growth of the electronic music studios was magnetic tape recorders which was a medium that had been greatly refined within Germany during the war. Magnetic tape was being utilized by composers to record sounds which could then be manipulated through looping, speed adjustments, playback direction changes, and outboard processing techniques. The tape could also be physically "spliced" with the aid of "splicing tape" so as to allow the composer to edit the composition in a nonlinear fashion. These individual tape "tracks" could then be added together and supplemented with other content and recorded onto a master tape. This early music was called *Musique Concrète* or *Elektronische Musik* based on the characteristics of the composition and the studios in which those composition were created. Today, this music is broadly referred to as "tape music" or "electroacoustic music."

During the 1950s and throughout much of the 1960s, electroacoustic studios located within the United States were almost exclusively associated with universities. These studios and universities eventually became repositories for magnetic tape recordings. Unfortunately, as time passed, age-induced physical deterioration of these magnetic materials endangered the integrity of those recordings. As the Association for Recorded Sound Collections (2015) notes, magnetic tape is highly susceptible to various deterioration issues even if stored in the most ideal conditions (pp. 54-56). Haus and Pelegrin Pajuelo (2001) argue, based on their own work in electroacoustic tape archives, that many old electroacoustic recordings are now at risk due to issues of age-based deterioration. Furthermore, these risks are often unrecognized or unaddressed by archivists due to the large volume of recordings that are held in many

electroacoustic archives (see also Teruggi, 2001; Zattra, Poli & Vidolin, 2001; Polferman, Sheppard & Dearden, 2006). The risk associated with these materials is due to the deterioration of the chemical composition of the magnetizable coating on the tape and the weakening integrity of the plastic film that the coating is placed upon. These deterioration issues are exacerbated in non-ideal environmental conditions. Unfortunately, in even the most ideal environmental

conditions, magnetic tape based recordings will eventually fail (see Association for Recorded Sound Collections, 2015 pp. 24-25). Therefore, the only real preservation strategy is to try to prolong the life of the tape through proper care while also creating a digitized copy of that recording for future use.



Picture 1. Two LPs from composers associated with the EMS. On left, Electronic Music From The University Of Illinois (Heliodor Records, 1968). From the author's personal collection. On right, Lejaren Hiller / John Melby – Computer Music (CRI, 1973). From the EMS collection.

Unfortunately, issues of preservation in electroacoustic studios may be compounded when a repository also stores original tape loops or spliced performance tape segments. Splicing tape can lose its ability to bind the tape segments together requiring extra time and specialized labor to repair.

For these reasons, archivists within an electroacoustic archive must have the knowledge to work with magnetic audio tape, the ability to recognize what materials are most in need of preservation, and the ability to implement a successful long-term preservation and access plan.

The University of Illinois Experimental Music Studio

The University of Illinois Experimental Music Studio (EMS) was created in 1958 by composer Lejaren Hiller who served as its Director until 1968. The period from 1968-1975 saw several different Directors. In 1976, Scott Wyatt was hired and would serve as Director of the EMS for forty years. Scott Wyatt was succeeded by Dr. Eli Fieldsteel in 2016.

In the ensuing decades following the inception of the EMS, many notable composers came through the program, either as students or faculty. Such composers included (but are not

limited to) Herbert Brun, Kenneth Gaburo, Ben Johnston, Salvatore Martirano, and David Rosenboom. From its inception, the EMS generated commercial releases both through individuals associated with the department or as a university department as a whole (see Picture. 1).

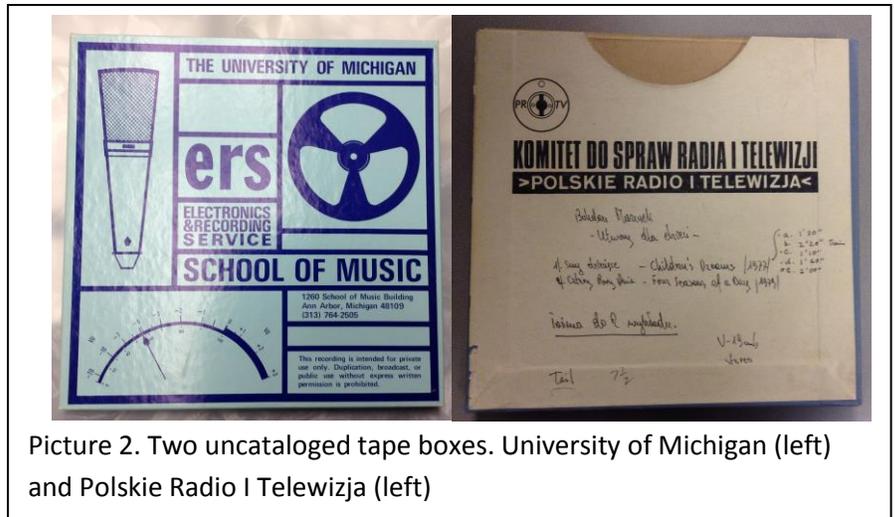
Aside from musical compositions, the EMS was also active in creating and utilizing

unique electronic instruments and technology, often in association with University of Illinois engineers and computer scientists. For example, Lejaren Hiller's Illiac Suite, written in 1956, utilized a newly developed computer at the University of Illinois, the ILLIAC. The Illiac Suite is often credited as being the first piece of computer music (Chadabe, 1997; pp. 273-274). Additionally, James Beauchamp's Harmonic Tone Generator, developed in 1964, was one of the earliest voltage controlled synthesizers. In 1969, Salvatore Martirano began constructing his unique instrument, the Sal-Mar Construction. Built partially from the circuit boards of the ILLIAC II, the Sal-Mar Construction was one of the first musical instruments to use modern transistor-transistor logic (TTL) digital circuitry (see Chadabe, 1997; pp. 289-290).

The EMS Audio Collection

The EMS' audio collection began to be built shortly after the program was started. This practice was continued when Scott Wyatt took over the EMS. Scott accumulated most of the materials in the collection. The collection was meant to be utilized for pedagogical purposes, to be played during specific live performances, or as a general repository for recorded materials. Scott continued to grow the tape collection until digital recording technology began to replace analog tape around the mid-1990s.

Many of the tapes within the collection that were not generated from within the EMS were gifted by other musicians from outside the University of Illinois. Some of these tapes were given in person when that composer came to campus, some were exchanged at performances and symposiums, and others arrived via correspondences in the mail. The tape cases in the collection reveals many different studio sources (See Picture 2).



Picture 2. Two uncataloged tape boxes. University of Michigan (left) and Polskie Radio I Telewizja (left)

Transition in the EMS and a Transition of the EMS Collection

In 2016, Scott Wyatt retired and the new Director of the EMS, Dr. Eli Fieldsteel, came into the program. Although Scott had done an extraordinary job of growing and caring for the collection, the tape collection was no longer being utilized and the tapes were taking up a large amount of limited space. Additionally, many tapes were not immediately playable, as the paper tape leader¹ needed to be replaced before playback. This could be especially time consuming as many of the tapes had leader separating all of the individual compositions.

Of greater concern though, were the issues regarding the deterioration of the actual magnetized tapes. Because all of the tapes in this collection were at least a few decades old, there was a concern regarding how much longer those tapes would remain playable.

With these factors in mind, a decision was made amongst parties that the tapes should be accessioned to the University of Illinois Sousa Archives and Center for American Music. The Sousa Archives and Center for American Music already had a large collection of EMS materials including the unique instruments of Salvatore Martirano and James Beauchamp and the various collections of numerous EMS faculty.

During my seventeen week involvement with the EMS, I served as a liaison across departments, cataloged the content of the collection, provided an item level inspection for specific items in the collection, and eventually helped move the physical collection to the Sousa Archives.

Arrangement of Collection

The EMS tape collection was located in a ten foot by six foot temperature controlled storage closet that also shared space with other EMS materials (such as cables, boxes, cleaning supplies, and other assorted materials). Within that closet space are four metal shelves that are six feet high by about thirty-four inches long. Each shelf has six metal shelf spaces (see Picture



Picture 3. The three metal shelves which tapes are stored on (two to the left with a few tapes on the shelf straight back).



Picture 4. Tape sitting on shelf with red catalog number and tape name in black.

¹ Leader tape is nonmagnetic paper which is used at the beginning or end of the tape reel or to delineate between selections on the tape. Leader tape is applied via an adhesive such as splicing tape.

3). Three of those shelves are along the left side of the closet space (looking through the door). One shelf is on the far end of the closet. All of the tapes were on three of those shelves. The tapes took up about twenty-four linear feet of space once they were boxed up for the move.

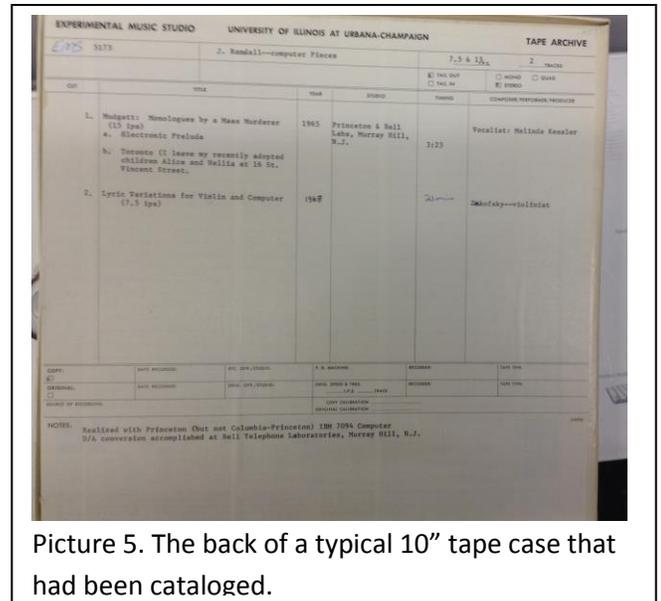
Written on the spine of about 60% of the 457 overall tapes is a catalog number and a tape name (see Picture 4). For the cataloging classification system, all numbers all start with “5” and are followed by three additional numbers (5001, 5002, etc.). All of the cataloged materials were in 10” tape boxes (mostly Scotch 206 or Scotch 207 tape boxes). The tape brand listed on the box is not representative of the tape brand that was used.

Written on the back of the tape boxes is information about the recording (see Picture 5). This descriptive content is often typed out but occasionally written by hand. These tapes were easily accessible on the shelf and were organized from left to right.

An index-card catalog system was created and utilized by Scott Wyatt. Those index cards contain composition, composer, and playback information. These catalog cards were stored in a wooden box (see Picture 6). Three manila folders within the archive also had information regarding the cataloged collection. These manila folders have been scanned and serve as a supplement to this report.

Although there were a few non-cataloged tapes in 10” boxes filed along with the cataloged collection, most of the non-cataloged tapes were in 7” boxes and were less physically accessible (due to those tapes often being stacked on top of each other and on the lower shelf) (see Picture 7). Some of these tapes were grouped by author but often, the overall organization of these materials was unclear.

Some of these non-cataloged tapes arrived as gifts from other composers but many were created within the EMS. This collection represented a wide range of materials from different studios and composers. Some of the material contained popular compositions that were probably used for pedagogical purposes, some are from external studios (probably gifted to the collection but never cataloged), and a few tapes seem to be projects of students who took



Picture 5. The back of a typical 10” tape case that had been cataloged.



Picture 6. The wooden box in the EMS that holds the catalog cards.

classes at the EMS. The bulk of these materials are in 7" boxes with handwritten notes on the back.

Presumably, the cataloged tapes were more important to the EMS as they were the recordings that were much more easily accessible and had a cataloging schema assigned to them.

Method

For this project, I spent seventeen weeks working with the collection and those people associated with it. The overall goal of this project was to understand and document the EMS collection before it was moved. Other goals included the implementation of a long term preservation plan for these materials while helping to preserve the institutional memory of the EMS.

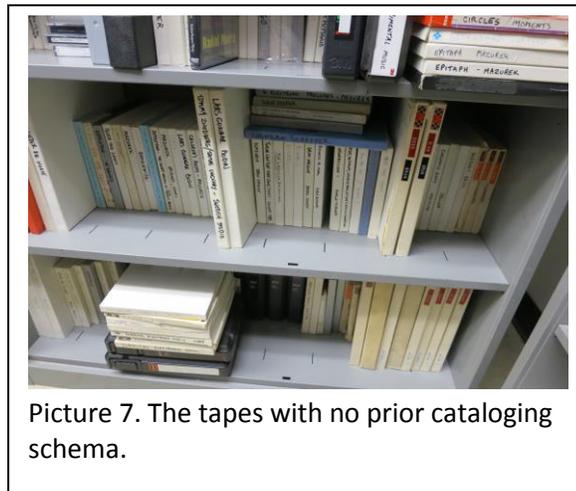
To assist in processing this collection, I created a Google Form to record all of the data from the tape cases as well as data regarding the physical condition of each item. I also recorded information regarding the ephemera found in the tape boxes, the location of materials, and my own general notes. See the Appendix for a list of data that was collected through this form. This data was exported into a spreadsheet and converted to a simple database so the information could be easily analyzed through SQL commands.

Although this study is primarily interested in the tape collection, I also cataloged other ephemera, musical scores, digital audio tapes, LPs, videocassettes, and optical discs. That said, the overwhelming majority of items in the collection were magnetic tape recordings.

Findings

There are 457 magnetic tapes within the EMS archival collection. Of that collection, 274 tapes were part of the original EMS catalog schema. Within the EMS collection, 133 tapes are acetate, 291 tapes are polyester, and 33 tapes have both polyester and acetate on the same reel. Of these acetate tapes, ten are clearly marked as being master recordings.

Many of the tapes were marked as being copies or master recordings on their boxes although the majority of tapes had no provenance information on them. I observed that these tapes without any provenance markings were often copies of previously recorded materials. Of these recordings, 38 tapes were clearly marked as being master recordings. Within these master recordings, fourteen tapes were composed of acetate, one tape was a mix of acetate and polyester, and the rest of the recordings were polyester based. From this collection, the provenance of the materials is as follows:



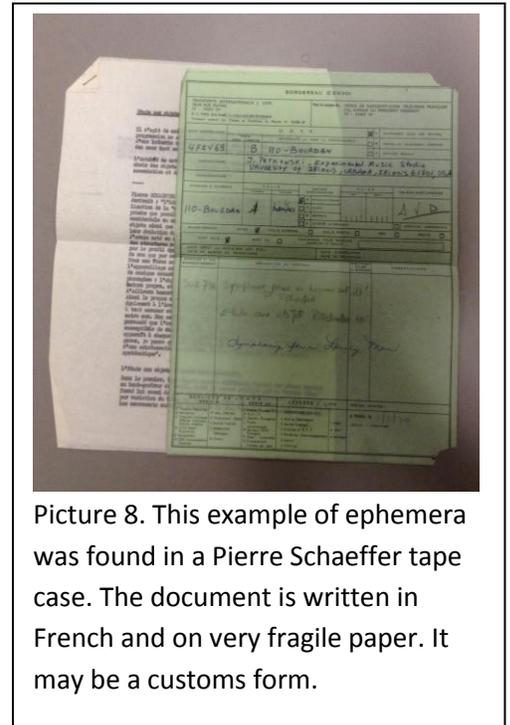
Picture 7. The tapes with no prior cataloging schema.

Provenance of Recording	Number of Tapes in Collection
Unknown/Not Specified Recording Source (Presumably copies)	346
Copies	65
Master Recordings	38
SubMaster Recordings	4
Backup Master Recordings	2
Performance Master Recordings	1
Dubbing Master Recording	1

Upon an item level inspection of each tape, ninety-six tapes were determined to have an immediate preservation concern. These tapes exhibited signs of uneven tape spooling, wrinkled or damaged tape, and other possible signs of deterioration. Of these tapes that were deemed the most in need of preservation consideration, eleven of them were marked as either being a master recording or a backup master recording.

The tapes represent various tape speeds, track types, and channel configurations. Within this collection, 443 tapes are ¼” tapes and fourteen are ½” tapes. Within this collection, eighteen tapes are indicated as being quadraphonic sound recordings. The rest of the tapes are either mono or stereo recordings. The tapes utilize various tapes speeds (mostly seven and a half inches per second and fifteen inches per second). Forty-three of the tapes actually change speeds based on the individual song selection on that tape.

Although the vast majority of cataloged tapes are in Scotch 206 or Scotch 207 tape boxes, those labels are not necessarily representative of the actual manufacturer of the tapes inside those boxes. In fact, most of those tapes, according to Scott Wyatt, are Scotch 201 or 202. Such tapes are made of acetate and therefore a particular



Picture 8. This example of ephemera was found in a Pierre Schaeffer tape case. The document is written in French and on very fragile paper. It may be a customs form.

preservation concern based on their inability to be baked,² which is a common tape preservation strategy.

Forty-seven different international recording studios were mentioned on the tape boxes with many more studios being represented (but not explicitly mentioned on the tape case).

Of the tapes in the collection, sixty-one tapes had some ephemera included within the box. These materials were often information that had been written by the composer or from someone inside the EMS. Ephemera also included customs information, live performance notes, or correspondences (see Picture 8). This ephemera presents another preservation challenge as some of these paper materials are fragile and also deteriorating due to age.

I was unable to determine the amount of tapes that were meant to accompany live performances but I suspect there are at least four or five recordings (based on the content written on the back of the tape cases). There are no first generation tape spliced materials or original tape loops within the collection. According to Scott Wyatt, it was the policy of the EMS for the individual composer to retain this material.

Conclusions

This tape collection represents decades of accumulating materials and interactions with musicians. As this collection is moved and the EMS encounters its own transitions, I believe that by understanding this collection one can better understand the legacy of the EMS and the history of electroacoustic music as a whole. I also believe that by collecting this information, archivists can make informed preservation decisions about these materials.

Because of the cultural significance of the collection, care must be taken in its preservation. Such a collection presents considerations for what should take preservation priority. The most likely candidate for preservation action and digitization would be master recordings that were generated at the EMS, especially those that have been marked to have condition concerns.

That said, it seems possible that some of the materials that are either unmarked or marked as being a copy could also be of significance. In fact, it is possible that such recordings might be the highest quality recording that currently exists of that material. Therefore, it should not be assumed that these materials are not a preservation priority.

This study represents the earliest stages of processing the EMS collection. The majority of work still needs to be done. Tapes need to be digitized, preserved, and accessed. Copyright issues need to be evaluated. This report was meant to provide a description of how the EMS

² Tape baking is a method in which a magnetic tape is placed in a specialized oven. The baking process temporarily helps with issues of sticky shed and makes the tapes temporarily playable with little actual deterioration of the sound quality.

materials were collected and arranged. It is my hope that this information will provide a better understanding of how such studios operated.

References

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- Chadabe, Joel. (1997). Electric sound: the past and promise of electronic music. Upper Saddle River, N.J: Prentice Hall.
- Polferman, R.S., Sheppard, D. & Dearden, I. (2006). Time to re-wire? Problems and strategies for the maintenance of live electronics. *Organised Sound*, 11(3), 229–242.
- Teruggi, Daniel. (2001). Preserving and diffusing. *Journal of New Music Research*, 30(4), 403–406.
- Zattra L, Poli G, & Vidolin A. (2001) Yesterday Sounds Tomorrow. Preservation at CSC. *Journal of New Music Research*, 30(4), 407–413.

Appendix:

Data Collected via Form:

Catalog Number
Format
Name on Case
Medium of material (acetate, polyester, etc.)
Title (on back of tape case)
Notes Regarding Condition
Immediate Action Required?
General Notes
Tape type
Tape material (acetate, polyester, both)
Speed of Recording (Reel to Reel Only)
Provenance
Source of Recording
Studio
Tracks/Recording Info

Track Info (i.e. 2 Tracks, 4 Tracks, etc.)
Originating Tape Recorder Info (on reel to reel case)
Notes Regarding History, Recording, EMS, etc.
Notes Regarding Provenance/Uniqueness
Copyright/Publishing Info on Case
Notes on Case
Selection # Composer/Performer/Producer
Selection # Title
Selection # Year
Selection # Timing
Selection # Notes