Older Technological Sound Recording Mediums:

Problems of Preservation and Accessibility

By

Justin Bouchard

A Thesis or Project
Submitted in Partial Fulfillment
Of the Requirements for the Degree of
Master of Science in Interdisciplinary Studies
At the State University of New York at Fredonia
Fredonia, New York

December 2012

[redacted]

Bruce N. Simon, Ph.D.
Thesis Advisor
Department of English

[redacted]

James A. Davis, Ph.D.
Thesis Advisor
School of Music

[redacted]

Kevin P. Kearns, Ph.D.
Associate Vice President for Graduate Studies & Research

Justin Bouchard

Dr. Bruce Simon/Dr. James Davis

INDS 690-Research

11 December 2012

Older Technological Sound Recording Mediums:

Problems of Preservation and Accessibility

The evolution of sound recording technology has made capturing and preserving audio simple. So why is our musical heritage largely inaccessible or unavailable? The art of preserving a recording of sound and playing it back has only been around since 1877. According to the St. Louis Symphony Orchestra artistic advisor and creative chair Tim Page: "It is sometimes said that the human race is losing its sense of the past" (5). It would be terrible if we lost nearly a century and a half of our past recorded musical heritage, preserved on various mediums. Many, including cylinders and early 78 discs, are decomposing and/or broken. Due to strict and muddy United States copyright laws, many early sound recordings have disappeared forever. Books, films, even sheet music published before January 1, 1923 are available in the public domain in the United States. The same cannot be said for sound recordings made before January 1, 1923. Until February 15, 2067, no sound recordings made before 1972 will enter the public domain in the United States. By the time of the copyright expiration date, many of our earliest sound recordings may be lost due to deterioration. This date may well be "the day the music died" (Sharp 310). Despite these obstacles, many sound archivists and engineers have taken matters into their own hands to preserve our musical past. Using state of the art digital technological

means, these individuals have made a small sampling of sound recordings available from almost total obscurity and disintegration. From these efforts, a minute window of our past has been made accessible for both present and future generations, but a larger portrait may be needed.

This paper spans a time period from the first American copyright legislation in 1790 until 2011, when the European Union passed sound recording copyright extension legislation, and is divided accordingly into five chapters, with sections, as follows:

I. The First Century of Sound Recording highlights a century of sound recording technology, from Edouard Leon Scott de Martinville's 1857 invention of the phonautograph to the introduction of commercial magnetic tape in the recording studios in 1949.

    a. *The Early Pioneers of Sound Recording* focuses on Edouard Leon Scott de Martinville's phonautograph, Charles Cros' early 1877 theoretical phonograph sketch, and Thomas Edison's late 1877 invention of the phonograph. Other inventors that improved upon both Martinville's phonautograph and Edison's phonograph inventions will also be mentioned.

    b. *The Commercial Sound Recording Industry* spans from the incorporation of the American Graphophone Company in 1887 to 1949, when the major recording studios had a magnetic tape recorder in place of master disc recording machines.

II. The Preservation and Restoration of Cylinder and Disc Recordings begins with the technical aspects of early preservation and analog restoration efforts from the 1960s to modern, twenty-first century digital methods.

a. *The Birth of Sound Restoration* focuses on early analog and digital attempts in the 1960s and 1970s to both preserve and restore older pre-magnetic tape recordings.

b. *Preservation and Restoration* compares and contrasts the present preservation and restoration efforts of Ted Kendall and Richard Martin, two sound engineers dedicated to both digitally archiving and making our sound recording history available to the public via sonically cleaned digital formats.

III. Sound Recording Preservation and Accessibility Problems examines the political background into both American and European copyright law regarding sound recordings and recent copyright extensions on both sides of the Atlantic.

a. *The History of American Copyright Law* focuses on an examination into the history of American copyright law from the first passage of a Congressional copyright act in 1790, to a study conducted in 2009 by Congress for the Copyright Office concerning the welfare and accessibility of pre-1972 sound recordings.

b. *American Music Copyright Extension* presents the extension of music copyright in the United States since 1831, ending with the Sonny Bono Copyright Term Extension Act of 1998, which officially closed the public domain until 2019.

c. *European Music Copyright Law* deals with the copyright and public domain aspects of sound recordings in Europe, beginning in 1911 with the first major revision of British copyright law regarding mechanical sound reproduction, to the late 2011 European Union decision to pass copyright extension legislation, lengthening the public domain status on 1960s sound recordings.

IV. Culture and Older Sound Recordings presents the question of why our sound recording culture is inaccessible and how large media corporations are making their holdings unavailable to the public.

V. Coda will present a finale regarding issues of sound recording technology, restoration and preservation, copyright issues, and the cultural recommendations and ramifications involved with over a century of commercial sound recordings.

With this in mind, the question of why our past musical heritage is largely inaccessible and unavailable despite the recent preservation of older recording mediums can be answered thoroughly.

I: The First Century of Sound Recording Technology

We are very lucky to live in an age where we can relive the memories of the past. With modern technology, such as video recording, we can see, relive a glimpse of the past, and be in the presence of people who have passed on. With another technological invention that can both play back and record sounds, we can hear a window of our cultural and historical past. Just like video recording, we can revisit a person who died over a century ago, or hear a person from the present living on other side of the globe. It is very important to know about our preserved technological history, so we can both learn from it and improve upon it.

a. The Early Pioneers of Sound Recording

The possibilities of recording and preserving sound date back to 1857. It was during that year a French printer, Edouard Leon Scott de Martinville, invented and patented a machine called a phonautograph (Mileham 22). Martinville's intention was to record accurate records of

spoken dialogue, and although his phonautograph was successful by recording sound wave impressions onto a soot covered cylinder, the recordings at the time could not be played back (22). Although Martinville's phonautograph would be the inspiration behind Emile Berliner's gramophone invention thirty years later, the machine would linger in obscurity until 2008, when scientists at the Lawrence Berkeley National Laboratory in California were able to digitally play a ten-second recording of "Au Clair de la Lune," made in the 1860s (22).

In early 1877, twenty years after Martinville invented the phonautograph, fellow countryman Charles Cros produced a theoretical paper sketch of a phonograph machine that was able to record sound. Although Cros' work had unique aspects found in American inventor Thomas Edison's phonograph machine, no working model was made (Library of Congress, The History of the Edison Cylinder Phonograph). The idea of a sound recording/playing device would have to wait until later in 1877.

The invention of the phonograph was the most profound impact in the transmission of music since movable type (Bonds 516). The invention of a machine that was capable of both recording and playing back sound began in 1876 as the result of improvements on the telegraph and the telephone by American inventor Thomas Edison. By the summer of 1877, Edison would begin to sketch the basic ideas of recording telegraphic incoming messages (Millard 24). In July 1877, Edison began experimentations on sound recording. With an indenting stylus connected to a telephone diaphragm, Edison began to shout into the speaker, while "a strip of paraffin-coated paper was run underneath the stylus…when the strip was pulled back under the stylus, the group of men crowded around the laboratory table heard, with disbelief, the faint sounds of Edison's shouts of a few minutes previous" (24). After this remarkable discovery, Edison built a working

phonograph machine. Before 1877 came to a close, Edison changed the recording medium to a tin foil coated metal cylinder, complete with both a recording and play back diaphragm and needle. By testing the machine, Edison created his famous recitation of *Mary Had a Little Lamb*. Afterwards, Edison would make the first public demonstrations of the phonograph at the offices of Scientific American magazine on December 6, 1877 (26). Before the year ended, Edison filed a patent for his phonograph invention on December 24 (Butler 8). On February 19, 1878, Thomas Edison was granted a United States patent for his phonograph invention (Hoffman 258). The inner-workings of how Edison was able to reproduce sound on his phonograph were explained in scientific detail for his patent application:

> "a cylinder having a helical indenting-groove cut from end to end – say, ten grooves to the inch. Upon this is placed the material to be indented, preferably metallic foil. This drum or cylinder is secured to a shaft…having at one end a thread cut with ten threads to the inch" (258).

In the 1936 British Pathe newsreel, "Immortal Voices," an animated diagram showed the viewer, in simplistic terms, the mechanism of Edison's cylinder phonograph. Using a hill-and-dale method of capturing and playing back sound, the needle inside one of the grooves, would move in a vertical method. The cylinder's hill-and-dale method contrasts with the flat disc, in which the needle recorded and played back the sound impressions in a lateral or sideways movement. Although the phonograph had a lasting impact on both inventors and the public of 1877, the commercial potential of it at the time was limited (Millard 27). The machine was cumbersome to operate, and the tin foil would wear out after a few playbacks. Nevertheless, in the *North American Review*, Edison listed ten different uses for his phonograph:

1. Letter writing and all kinds of dictation without the aid of a stenographer.
2. Phonographic books, which would speak to blind people without effort on their part.
3. The teaching of elocution.
4. Reproduction of music.
5. The "Family Record" – a registry of sayings, reminiscences, etc., by members of a family, in their own voices, and of the last words of dying persons.
6. Music boxes and toys.
7. Clocks that should announce in articulate speech the time for going home, going to meals, etc.
8. The preservation of languages, by exact reproduction of the manner of pronouncing.
9. Educational purposes; such as preserving the explanations made by a teacher, so that the pupil can refer to them at any moment, and spelling or other lessons placed upon the phonograph for convenience in committing to memory.
10. Connection with the telephone, so as to make that invention an auxiliary in the transmission of permanent and invaluable records, instead of being the recipient of momentary and fleeting communications (646).

Out of one of these ten phonograph usages envisioned by Thomas Edison, reproduction of music, would have the longest and lasting impact in the following decades. However, Edison did not see the commercial potential for recorded music during 1877 and 1878. At the end of the

1870s decade, the phonograph's novelty quickly diminished (Library of Congress, The History of the Edison Cylinder Phonograph). Edison went on to invent the incandescent electric light bulb, leaving the door open for other inventors to improve on the phonograph.

Within less than a decade after inventing the phonograph, Edison's patents on the phonograph expired in 1885, which left "the field wide open on both sides of the Atlantic to the many newcomers who thought they could produce a better machine" (Millard 32). In 1887 Chichester Bell and Charles Tainter of Washington, D.C. were experimenting with improvements on Edison's phonograph. Since the tinfoil recording medium wore out after a few plays, new mediums were tested. Some of the various materials Bell and Tainter used included copper and soft iron sheets, but both men settled on a cylinder with beeswax filled grooves (Hoffman 258). Also during 1885, Thomas Edison began to improve upon his phonograph invention. Using Bell and Tainter's beeswax cylinder as a model, Edison scrapped tinfoil in favor of a cylinder made of soft wax (258). Although the wax cylinder was very fragile as a recording medium, a more durable medium was being developed.

Around the same time as improvements were conducted on Thomas Edison's phonograph, a new medium and way of recording and playing back sound was entering the experimental stage. Based in Washington, D.C., Emile Berliner used Edouard Leon Scott de Martinville's nearly thirty-year old phonautograph machine as a basis for his new invention. A disc format was synched with the lateral vibration of the phonautograph (Library of Congress, The Gramophone). At first, Berliner tried Martinville's procedure of blackened glass. He then attempted a photoengraving process which proved to be a failure. Many attempts and substances were made, and eventually, Berliner decided on a zinc etching method. Unlike the cylinder,

reproduction of a flat disc was possible. The master zinc record was electroplated, which produced a negative. This negative could be used to stamp copies of the master record. This negative then could be used to stamp duplicate copies of the original master record (Library of Congress, The Gramophone). Many substances were used to make the disc, including plaster of Paris, sealing wax, celluloid, hard rubber, and shellac. In both 1887 and 1888, Berliner was awarded two patents for his gramophone disc invention. Nevertheless, Berliner continued to "patent improvements to his gramophone throughout the remainder of the century and even into the early years of the twentieth century" (Library of Congress, The Gramophone).

The main reason inventors such as Bell, Tainter and Berliner were able to improve upon both Thomas Edison's and Edouard Leon Scott de Martinville's sound recording inventions was due to patent expirations. In the late nineteenth century, patents on inventions lasted for short and limited times. Inventors were able to build and improve upon other inventions when the patents became public domain, thus creating better and easier to use technology. This is a stark contrast to the current situation of American copyright law. Since copyrights today are controlled by a few owners and are rigidly enforced against infringement, we have lost the ability to build upon our past and improve technology for the public to use. By having the phonograph's patents and copyrights expire, a new opportunity would arise for the phonograph during the late 1880s and early 1890s decades.

b. The Commercial Sound Recording Industry

The birth of the commercial sound recording industry began with unlikely circumstances. Legal stenographer Edward Easton of Washington, D.C., became fascinated by the phonograph for stenography purposes after nearing completion of his law studies (Marmorstein 4). In June

1887, Easton had incorporated the American Graphophone Company, which made phonographs specifically for legal dictation purposes (6 and 7). By February 1888, Easton had split from the American Graphophone Company. On January 22, 1889, Easton and several new business partners incorporated the Columbia Phonograph Company, and within six months of the company's founding, Columbia began to record music cylinders (8). To this day, the name of the first recording artist remains a mystery (Tim Brooks 102). Two possible candidates may have the piccolo player Frank Goede or John Y. AtLee, a Washington, D.C. government clerk and amateur whistler ("Directory" 102 and 105). However, in September 1889, Columbia Phonograph asked John Philip Sousa, conductor of the United States Marine Band, to record cylinders (Michael Brooks 20). When Columbia did make cylinder recordings of the U.S. Marine Band, mass production of cylinders was not yet possible, and "instead, the band played in front of a battery of cutting machines, and when the performance was complete, the cylinders were removed, new blanks inserted and the whole process repeated" (20). The United States Marine Band became the most well-known Columbia recording artist during the company's first five years ("Directory" 126). According to Billboard chart historian Joel Whitburn, the United States Marine Band's Columbia recording "Semper Fidelis," was America's first number one record, peaking at the number one chart position on August 2, 1890, and lasting at number one for six weeks (Whitburn 426). During the 1890s, Columbia Phonograph would also progress the careers of other recording artists, including the Pat Brady series originator Dan Kelly, Casey monologist Russell Hunting and singer Dan W. Quinn (Tim Brooks 104). Although phonograph recording technology still had its limitations in the 1890s, all of that would change in the early twentieth century.

On October 3, 1901, entrepreneur and inventor Eldridge Johnson, who had been marketing Berliner's flat disc invention for a few years, formed the Victor Talking Machine Company which manufactured discs and gramophone machines (Marmostein 23). Victor would be fundamental in making discs the choice among record buyers by 1902 (24). That same year, Thomas Edison would invent a new mass produced Gold Moulded cylinder (Library of Congress, The History of the Edison Cylinder Phonograph). Since the disc had become prevalent among record buyers, Edison would continue to market new variants of his cylinder until he made his last phonograph record in 1929 (Thompson 161). The next technological breakthroughs for the recording industry would prove to be major setbacks.

Prior to 1925, which is known as the acoustic era, a sound recording was produced without the use of electricity. Every record was "recorded into a horn and the vibrations that the singers and the players made in the horn etched the sound into the master recordings" (Martin). The acoustic era officially ended on February 26, 1925, when Columbia became the first American record label to obtain the rights and usage to the Western Electric recording process (Marmorstein 55). Despite the improved fidelity of electrical phonograph records, radio would prove to be a challenge for the recording industry during the remainder of the 1920s and into the 1930s. When the United States entered World War II in the early 1940s, the shellac supplies used to make phonograph discs eventually became restricted. In the place of shellac, vinyl became the ingredient of choice for the manufacture of 78rpm records (Yale University Library). Just before the end of World War II, a new technological breakthrough for sound recording was discovered.

During the summer of 1945, after the end of World War II in the European theater, Jack Mullin's unit of the U.S. Army was sent to Germany to "check out reports of a high-frequency

electronic device with the ability to cause airplane engines to malfunction in flight" (Snell). Although nothing was discovered pertaining to this, a sound recording machine running on magnetic tape was unearthed. The magnetophon, capable of recording sound in pristine quality, was shipped back to the United States disassembled. After his discharge from the military, Mullin worked on perfecting the magnetophon tape recorder. By 1947, a public demonstration of magnetic sound recording was given. During that year, the Ampex Company would promote the tape recorder as their newest product. Simultaneously, the 3M Company were developing their own brand of magnetic recording tape (Phantom Productions, Inc.). In a Billboard magazine article for the May 22, 1948 issue, Capitol Records bought magnetic tape recording equipment for investigative comparisons with disc recording. Technicians at Capitol knew that tape was about to revolutionize the recording industry by:

> "Allowing diskeries to keep their backlog on tape, thereby eliminating storage space for masters; Tape can be kept without danger of injuring recorded matter or its fidelity; Tape will facilitate the recording process by making the initial recording on it rather than disk, since editing and patchwork is possible via the new method, and expenses will be trimmed considerably, since the present method requires the throwing away of bad first cuttings while in tape undesirable recordings can be demagnetized and the same tape used" (Billboard).

Due to the initial success and ease of magnetic recording tape, most of the major recording studios had a tape machine by May 1949 (Phantom Productions, Inc.). By the 1950s decade, magnetic tape had replaced the old master disc recording method. However, as soon as magnetic recording became the dominant choice in the recording industry, a new era would

begin with the wax cylinder and shellac disc commercial sound recordings of the previous sixty years.

When magnetic tape technology became available for commercial use, the record companies were quick to respond to making their disc and cylinder masters available for the public to enjoy. By preserving the recordings onto tape, and offering the results for sale to the public on vinyl long playing records, our past sound recording heritage could be enjoyed by many. However, at the present time, media corporations that own the recording companies do not want to reissue and make our past culture available on digital formats. The situation of preserving and making recordings accessible fifty years ago has become a locked and controlling copyright and ownership struggle during 2012. Thankfully, there was a time when older sound recordings were both preserved and made publically accessible.

II: The Preservation and Restoration of Cylinder and Disc Recordings

As soon as the switch from disc to magnetic tape recording occurred, over sixty years of older sound mediums remained. The question in mind that was posed during the 1950s and 1960s decades was what was going to happen to the obsolete recording material available. It was decided by the record companies that our sound recording heritage must be saved for both the public and future generations to enjoy. This coincided with the end of 78rpm record manufacture, and the introduction and sale of the long playing 33 1/3rpm and the single 45rpm vinyl formats. Since these two speeds became the preferred and only choices among record buyers, older recordings on cylinders and shellac discs could be heard not only for enjoyment, but in place of older and outdated formats with substandard sound.

a. The Birth of Sound Restoration

In the 1950s and 1960s decades, preservation and restoration techniques were created for older cylinder and disc sound recordings. Since digital technologies were still a few decades in the future, analog restorations onto magnetic tape was the only option. During the 1960s, the Reader's Digest Association released "The Swing Years," a vinyl long-playing record set. Produced in partnership with RCA Victor Records, author John S. Wilson gave a detailed explanation about the sound restoration techniques engineer Donald Miller used on the records:

> "To transform the originals, which were 78 rpm's, into 33 1/3 rpm's required the highly specialized skills of a trained sound engineer. After making tapes from new pressings of each old record, he eliminated surface noises which were inevitable with earlier recording techniques, and he added just enough echo to restore to the music the sparkle that the old-time, sound-deadening studio had dimmed. The stereo version of the album he created electronically, because stereophonic recording had not yet been perfected in the Swing Years" (Wilson).

By the 1970s, the analog restoration techniques of the 1960s had become obsolete. A new technological revolution was about to forever change both the preservation and restoration fields.

In the mid-1970s, digital sound recording, which was once isolated to the laboratory, became a reality (McWilliams 19). One of the first digital restorations occurred with the Soundstream Corporation in 1978. All of tenor Enrico Caruso's early twentieth century acoustic sound recordings received digital reprocessing with the Stockham Soundstream Computer Process (Gold). The process involved minimizing various noises such as clicks and pops in the

original discs, and giving Caruso's acoustically recorded voice a neutral clarity (Gold). "The Complete Caruso" was a large leap in digital computer restoration when the vinyl record series concluded in 1985. A new era of cylinder and disc restoration processes and techniques would begin at the end of the twentieth and the beginning of the twenty-first centuries.

b. Preservation and Restoration

According to author Jerry McWilliams, the definition of preserve is "to cause to continue or last indefinitely and to keep or save from injury or destruction" (McWilliams 22). When this was written in 1979, new techniques to accommodate digital preservation and restoration were in a nascent stage. Storage of older recording mediums was also beginning to be perfected. By keeping flat discs stacked vertically on horizontal metal shelves, warping could be prevented (30). However, this remedy is not without problems. Slanting of records can accelerate the warping process (31). Another key factor to keeping sound mediums alive depends on the environment they are stored in. The Library of Congress maintains their record collections at seventy-two degrees Fahrenheit all year (34). This is meant to combat the seasonal weather temperature changes and to prevent vinyl and shellac from becoming brittle. Despite these various methods used to keep older sound mediums in great condition, the digital restoration process can make archaic sound mediums easily accessible.

The digital restoration process began during the 1970s decade with the advent of computer technology. Forty years later, various computer procedures have been used to create the illusion of an optimal sound preserved in the cylinder and disc grooves. There are a few sound restoration engineers who prefer to use different methods for early sound recordings, including the British freelance Ted Kendall and Richard Martin, owner of Archeophone Records.

Although both men have different digital techniques and processes they use, some of their motives, although in contrast, remain similar.

When beginning the initial restoration process, Ted Kendall chooses any given disc copy from the best available commercial pressings. Finding pristine copies of popular recordings can be difficult to trace, since these discs can be worn due to the Victrola steel needle usage prevalent during sound recording's early history (Kendall 210). After a quality disc copy is located, Kendall attempts to center the record as precisely as possible to eliminate the wow and flutter that results from off-centering. The proper pitch and speed of the disc remains crucial, since many early sound discs do not run at exactly 78 revolutions per minute (211). Before Kendall begins to record an analog disc digitally, the most critical step involves the phonograph stylus size. The stylus travelling into the disc groove can make the greatest impact in the quality of sound from the disc, and ensure a longer groove life (McWilliams 68). According to Kendall, the standardization of phonograph record grooves was not yet used by the recording industry during the 78rpm era. The 78 grooves are a U shape instead of the microgroove vinyl V shape (Kendall 211). With all the necessary transfer bases covered, the digital re-mastering process can be attempted.

Using CEDAR digital computer software, Ted Kendall can make a restored digital copy of a 78. Using noise reduction, Kendall can both quiet the hiss and use the de-clicking and de-crackling functions to erase the anomalies prevalent in the disc transfer (Kendall 212). With other equalization processes applied in the digital clean-up, other precautions can be taken to fix other disturbances in order to make a perfect digital copy. The final method Kendall uses for a pleasant digital listening experience is trimming the start and end of the blank grooves as to not

"obtrude and thereby distract attention from the performance" (213). Outside of Great Britain, Richard Martin in the United States also attempts his best for not only the restoration of older sound recordings, but for the preservation of them also.

In 1998, due to the vanishing state of our earliest sound recordings in the United States, Richard Martin, along with his wife Meagan Hennessey, founded Archeophone Records (Martin). The goal of the record label Martin incorporated was to preserve and digitally restore acoustic cylinders and discs made before the advent of electrical microphone recording in 1925. By offering these restorations for sale on compact discs, Archeophone has at least attempted to close the gap on the vague cultural aspect on early sound recording history on fifty-seven released CDs (Archeophone Records). In 2006, Archeophone Records received the distinction of winning that year's Best Historical Album Grammy Award for "Lost Sounds: Black and the Birth of the Recording Industry, 1891-1922" (Archeophone Records). With these accomplishments, Martin has perfected a variety of preservation and restoration techniques to open a window of our neglected sound recording past.

Using a trial and error method for the past fifteen years, Richard Martin has perfected his preservation and digital restoration talents for wax cylinders and 78 shellac discs. For cylinders, a cleaning method cannot be used, due to the damage that is caused by a chemical reaction resulting in mold. Although eventually destroying the cylinder grooves, a digital transfer is possible which can unfortunately make both an unpleasant transfer and listening experience (Martin). Shellac 78 discs on the other hand can be cleaned, using a mixture of distilled water and mild detergent. This cleans and removes dirt embedded in the grooves. Not all the discs Martin can use for transfers can be cleaned or are in perfect condition. A broken disc can be

either remedied by finding another copy or if none is in existence, Martin has to manually fix it by smoothing a melted wax substance over the broken area to piece it back together for transfer purposes (Martin). Stylus size is also a very important factor resulting in a great digital transfer. Like Ted Kendall, Richard Martin also experiments with stylus size. Trying various styli, Martin attempts to find in the disc or cylinder what he calls "the sweet spot in the groove" (Martin). This results in an optimal quality in the record transfer stage. After either a cylinder or disc has been converted as a digital file, Martin uses several computer software programs to restore the sound to a bright and clean quality.

Richard Martin, unlike Ted Kendall, does not rely on only one digital computer re-mastering software. He uses three at any given time for various processes. First, Martin uses Sony's Sound Forge Audio Studio as a basic step in the restoration process, Waves as an addition for de-clicking and de-crackling, and iZotope RX, for both an added de-clicker and de-crackler. iZotope RX also works for Martin to digitally remove audio blemishes on a computerized heat map that may have resulted during the initial transfer stage. On average, both the preservation and restoration stages take Martin about one hour per record. Although the finished preserved and restored product will eventually go through several additional stages, Martin takes great lengths to ensure the novice or experienced ear has a pleasant listening experience for his digital work (Martin). Since the founding of Archeophone Records in 1998, it has become a prestigious and dedicated historic acoustic cylinder and 78 acoustic disc preservationist record label.

Both Ted Kendall and Richard Martin, along with other sound engineers, are dedicated to our sound recording past. Although they have attempted and made a small fragment of preserved

and restored sound recordings accessible to the public, a large percentage of many sound recordings are presently unavailable and are in danger of being lost forever.

III: Sound Recording Preservation and Accessibility Problems

The efforts of Archeophone Records and other niche record labels have attempted to make a minute sample of our early recording legacy available with modern preservation and restoration techniques. Despite this endeavor by specialists in the area of early sound recordings, the small fraction available to the public is not enough. There are several factors why our past audio heritage is in danger of disappearing, including the present copyright law for sound recordings, the never-ending copyright extension revisions in the last fifty years, and the large American and European media corporation conglomerates that both own and control the copyright situation on sound recordings. The question of how copyright laws evolved for music and later sound recordings is fundamental into understanding the strict and muddy American copyright laws, and the European sound recording copyright extension that governs our audio heritage on both sides of the Atlantic in the twenty-first century.

a. The History of American Copyright Law

The United States Constitution gives Congress the authority to enact laws that establish a system of federal copyright. In Article 1, Section 8 of the Constitution, copyright is clearly mentioned: "The Congress shall have the power to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries." The first time Congress used their copyright power occurred on May 31, 1790, when the first federal copyright law was enacted. A copyright term of fourteen years,

with a choice of renewal for an additional fourteen years, was given to authors of books, maps and charts (U.S. Copyright Office). Forty years later, in 1831, music works received protected copyright for the first time against unauthorized printing and vending. In 1897, another triumph resulted in the protection from unauthorized public performances of copyrighted music. At the turn of the twentieth century, the possibility of commercial music sound recordings in regards to copyright law had to be remedied.

On July 1, 1909, a sweeping landmark in music copyright was passed and enacted by Congress. For the first time, an owner of a copyrighted musical work had jurisdiction over the mechanical use of that work, by "disks, rolls, bands, or cylinders for use in mechanical music-producing machines" (1909 Copyright Act). Other facets of copyright in this act were also mentioned, including unauthorized usage, manufacture and copyright infringement of a work. Also pertinent to this law was the longest term extension of copyright at that time. The length of an owner's copyright could last for fifty-six years. The first term of copyright had been extended in 1831 from the initial fourteen years to twenty-eight years. Until 1909, the renewal option of fourteen years enacted by Congress in 1790 stayed the same. Under the 1909 Copyright Act, the renewal term was lengthened an additional fourteen years, resulting in a twenty-eight year renewal. The federal copyright situation on sound recordings was not clearly outlined in the 1909 Act. This would all change in 1972.

On February 15, 1972, a major legislative copyright landmark was revised and passed by Congress regarding sound recordings. As outlined in Section 301c of the Copyright Law of the United States, sound recordings fixed prior to February 15, 1972 received protection under the jurisdiction of the individual fifty states common laws (Copyright Law of the United States of

America). The recordings made on or after the February 15, 1972 date are protected by federal copyright law (Tim Brooks 185). The earliest public domain date for pre-1972 recordings will be 2067 ("Copyright" 184). However, not all these recordings are protected under copyright. Some pre-1972 recordings have become available in the public domain. During the 1950s "in an act of unparalleled corporate generosity Edison's successor deeded its copyrights over to the federal government…as part of an agreement establishing the Edison National Historic Site" ("Copyright" 185). The recordings made between the 1880s and 1929 by Thomas Edison's record labels are now free for the public to use since becoming government property ("Copyright" 185). On the other hand, some pre-1972 sound recordings have become orphaned. The recordings made by the U.S. Everlasting Company of Cleveland, Ohio are one example. Since the company has no known corporate successor, the rights held cannot be claimed at the present time ("Copyright" 185). Despite these two examples, the majority of pre-1972 sound recordings have two different and valid copyrights. The first copyright of sound recordings is the publication of the music and lyrics, and the second is the actual recorded performance contained in the cylinder and disc grooves ("Copyright" 184). During the past few years, the copyright situation of pre-1972 sound recordings has warranted an investigative report by Congress to the United States Copyright Office.

In 2009, under the Omnibus Appropriations Act, a major study of the copyrights of pre-1972 sound recordings was conducted by Congress for the Register of Copyrights. The main argument in this study was to enact federal copyright protection for sound recordings made before February 15, 1972. Three points were directed by Congress in this study, including:

1. “The effect that federal protection would have with respect to the preservation of pre-1972 sound recordings;

2. The effect that federal protection would have with respect to providing public access to the recordings; and

3. The impact that federal protection would have on the economic interests of right holders of the recordings” (Pre-1972 Sound Recordings, U.S. Copyright Office vii).

Congress also requested the Register of Copyrights to take any appropriate recommendations regarding this study. The focus of this study was to serve the preservation needs of libraries and archives of old sound recordings and to increase the availability of these sound recordings to the public (U.S. Copyright Office viii). As of 2012, pre-1972 sound recordings are still protected and governed by what Congress in 2009 called “a patchwork of state statutory and common law.” (vii) This unfulfilled enactment may prove to be a disappointment to the preservation and restoration needs of these recordings before the 2067 public domain date. The larger question remaining is how did these sound recordings from the dawn of the commercial sound recording industry in the early 1890s until February 15, 1972 become under the ownership of various laws until 2067?

b. American Music Copyright Extension

Since 1831, when Congress enacted both copyright protection for music and extended the copyright term from the initial fourteen year period to twenty-eight years, copyright extension in the United States has become prevalent and never ending. Nearly a century would pass before another extension of the copyright law occurred. In 1909, while a successful major

revision and passage of the United States copyright law took place in Congress, an extension in the limit of copyright was enacted. Keeping the original 1831 length of the initial twenty-eight years, the renewal period of copyright was changed from fourteen to twenty-eight years. For the first time in 120 years of American copyright history, the length of copyrights doubled. The 1909 Copyright Act was the precursor to numerous copyright extensions by Congress in the twentieth century.

The fifty-six year length of copyright passed in the 1909 Copyright Act still kept the original 1790 option of renewal of the copyright holder. After the initial twenty-eight year period, many copyrighted works were not renewed for an additional twenty-eight years, lapsing into the public domain. However, this was not to last throughout the second half of the twentieth century. Beginning in the mid-1950s, Congress began work on another major revision of the 1909 Copyright Act (Newby). In 1962, all copyrighted works published before January 1, 1906 that were renewed in the twenty-eighth year, had fallen into the public domain (Newby). It was also in 1962 that Congress passed the first copyright term extension act in almost fifty years. This new act granted works copyrighted after 1906 a total copyright term of seventy-five years. The already shrinking public domain was made inaccessible until 1976, when another copyright act was passed (Newby). The failure of the renewal of works on behalf of the copyright holder was given little notice until 1992. Before that year, if a renewal was not filed for a copyrighted work in a timely manner, it would enter the public domain. In 1992, renewal of copyrighted works was made automatic (Newby). This would set the stage for the longest length of copyright in American history.

On January 27, 1998, the 105th Congress during their second session of the year presented an act for passage known as Copyright Term Extension (One Hundred Fifth Congress of the United States of America). Also known as the Sonny Bono Copyright Term Extension Act, all facets of copyright length were lengthened by twenty extra years. Sound recordings made before 1972 were originally set to enter the public domain on February 15, 2047, but were amended until February 15, 2067 (One Hundred Fifth Congress of the United States of America). This copyright extension, which would close the public domain in the United States for twenty years, was the result of lobbyist action by the Disney Corporation acting on behalf of the movie industry (Battista). Since Mickey Mouse's copyright was about to enter the public domain, the Disney Corporation needed extra copyright protection on its character (Battista). On October 7, 1998, both the House and Senate passed the Sonny Bono Copyright Term Extension Act, also known as the CTEA (Karjala). Twenty days later, on October 27, 1998, President Bill Clinton signed the CTEA bill into law. Two partners of this act were harshly criticized. The first wave of criticism came against the Disney Corporation, due to the fact that Mickey Mouse may be public domain property, due to a lack of proper copyright notice when first created (Battista). The second critical attack was forwarded on President Clinton. According to Arizona State University Professor of Law Dennis S. Karjala, Clinton was a "self-proclaimed supporter of the little guy" who "sold out the interests of the American people to a few owners of valuable copyrights from the 1920's and 1930's (Karjala). Whatever criticisms may arise from this act, the Sonny Bono Copyright Term Extension Act is the law, which has done its job of closing the public domain as of 2012 for almost fifteen years. Within a few short years of this act's 1998 passage, problems resulting from copyright lengths of sound recordings in Europe would foreshadow a copyright extension on that continent.

c. European Music Copyright Law

In 1911, two years after Congress passed the 1909 Copyright Act, the United Kingdom Parliament passed the first major revision of their copyright law in over 200 years since the Statute of Anne in 1709. The Copyright Act of 1911 specifically dealt with many facets of copyright for a modern and changing world, including mechanical sound reproduction. Phonograph records, perforated piano rolls, and any other mechanical sound reproductions were given a fifty year copyright term limit (MacGillivray 125). For seventy-seven years, the Copyright Act of 1911 was valid law in the United Kingdom, until 1988, when the Copyright, Designs and Patents Act of 1988 was passed by Parliament. Most copyright lengths instituted in 1911 were extended, but the fifty year copyright length on sound recordings was kept the same. However, by the late 1990s decade, this would begin to create problems not only in Europe, but internationally.

Beginning in the late 1990s, the first problem resulting from the fifty year limit on sound recordings in the United Kingdom and Europe first occurred with classical music recordings. In 1999, Naxos of America, Inc., a classical record label with headquarters in different areas of the world, decided to preserve and restore classical recordings made by "three world-renowned artists" (Graffeo). The recordings included for reissue included: Yehudi Menuhin's performance of Elgar's "Violin Concerto in B Minor, Opus 61," Pablo Casals' renditions of J.S. Bach's cello suites, and Edwin Fischer's versions of books one and two of Bach's "The Well-Tempered Clavier" (Carroll). These performances were recorded in England for Gramophone between 1932 and 1939, and by the beginning of the 1990s, all of the recordings had entered the public domain in the United Kingdom and Europe. When the original recordings were made in the 1930s, the

contracts of the three artists' mentioned that "Gramophone would have absolute, worldwide rights to the performances, including the right to reproduce and sell copies of the performances to the public" (Graffeo). In 1996, EMI, the successor to Gramophone in Britain, gave Capitol Records in the United States permission to sell the recordings. With modern computer technology, the original recordings received sonic cleanup and were transferred digitally to compact disc for sale. Three years later, in 1999, Naxos took advantage of the expired European copyrights of the recordings by digitally re-mastering and offering the results for sale in the United States. As soon as Naxos' versions hit record store shelves, Capitol sent a cease and desist letter to Naxos to pull the product. Naxos ignored the request, and by Capitol's actions, a lawsuit ensued in 2002 at the United States District Court for the Southern District of New York (Graffeo).

The main argument of the Capitol Records, Inc., v. Naxos of America, Inc. case involved the copyright law in the United States concerning pre-1972 sound recordings. Sound recordings made before February 15, 1972 are not under the jurisdiction of federal copyright, and are protected by state common law until the copyright expires on February 15, 2067 (Carroll). Although this was one of the arguments brought before the court, the main issue was "whether the expiration of the term of a copyright in the country of origin terminated a common law copyright to the recordings in New York state" (Carroll). Naxos noted the copyright expiration outside of the United States "prevented enforcement of copyright protection in other jurisdictions, including the U.S. and New York" (Carroll). The court disagreed with Naxos, stating copyright treaties with the United States and foreign countries "have the same force as federal law and must be respected by states" (Carroll). Three years later, on April 5, 2005, a decision was made by the court. Capitol Records, Inc. won, and Naxos claim on common-law

copyrights in the original sound recordings was invalid (Graffeo). As a result of the Capitol v. Naxos decision, Naxos has decided to take a safe approach in refusing to sell their reissues of public domain recordings in the United States. On their website, a disclaimer is noted at the bottom of every webpage:

> "All Naxos Historical, Naxos Classical Archives, Naxos Jazz, Folk and Rock Legends and Naxos Nostalgia titles are not available in the United States and some titles may not be available in Australia and Singapore because these countries have copyright laws that provide or may provide for terms of protection for sound recordings that differ from the rest of the world" (Naxos Digital Services Ltd).

During the same time period as the Capitol v. Naxos legal battle, another genre of music recordings set to enter the public domain would result in action from the artists who participated on those recordings.

In November 2004, talks began circulating in Europe about extending the fifty-year copyright term for sound recordings. Within a few months from that date, beginning on January 1, 2005, anyone was able to "release landmark rock'n'roll recordings such as Elvis Presley's *That's All Right* without paying a penny in royalties to the performer or their estates" (Sherwin). Also in late 2004, British rock musician Sir Cliff Richard was beginning to lead a lobbying campaign to close the fifty-year European copyright law. Richard is considered the most successful singles artist in British chart history, having the first authentic British rock hit in 1958, *Move It* (Sherwin). The reason behind Richard's intentions were to protect music's unsung heroes: "…but what about the Shadows or the families of Tommy Steele, Adam Faith or Lonnie

Donegan? Many artists rely on one hit record as their sole source of income, but now they will earn nothing. I feel a responsibility to speak out for them" (Sherwin quoting Richard). Richard's Christian beliefs also played a factor behind his fight: "I am told that my recordings could even be used in pornographic films and there's not a thing I could do about it. I will have no control over how my music is used. I believe performers must be entitled to their dignity" (Sherwin quoting Richard). For the next six years, while Richard continued to lobby the European Union on extending copyrights on sound recordings, many rock and roll recordings fell into the public domain in Europe, including Elvis Presley's *Heartbreak Hotel*, Chuck Berry's *Roll Over Beethoven*, and Cliff Richard's *Move It* (Sherwin).

By September 2011, Sir Cliff Richard's fight to extend the fifty-year copyright term on sound recordings in Europe seemed on the edge of victory. A proposed law by the European Union named "Cliff's Law," was about to become reality. On Wednesday, September 7, 2011, in Brussels, Belgium, a "key EU committee voted to approve a directive that would extend music copyright from 50 to 70 years" (Cellan-Jones). The last obstacle remaining was approval from the EU Council of Ministers. If that was successful, the EU member states would be "obliged to enshrine the extended copyright in law" (Cellan-Jones). Within less than a week, on Monday, September 12, 2011, the "EU ratified a new law – "Cliff's Law," – that extended the copyright in music recordings from 50 years to 70 years" (Stanley). Sound recordings from the 1960s that were about to fall into the public domain in Europe would have to wait until 2033 (Halliday).

The never-ending copyright revisions and extensions in the United States and Europe has created a bevy of problems with our past musical heritage and culture. Over 120 years of sound recordings remain controlled by large media corporations, who own the copyrights for another

fifty years in the United States. Our culture is and has been controlled and will be locked up for many years, resulting in either minimal or no access whatsoever. The situation of copyrights at present, is in my opinion, troubling. The situation in Europe was once to support a healthy public domain. By having the copyright on sound recordings last for fifty years, I was once able to hear recordings that would have never been made accessible in the United States. Since the copyright struggle in Europe has put copyright on an equal footing with the United States, I may not get to hear recordings from small public domain niche record labels on either side of the Atlantic during my lifetime. Our sound recording past is something that should be made available for all to enjoy, but time may be running out.

IV: Culture and Older Sound Recordings

After the 1998 success of the Sonny Bono Copyright Term Extension Act, accessibility to our sound recording culture looks very bleak. Except for Thomas Edison's produced recordings and the recordings made by the U.S. Everlasting Company, all sound recordings are owned by large media corporations. The recordings that are held by their respective copyright owners are rarely reissued, preserved, or made available. This has led to numerous imports from European countries where the recordings are public domain and can be used freely and made available to the public. Despite numerous copyright extensions and revisions domestically and internationally, over 120 years of sound recording cultural history is on the verge of being lost forever.

One section of cultural sound recording history that remains in danger of being lost forever are early recordings made by African Americans prior to 1920. According to author Tim Brooks in his book *Lost Sounds*, about 800 recordings were made by African Americans before

1920, and although the majority of these recordings exist, "about half are controlled by successor corporations that will neither release them nor allow others to do so" (10). Among these corporations includes BMG, which owns both the Berliner and Victor catalog and Sony Music, parent owner of Columbia. These media corporations have copyright ownership on recordings made in 1890, which will be controlled until 2067, more than 170 years of copyright protection. Although many overseas record labels have made these important facets of our culture available, the limited availability of these albums makes them hard to find (*Lost Sounds* 10). Although only two such recordings made by African Americans in the early twentieth century have been made available by the copyright holders, other early sound recordings remain in danger of never being made available.

Despite the recording companies wasteful attitude of destroying most of their recording masters and file, more than ninety percent of recordings made before 1964 still exist in some format ("Copyright" 190). Many cylinder recordings from the 1890s are also lost, but according to preservation specialists, between 7,000 and 10,000 cylinder releases are in existence in the United States ("Copyright" 190). In August 2005, a study was commissioned by and conducted for the National Recording Preservation Board branch of the Library of Congress. Although it was only a sample survey, 1,500 historic recordings made between 1890 and 1964 were chosen to represent the sample (Historical Recording Coalition for Access and Preservation). The findings that resulted were astounding:

1. "Most historical recordings are controlled today by identifiable owners, primarily major record companies that have absorbed older, smaller labels.

2. Only 14% of controlled historical recordings are available from the rights holder, either directly or through licensing.

3. Availability is highly skewed toward more recent periods – about one-third of historical recordings from the early rock ‘n’ roll era (1955-1964) are available, versus 20% of those from the big band swing era (1935-1944) and 11% of those from the early jazz age (1920-1934). The percent available from before 1920 approaches zero.

4. Some genres of music are almost totally unavailable. Only one percent of recorded ethnic music, the music of minorities and foreign-language immigrant groups, is available from rights holders (tens of thousands of such recordings were made in the early 1900s).

5. There is a clear demand for historical recordings. Non-rights holders, including foreign labels not subject to U.S. law and small, illegal U.S. operations make available another 22% of the recordings studied, more than the rights holders.

6. The situation in the U.S. is in sharp contrast with other countries, where copyright for recordings expires after 50 to 75 years and older recordings are kept available by a vibrant public domain.” (Historical Recording Coalition for Access and Preservation)

Although this study was conducted in 2005, little has changed in the realm of keeping sound recordings available to the public. The public domain in the United States remains closed, while recent copyright extension in Europe has closed the public domain for sound recordings until the 2030s decade. Despite these recent setbacks, the Historical Recording Coalition for Access and Preservation and other organizations want a major change to the American copyright law to keep pre-1972 recordings accessible to not only the public, but for future generations also.

In a November 2007 study conducted and recommended by both the Association for Recorded Sound Collections (ARSC) and the Music Library Association, the present legal situation of "pre-1972 sound recordings in the United States places historical recordings at significant risk of loss and has made it difficult for students, scholars, and the general public to hear and appreciate the vast majority of music and spoken word recordings produced in the U.S. during the first century of commercial recording" (Association for Recorded Sound Collections 1). The ARSC, founded in 1966, is a representative organization with 1,000 preservationist professionals as members, including educational institutions, archivists, librarians, and cultural historians whose common goal is the study and preservation of older sound recordings. In the same 2007 study conducted, the ARSC proposed five changes to the Unites States copyright law regarding older recordings:

1. "Place pre-1972 U.S. recordings under a single, understandable national law by repealing section 301(c) of Title 17, U.S. Code.

2. Harmonize the term coverage of U.S. recordings with that of most foreign countries, i.e. a term of between 50 and 75 years. Note that this would address the specific needs of recordings, and need not impact other creative works.

3. Legalize the use of orphan recordings, those for which no owner can be located.

4. Permit and encourage the reissue by third parties of "abandoned" recordings, those that remain out of print for extended periods, with appropriate compensation to the copyright owners.

5. Change U.S. copyright laws to allow the use of current technology and best practices in the preservation of sound recordings by non-profit institutions." (Association for Recorded Sound Collections 1, 2)

Although these recommendations to the current U.S. copyright law have yet to take place, they are needed quickly. If Congress was to be compliant with changing the copyright law concerning pre-1972 sound recordings, the preservation of these recordings would be kept alive for future generations. Although Congress has yet to act on a major revision of our copyright law which will provide easy access to our sound recording culture, private archives and record labels such as Archeophone Records have taken matters into their own hands by skirting around the copyright law. Although this is considered illegal in regards to copyright law, it is the only way during the present that our sound recording culture can be heard and enjoyed by the public.

V: Coda

Despite almost a century and a half of sound recordings preserved on various materials and formats, the valid copyright status on these recordings should not be rigid or controlling. The key point many proponents of the public domain have argued is written in Article I, Section 8 of the United States Constitution: "…by securing for limited times…". Since Columbia's earliest commercial cylinder recordings date back to 1889, the copyright is still owned by Sony and will be valid until 2067. By the time the recordings made between 1889 to 1971 fall into the public domain, many of the earliest recordings will have been protected for over 170 years. According to author Tim Brooks, 170 years of copyright "is clearly not "limited times"" (Tim Brooks 11). I personally agree with proponents of the public domain such as Tim Brooks, the Historical Recording Coalition for Access and Preservation and the Association for Recorded Sound

Collections, who want a thriving public domain and access to our sound recording culture. The reason why our sound recording history remains unavailable and inaccessible is due to strict and rigidly enforced copyright law. Sound recordings should be public domain just as books, films and sheet music have had copyrights expire. The Sonny Bono Copyright Term Extension Act is a mess which has officially closed the public domain in the United States for twenty years. In Europe, the situation was once a vibrant and healthy public domain. Copyright on sound recordings would expire after fifty years, and would become the property of the public. In 2012, the situation in Europe remains the same as in the United States. Many record labels benefiting from public domain sound recordings have both fallen on hard economic times and have gone out of business. Lobbyists such as Sir Cliff Richard did not want their royalties on older recordings to expire. The end result has occurred with recordings of the 1960s having valid copyrights until the 2030s decade. These copyright setbacks have made sound recording preservationists and archivists take matters into their own hands.

The public should welcome the digital preservation efforts and techniques of sound archivists such as Ted Kendall and Richard Martin. Kendall does not have to worry about strict and muddy copyright laws regarding sound recordings like Martin has to. Kendall has numerous choices on what sound recordings he wants to use. He can choose recordings made between 1889 and the beginning of the 1960s decade without having to ask the copyright owners for permission. They are the property of the public domain in the United Kingdom and mainland Europe. The small record labels of both the United Kingdom and the European continent always give the consumer plenty of music for little money, and the restoration jobs on these discs have always been great. Kendall does freelance work for many of these small European labels, and does excellent restoration work on 78rpm shellac discs. On the other hand, Richard Martin and

Archeophone Records, while doing a superb job of preserving and restoring older acoustic sound recordings, resides in the United States, and are both subject to pre-1972 sound recording copyright laws. Besides the restrictions American copyright law has on our older sound recordings, both Martin and Archeophone Records deserve credit for making our once lost audio culture available in a minute fragment for the public to enjoy. This is our musical heritage that large media corporations, who remain the sole copyright owners of these audio artifacts, will never release to the public. It is about time these older sound recordings are heard, before they disintegrate and become lost to time forever. The complicated copyright law in the United States pertaining to sound recordings needs revision. This would heighten the general public's awareness of what older audio treasures are waiting to be both heard and discovered.

As of 2012, the technology of both recording and playing back a sound recording has only been around for 135 years. Within this time span, copyright law has suppressed a large portion of audio made on different formats and materials and has made them inaccessible to the public. Although non-profit organizations and institutions have made recommendations available to both a non-compliant Congress and an uninterested Copyright Office, the choice of our audio heritage remains in the hands of small record labels and archivists. The decision of making these audio recordings available belongs to all of us, including the public, Congress, and the media corporations. If we decide to wait until the pre-1972 sound recording public domain date of February 15, 2067, it may just as well be "the day the music died" (Sharp 310).

Bibliography/Works Cited:

60th Congress, 2d session. "An Act to Amend and Consolidate the Acts Respecting Copyright." U.S. Copyright Office. 1909. 3 November 2012. <http://www.copyright.gov/history/1909act.pdf>.

Archeophone Records. "About Archeophone Records." Archeophone Records. October 11, 2012. 28 October 2012. <http://www.archeophone.com/about/index.php?osCsid=fl6sn45jobpbd90f59o16gf3t2>.

Association for Recorded Sound Collections. "Legal Impediments to Preservation of and Access to the Audio Heritage of the United States." Association for Recorded Sound Collections. November 2, 2007. 25 November 2012. <http://www.arsc-audio.org/pdf/ARSC-MLAcopyright.pdf>. PDF file.

Battista, Nicola. "Federal Law Protection on pre-1972 Recorded Music Masters in the United States." United States Copyright Office. January 13, 2011. 30 September 2012. <http://www.copyright.gov/docs/sound/comments/initial/20110113-N-Battista.pdf>. PDF file.

Bonds, Mark Evan. A History of Music in Western Culture Second Edition. 2006. Pearson Prentice Hall. Upper Saddle River, New Jersey.

Brooks, Michael. Booklet. Pop Music: The Early Years 1890-1950. Columbia, 1999. CD.

Brooks, Tim. "A Directory to Columbia Recording Artists of the 1890s." ARSC Journal. 1979. 7 October 2012. <http://www.timbrooks.net/PDFs/colhist79.pdf>. Pg.102-138.

Brooks, Tim. "How Copyright Law Affects Reissues of Historic Recordings: A New Study." ARSC Journal. 2005. 7 October 2012. <http://www.timbrooks.net/PDFs//copyrarscj05.pdf>. Pg. 183-199.

Brooks, Tim. Lost Sounds. 2004. University of Illinois Press. Urbana, Illinois.

Carroll, Jacob J. "New York Common Law Copyright Infringement and the International Copyright Public Domain." Oregon State Bar Association. May 2005. 31 January 2012. <http://www.osbar-ils.org/articles/NewYorkCommonLawCopyright.pdf>. PDF file.

Cellan-Jones, Rory. "Victory for Cliff's Law."BBC News Technology. September 7, 2011. 28 February 2012. <http://www.bbc.co.uk/news/technology-14829373>.

Copyright Law of the United States of America. "Chapter 3: Duration of Copyright." United States Copyright Office. 2012. 4 November 2012. <http://www.copyright.gov/title17/92chap3.html#303>.

Edison, Thomas. "The Perfected Phonograph." The North American Review. June 1888. Pg. 641-650.

Gold, Gerald. "Record Notes; Caruso Series Nears Its End." The New York Times. September 15, 1985. 10 August 2012. <http://www.nytimes.com/1985/09/15/arts/record-notes-caruso-series-nears-its-end.html>.

Graffeo, J. "USCOA, 2 No. 30: Capitol Records, Inc., Appellant, v. Naxos of America, Inc., Respondent." April 5, 2005. 31 January 2012. <http://www.law.cornell.edu/nyctap/I05_0027.htm>.

Halliday, Josh. "Musicians win copyright extension to 70 years." The Guardian. September 12, 2011. 15 April 2012. <http://www.guardian.co.uk/media/2011/sep/12/musicians-copyright-extension>.

Historical Recording Coalition for Access and Preservation. 2012. 4 September 2012. <http://www.recordingcopyright.org/about.html>.

Hoffman, Frank. Encyclopedia of Recorded Sound, Second Edition. 2005. Routledge. New York, New York.

Immortal Voices. British Pathe News, 1936. Newsreel.

Karjala, Dennis S. "Opposing Copyright Extension." Arizona State University. January 23, 2012. 15 November 2012. <http://homepages.law.asu.edu/~dkarjala/OpposingCopyrightExtension/>.

Kendall, Ted. "One man's approach to remastering." The Cambridge Companion to Recorded Music. 2009. Cambridge University Press. Cambridge, United Kingdom. Pg. 210-213.

Library of Congress. "The Gramophone." Library of Congress. April 30, 2002. 4 September 2012. <http://memory.loc.gov/ammem/berlhtml/berlgramo.html>.

Library of Congress. "The History of the Edison Cylinder Phonograph." Library of Congress. January 13, 1999. 4 September 2012. <http://memory.loc.gov/ammem/edhtml/edcyldr.html>.

MacGillivray, E.J. The Copyright Act, 1911, Annotated. 1912. Steven And Sons, Limited, London, United Kingdom.

Marmorstein, Gary. The label: the story of Columbia Records. 2007. Thunder's Mouth Press. New York, New York.

Martin, Richard. Interview by Esther Kaplan and Marilyn Kleinberg Neimark. *Beyond the Pale*. WBAI, New York. 18 October 2009. Radio.

Martin, Richard. Telephone interview. 17 October 2012.

McWilliams, Jerry. The Preservation and Restoration of Sound Recordings. 1979. American Association for State and Local History. Nashville, Tennessee.

Mileham, Rebecca. "Sounds of History." Engineering & Technology. October 4-November 6, 2009. Pg. 22-24.

Millard, Andre. America on Record: A History of Recorded Sound, Second Edition. 2005. Cambridge University Press. New York, New York.

Naxos Digital Services Ltd. Naxos: The World's Leading Classical Music Group. 2012. 2 February 2012. <http://www.naxos.com>.

Newby, Greg. "Copyright How-To." Project Gutenberg. March 25, 2012. 4 October 2012. <http://www.gutenberg.org/wiki/Gutenberg:Copyright_How-To>.

One Hundred Fifth Congress of the United States of America. S. 505, Title I – Copyright Term Extension. January 27, 1998. <www.copyright.gov/legislation/s505.pdf>. PDF file.

Page, Tim. Booklet. Sony Classical Great Performances: 1903-1998. Sony Classical, 1999. CD.

Phantom Productions, Inc. Phantom's Reel to Reel Tape Recorder Museum. 2008. 26 October 2012. <http://reel2reeltexas.com/PPIMuseumAmpex200.html>.

Sharp, Holly. "The Day The Music Died: How Overly Extended Copyright Terms Threaten The Very Existence Of Our Nation's Earliest Works." Emory Law Journal Vol. 57. 2007. Pg. 279-310.

Sherwin, Adam. "Rock 'N' Roll 'Swindle' – The day the royalties die." Elvis Australia. November 2, 2004. 3 April 2012. <http://www.elvis.com.au/presley/rock_n_roll_swindle.shtml>.

Snell, Karen Crocker. "The Man Behind the Sound." Santa Clara Magazine. Summer 2006. 1 November 2012. <http://www.scu.edu/scm/summer2006/sound.cfm>.

Stanley, Bob. "Copyright Extension: good for Cliff and the Beatles, bad for the little guys?" The Guardian. September 15, 2011. 3 April 2012. <http://www.guardian.co.uk/music/2011/sep/15/copyright-extension-cliffs-law-beatles>.

U.S. Copyright Office. "United States Copyright Office: A Brief Introduction and History." United States Copyright Office. 2008. 24 October 2012. <http://www.copyright.gov/circs/circ1a.html>.

U.S. Copyright Office. "Pre-1972 Sound Recordings." United States Copyright Office. 2009. 4 November 2012. <http://www.copyright.gov/docs/sound/pre-72-exec-summary.pdf>. Pg. vii-x.

Whitburn, Joel. Pop Memories 1890-1954: The History of American Popular Music. 1986. Record Research Inc. Menomonee Falls, Wisconsin.

Wilson, John S. Booklet. "The Swing Years: 24 Top Bands, 72 Top Tunes, Original Performances, 1936-1946." Reader's Digest.1960-1969? LP recording.

Yale University Library. "The history of 78 RPM recordings." Music Cataloging at Yale. 2012. 4 September 2012. <http://www.library.yale.edu/cataloging/music/historyof78rpms.htm>.