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Digitizing, Organizing and Managing an Audio-Visual Archive: The Trevor Jones Archive at the University of Leeds

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Abstract:

Between 2005 and 2013, film-music composer Trevor Jones donated around 1000 items relating to his film and television scores to the University of Leeds. The collection includes audio and video materials alongside associated paperwork, and some musical sketches and scores. In order to undertake research into the Trevor Jones Archive, the entire collection required digitization and cataloguing, both to facilitate navigation of the materials, and enable understanding of the relationships between them and the processes that they document. This paper considers the practicalities of working with the archive including matters relating to the digitization of a range of analogue and paper-based items, the creation of appropriate metadata and repository structures, and the prioritization of some parts of the collection over others. It is hoped that the lessons learned through this activity highlight some of the issues and considerations of working with archival audio-visual materials, and provide a roadmap for those working with similar collections.

Key words:

audio-visual archive; digitization; metadata; Molly; Trevor Jones

With a career spanning nearly 40 years, Trevor Jones is one of the most successful contemporary British-based composers of film music and is seen by peers as an influential figure in the industry. He is distinguished by the range of projects he has worked on, the directors he has collaborated with, and his development of novel approaches to the creation of film music. His output includes scores for the groundbreaking animatronic films of Jim Henson (*The Dark Crystal*, 1982; *Labyrinth*, 1986), films with significant cultural impact such as *Brassed Off!* (1996) and *Notting Hill* (1999), and those dealing with political issues both in the UK and abroad. The latter includes pictures such as *In the Name of the Father* (1993) which investigates the wrongful arrest and treatment of the Guildford Four, and *Mississippi Burning* (1988), which deals with the struggles of black civil-rights activists and the Ku Klux Klan in the southern US in the 1960s. He has been active in an industry that has experienced a prolonged period of major technological change, including the switchover from analogue to digital production and post-production techniques, and developments in computer software for score production and sound recording/editing. In the audio sphere, this period saw the development of the digital audio workstation, the digital synthesizer and other electronic instruments that significantly impacted on the collaborative process of film-score production. Jones has been in the vanguard in his use of such technology and he continues to operate at the forefront of the profession. His embrace of a range of technologies across his career has resulted in his accumulation of a particularly rich personal collection of materials relating to his film and television scores.

In 2005 and 2010 Jones donated large collections of these materials to the University of Leeds. The original donation consisted of more than 400 multi-track analogue tapes of demos and session recordings, and an array of associated paperwork, with the second donation comprising rough and fine cuts for several pictures, additional multi-track and demo recordings, and some final mixes, another 300 or so items in total. A third donation was received in early 2013 taking the collection to around 1000 audio-visual items (plus paperwork and some musical scores), and Jones supplied three further boxes of paperwork in April 2015 - mainly spotting notes and similar records of communication between the music and film teams - expanding the breadth and depth of the archive further. In their 2009 scoping study for the Music Libraries Trust, *Film and Television Music Sources in the UK and Ireland*, Miguel Mera and Ben Winters observed that the holdings at the University of Leeds, which include the Michael Nyman Collection as well as the Jones Archive, are unique in the UK owing to the presence of demo and multi-track session recordings alongside musical and textual artefacts.¹ In 2013, the Arts and Humanities Research Council (AHRC) awarded David Cooper and Ian Sapiro a major grant to undertake research into these archival film-music materials [grant number AH/K003828/1]. The project investigates the various phases of Jones's career and changes in his sound, style and approach to scoring for film and television, in addition to researching changes in the creative process and how developments in technology have impacted on how Jones works. The project is situated within the context of research into the British film-music business more generally and it is planned that it will offer direct benefit to the film-music industry. The multi-

¹ Ben Winters and Miguel Mera, "Film and Television Music Sources in the UK and Ireland," *Brio* 46, no. 2, 37–65, 44-46.

dimensional nature of an audio-visual archive, combining audio, textual, musical and video sources, lends itself particularly well to an online repository resource that facilitates simultaneous cross referencing between items of different formats; the creation of such a system for the Jones materials is one of the key outputs of the research project.

While other multi-format collections have come to light over the last five or six years - not least the Barry Gray Archive that Evans discusses in this issue - it remains the case that there is relatively little experience within the scholarly film-music community of working with the range and indeed the quantity of materials such as that found in the Jones Archive. This article considers the practicalities of engaging with the archive, and examines issues surrounding the digitization, organization and management of the materials within the collection, as well as touching on considerations such as prioritization and the testing of an online archival interface and system. Throughout the discussion, examples are drawn from Jones's score for the 1999 film *Molly* (dir. John Duigan), for which the archival holdings are particularly diverse: audio from 24-track multitrack recording sessions and six- and eight-track mixes; complete viewing copies of the picture dated 29 June and 18 September 1999 on VHS tapes; numerous track sheets for the multitrack recordings, cue lists for the film, and a set of spotting notes, and; sketches of musical material that forms the basic idea behind a number of the film's cues. It is hoped that the lessons learned through this project will bring greater clarity to some of the issues and considerations of working with archival audio-visual materials, and provide a useful resource for those working with similar collections.

Digitization

William Koseluk has considered the tension between the utility and shortcomings of digital archiving, arguing that while a digital archive offers wide and permanent access to materials electronically, it is no substitute for the original source. Yet, he also suggests that as sources will deteriorate over time, digitization offers an invaluable opportunity:

It may not always be possible to prevent the accidental disintegration of some treasures, but it is possible to record, however inadequately, a representation of the original – a present-day snapshot – that can exist indefinitely.²

While Koseluk's focus is on images, his reflection on the "disintegration of some treasures" is equally relevant in an audio-visual archive, where the reels of magnetic tape deteriorate continually.³ Such is indeed the case in the Trevor Jones Archive and, furthermore, much of the paperwork relating to the audio-visual sources had already

² William Koseluk, "Digital Preservation of Archival Material," in *A Handbook to Twentieth-Century Musical Sketches*, ed. Patricia Hall and Friedemann Sallis (Cambridge: Cambridge University Press, 2004), 74–84 (74).

³ On the issue of the deterioration of magnetic tape, see Gerald G. Gibson, *Magnetic Tape Deterioration: Recognition, Recovery, and Prevention* (1996) <http://www.unesco.org/webworld/ramp/html/r9704e/r9704e11.htm> [6 November 2015]. Originally presented at the IASA Conference in Perugia, 26 August 1996.

suffered water damage prior to arriving in Leeds. Koseluk's view that "in most situations the [digital] reproduction is a mere shadow of the original" might now be considered a little extreme,⁴ given the advances in digital imaging technology over the decade since his chapter was published, though the premise that a digital copy can never fully replace the original source can still be seen as fundamentally accurate. However, his perspective can also be seen to apply to the digitization of sound recordings, where consideration of factors such as sample frequency and bit rate impact on the degree of accuracy with which the analogue sound data are captured and encoded in the digital copy. These matters will be considered below in relation to the digitization of the analogue reels of sound in the Trevor Jones Archive.

Koseluk's observations notwithstanding, the entire Trevor Jones Archive required digitization and cataloguing not only because of the deteriorating state of many of the items in the collection, but also to facilitate basic use and navigation of the materials, and enable understanding of the relationships between them and the processes that they document. Discussions with members of the University of Leeds Library team and advice provided by the University's Research Data Management Pilot Project (RoADMaP), led to the project Principal and Co-Investigators, Cooper and Sapiro, taking some of the first far-reaching decisions about the project before it had even begun, since technical details of the digitization project were required in order that the work could be put out to tender in line with University procedures. Questions were posed by Library and RoADMaP personnel regarding short- and long-term accessibility of the resources, whether the primary aim of digitization was to enable use of the materials, to preserve them, or both, and the sorts of research contexts in which other scholars might want to access and use the digital files. It was decided that the materials should be managed in a way that ensured long-term preservation even if the research-project website was rendered obsolete, and that they should be accessible to scholars, students and the public, with restrictions in place to comply with copyright regulations.

Decisions regarding suitable file formats were taken prior to the digitization process. Lossless WAV files were selected for individual tracks of audio, with collections of files stored as ProTools sessions, given that ProTools is, at least at present, widely used within both the recording and film-music industries and can be seen as a de facto standard. Notwithstanding this, however, WAV files can be accessed directly without the need for ProTools, with most audio packages on both PC and Macintosh computers, as well as the majority of smartphones and tablets able to play back sounds in this format. It was also agreed that files should be digitized at two resolutions: 16bit, 44.1kHz for immediate re-use, and 24bit, 96kHz for long-term storage and preservation. While the lower-resolution files (which are still of CD quality) are suitable for long-term preservation, the possibility that higher-resolution data might be required for future research projects and the relative ease with which both versions could be created led to the decision to create high- and standard-definition audio files.⁵

⁴ Koseluk, "Digital Preservation of Archival Material," 74.

⁵ In their consideration of digitizing speech recordings for archiving, Bartek Plichta and Mark Kornbluh assess the relative merits of different sample rates and bit depths, and suggest that "it seems to be sufficient to use the 44,100Hz sampling rate and a 16-bit resolution [...] as the human ear is not capable of hearing anything above 20,000Hz," though ultimately they adopt a

With paper-based sources, scanning was deemed preferable to photographing materials where possible, since the former provides a constant lighting environment.⁶ It was important to achieve a balance between scanning at a high enough resolution to provide suitable detail for researchers, and the size of the resulting file to be stored in the repository. After some experimentation it was decided to scan at 400dpi for black and white paperwork and 600dpi for color paperwork and pencil sketches, with the higher resolution better for capturing the differences in color and the faintness of pencil markings. Some of the paperwork is very fragile and much of the most recent donation has suffered from water damage and rust from ring binders, clips and the like. This has necessitated careful handling of individual items to prevent causing further harm, especially given that the materials are unique and, until scanned, irreplaceable. By contrast, Jones is particularly careful and cautious with his written and printed scores. Most are hard bound along with draft and sketch materials where they exist, meaning that scanning is not usually possible owing to the close proximity of written information to the bindings and the composer's unwillingness for them to be unpicked. Accordingly, the scores required photographing, and given that a score might have anything from 150 to over 500 pages, this is an extremely time-consuming task – certainly relative to using a sheet-feeder scanner. As already noted, each individual page must also be photographed in similar conditions to ensure consistency across a collection of files for one composition. Accordingly only a small proportion of Jones's scores (which are still held by the composer and do not exist as physical items in the Leeds collection) have been digitized to date, though work in this area is ongoing.

The sheer quantity of materials in the Jones Archive meant the digitization of the vast bulk of audio items took place over eight-months towards the start of the project, from November 2013 to June 2014, with the accompanying paperwork scanned in-house over the same period. Once the digital audio data had been delivered to Leeds it was necessary to consider how they might best be accessed in the repository. The extent of the collection could only really be estimated prior to digitization, since it was not always possible to tell how much audio data was on any given multitrack tape. Choosing the appropriate file format for preservation requires careful consideration of matters such as quality, size, and shelf life.⁷ While WAV files are excellent for preservation purposes, they pose issues for use and storage owing to the linear relationship between file size and duration, meaning that silence uses the same amount of data as significant sound. To alleviate these problems it was decided to convert the high- and standard-definition WAV files to lossless FLAC format (Free Lossless Audio Codec).⁸ FLACs are also widely used in archival work, but since the way they are encoded effectively “strips out” silence, the resulting files are smaller – significantly so

sample rate of 96,000Hz and a 24-bit resolution for their recordings owing to the availability of the necessary technology. Digitizing Speech Recordings for Archival Purposes (2002) http://www.historicalvoices.org/papers/audio_digitization.pdf [14 December 2015], 6.

⁶ Koseluk, “Digital Preservation of Archival Material,” 79.

⁷ The JISC Digital Media infokit for digital file formats is a useful resource for making these decisions: Digital File Formats (2015)

http://www.jiscdigitalmedia.ac.uk/infokit/file_formats/digital-file-formats [14 December 2015].

⁸ Josh Coalson, “About the FLAC Format,” FLAC – Free Lossless Audio Codec (2014)

https://xiph.org/flac/documentation_format_overview.html [6 January 2016].

in the case of the Jones materials – ensuring optimum use of storage space and faster retrieval and playback times. This is evident in the example from Molly shown in Table 1, below.

5M4 “Testing Molly” Mix 1	WAV (KBs)	FLAC (KBs)
Track 1	7,209	2,157
Track 2	7,209	2,143
Track 3	7,209	2,031
Track 4	7,209	817
Track 5	7,209	2,021
Track 6	7,209	1,897
Track 7	7,209	1,484
Track 8	7,209	1,426
TOTAL for cue	57,672	13,976

Table 1. Comparison of file sizes for WAVs and FLACs for cue 5M4 “Testing Molly” Mix 1 from Molly

While the WAV files for cue 5M4 “Testing Molly” Mix 1 are all the same size – in this case just over 7MB – track 4 on the multitrack tape is actually silent, and the amount of audio material on the others varies. Accordingly, the sizes of the converted FLAC files better reflect the amount of audio data on each track. All WAV files in the Jones Archive have been converted to FLAC format, and the original WAVs have been deleted, resulting in a significant space saving of around 70% across the whole collection of audio materials. The high-definition FLAC files were moved into long-term “cold storage” for preservation, with the standard-definition files accessed via the University of Leeds repository for research and teaching purposes.

Organization

Although digitization of materials enables them to be used, without associated metadata – detailed descriptions of and information on each item in a collection – navigation and active engagement with an archive is extremely limited. Constructing the metadata schema for the Jones Archive was a long and painstaking process, particularly given the need to bear in mind all those who might have an interest in the data, going beyond researchers and including the public and, of course, the composer himself.⁹

Development of the metadata schema required careful consideration of the possible and potential uses the materials may have for different types of users in addition to how the metadata supports access to and use of the materials beyond the end of the project’s funded period. The metadata schema has around 80 fields, though no individual artefact

⁹ We have been indebted to Tim Banks from the University of Leeds Research Data Management team, who has continually challenged us regarding the nature of the materials, the data that accompanies them, and the uses they all have.

has data in all of them. Effectively the schema breaks down into a number of smaller structures for the purposes of logging metadata relating to different types of item: audio, video, textual documentation and musical notation.

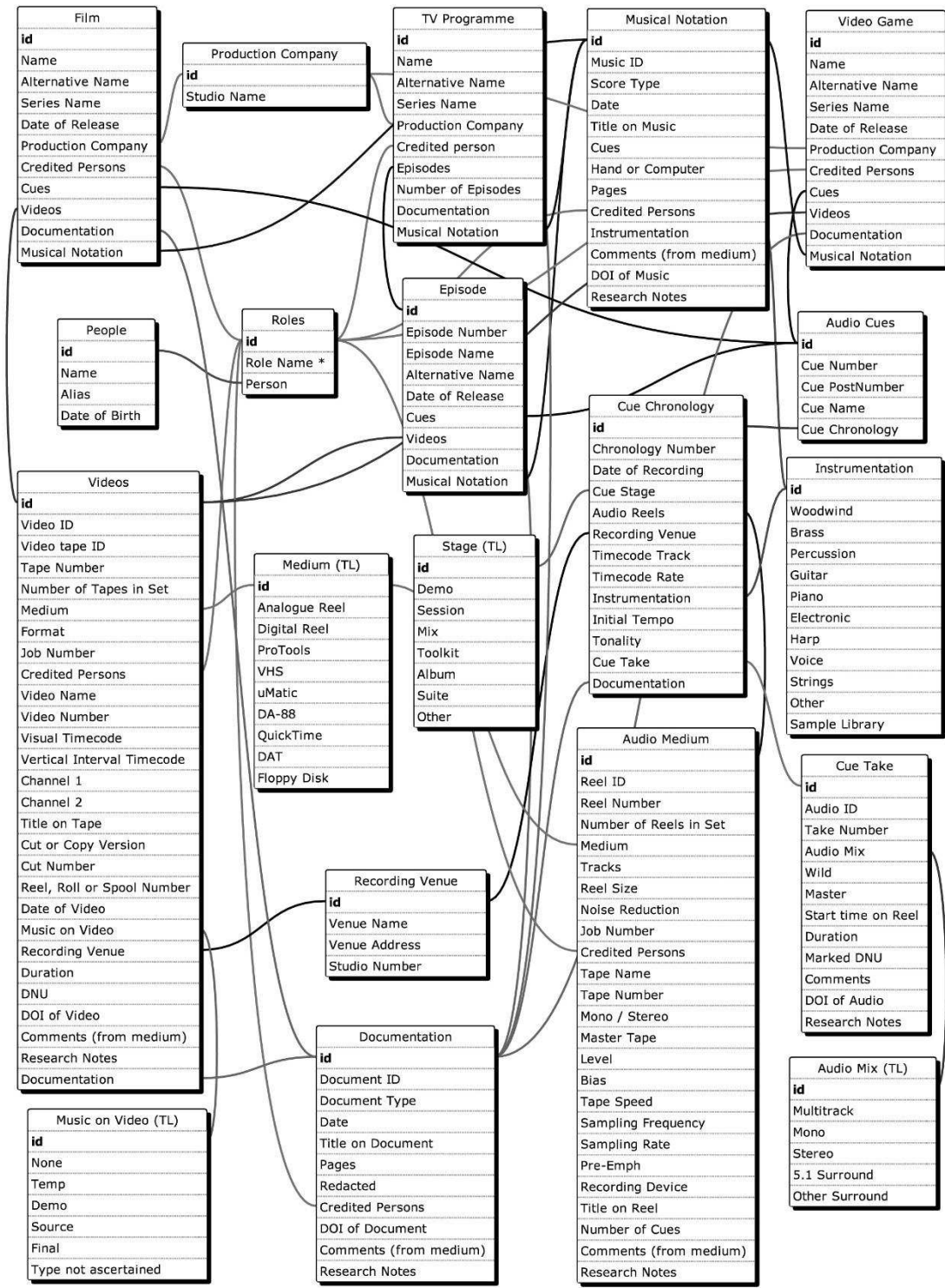


Figure 1. Graphical representation of the Trevor Jones Archive metadata schema¹⁰

¹⁰ Tables with names containing the abbreviation (TL) show term lists rather than additional metadata fields.

Figure 1 presents the complete metadata architecture for the archive, though the majority of the fields actually relate to the audio materials that comprise the bulk of the collection. While the structure appears to be complex, this is necessary to ensure that all items of metadata are attached to the relevant artefact at the appropriate level of a film, television or video game project. For instance, whereas the title of the screen music project applies to all artefacts for that collection regardless of whether they are audio, video, textual or musical, and is therefore towards the top of the architecture, information about whether or not a particular take of a particular cue recorded at a particular session was played “Wild” relates only to that specific audio instance within the overall project, and therefore sits much further down in the chain.

Several fields were populated quickly with little detailed reference to the materials themselves - composer, film/television/game title and the like – since they are common to all items relating to a single scoring project. In addition to the main schema, some further fields are required by the University of Leeds in order to deposit the materials in the institutional repository – project title, publisher, authors, etc. – which, in general, were also generated semi-automatically. However, assuming there are around 70 cues per project (on an assumption that each cue is only played once during recording, and is not repeated on a subsequent recording date), and given that Jones has completed about 90 projects, the challenge of completing upwards of 1,000,000 items of metadata was extremely daunting.

In order to log the metadata, the schema was “flattened” into a spreadsheet, with the required columns then extracted into separate sheets for audio, video, textual documentation and musical resources. Each individual cue on a reel of tape, video recording and item of paperwork was given its own line in its respective table, meaning that every distinct item in the collection is associated with a unique row of metadata. Tables 2a and 2b show some of the metadata for a small selection of audio and video items from the film Molly.

Film Name	Alternative Name	Release Date	Medium	Tracks	Cue No.	Cue Name	Chronology	Initial Tempo (bpm)	Tonality	Take	Duration
Molly	Rescue Me	22/10/99	Native Digital	6	1M1	Opening Titles	1	95	A	1	2:05
Molly	Rescue Me	22/10/99	Native Digital	8	1M2	Brookview Nursing Hospital	1	90	D	1	0:45
Molly	Rescue Me	22/10/99	Native Digital	8	1M4	Going Home	1	120	A	1	0:45

Table 2a. Excerpt from the audio spreadsheet for Molly, showing three audio recordings

Film Name	Alternative Name	Release Date	Medium	Format	Video Tape Name	Visual Timecode (BITC)	Vertical Interval Timecode (VITC)	Tape Date	Duration
Molly	Rescue Me	22/10/99	VHS	NTSC	Rescue Me Viewing Copy	No	No	29/06/99	01:57:11
Molly	Rescue Me	22/10/99	VHS	NTSC	Molly Viewing Copy for JD	No	No	18/09/99	02:02:31

Table 2b. Excerpt from the video spreadsheet for Molly showing the two video items in the Archive

One of the key challenges in organizing an archive is how to label and classify materials. This problem was exacerbated in the Jones Archive by the fact that several of the artefacts afforded scant information about their date of creation or their purpose in the creative process. This is not unusual and, indeed, it is a challenge faced by most composer-centric archives, where materials may not provide clear information and thus a system must be developed to accommodate items that cannot be systematically classified.¹¹ Since there were no standardized metadata conventions available for film-music materials, the project team developed their own metadata schema and a system of naming conventions in order to label each individual item, whether audio, video, textual or musical notation, and to provide some basic information about the nature of the file. As noted by Erika Schaller in her discussion of database management systems, “working from prepared lists of standardized information saves time when entering information in the database. It also guarantees the uniformity of the database and enlarges the program’s search capacity.”¹² The naming conventions created for the Jones materials are based on a system of concatenated abbreviations that identify the screen project, material type, and other key identifying features (that vary between material types). The various abbreviations are separated by underscore marks for clarity, with related elements such as words in a cue name or numbers in a date linked by dashes.¹³

¹¹ This can be seen to be the case with items in the Luigi Nono archive. See Erika Schaller, “The Classification of Musical Sketches exemplified in the catalogue of the Archivio Luigi Nono,” in *A Handbook to Twentieth-Century Musical Sketches*, ed. Patricia Hall and Friedemann Sallis (Cambridge: Cambridge University Press, 2004), 59-73 (59).

¹² Schaller, “The Classification of Musical Sketches,” 73.

¹³ Where two projects have required the same abbreviation, they have been distinguished by the addition of a further abbreviation hyphenated from the first. There are three such pairs in the Jones Archive: Molly and Merlin, distinguished by -F and -T to show film and television projects respectively; Labyrinth, which is a name common to both a film and a television project, and therefore also uses -F and -T, and; the TV mini-series *Dinotopia* and the spin-off TV series of the same name, distinguished by -TM (for mini-series) and -T respectively.

Type	Naming Structure	Filename	Explanation
Audio	[Project Name] _ [Material Type] _ [Cue Number or Name] _ [Audio Type] ¹⁴ _ [Recording Chronology] _ [Take] _ [Slave, Copy or similar] _ [Track]	M-F_A_5M4_M8_C1_T1_TR01	Track 1 of take 1 of the 1 st recording of an 8-track mix (Audio) of cue 5M4 from Molly
Video	[Project Name] _ [Material Type] _ [Cut Type (if known)] _ [Episode Number] _ [Reel Number] _ [Date]	M-F_V_Viewing_29-6-1999	Viewing copy (Video) dated 29 June 1999 for Molly (no episode or reel number)
Text	[Project Name] _ [Material Type] _ [Cue Number] _ [Item Type] _ [Audio Type] _ [Recording Chronology]	M-F_T_5M4_TS_S24_C1	Track sheet (Text) for the 1 st 24-track recording session of cue 5M4 from Molly
Music	[Project Name] _ [Material Type] _ [Item Type(s)] _ [Cue Number(s), Various, or Complete]	M-F_M_S_Various	Sketch material (Music) relating to various cues from Molly

Table 3. Naming structures and example filenames, with explanations, from Molly.

Table 3 shows the structures and example filenames for different materials from Molly, along with an explanation of each filename. It should be noted that elements of a filename may be omitted where they are not applicable (such as an episode number in a video from a film), and in broad terms the explanations decipher the filenames from right to left, going from the specific to the general. While this system results in often quite long filenames, this is necessary in order to ensure that every item in the Archive has a unique ID, enabling it to be related to its metadata in the University repository.¹⁵

Management

Most large archival projects at the University of Leeds do not require the data to be placed behind any form of access control, and indeed, some funding bodies require all research data to be freely available to the public. The Trevor Jones project is funded by the Arts and Humanities Research Council, as already noted, so some open access to the project data and materials is expected. However, given that the University's agreement with the composer allows access to the materials for the purposes of research and teaching, and not for commercial exploitation, it has been necessary to implement a form of access control. Within our own institution, the research data management team is able to implement a localized layer of security known as LDAP (Lightweight Data Access Protocol), which restricts access to an internal network (computers at the University or VPN users with a University of Leeds log in). While this might be

¹⁴ The audio type is logged as either a demo (D), toolkit (T), session (S), mix (M), album (A) or other (O).

¹⁵ Occasionally naming elements contained a forward slash, usually when cues are linked together over a change of reel (such as 5M4/6M0). This character that cannot be used in Windows filenames, so was replaced with a semicolon in the item ID.

sufficient for the use of the materials as part of in-house university research and teaching programs, it is clearly insufficient to manage the needs of researchers outside the institution. Using an externally-managed gateway such as Shibboleth could permit access to scholars beyond Leeds. Shibboleth is widely used in public-sector organizations where it ensures that only those with an organizational username and password are granted access rights, with the overall user list regulated and monitored via the Shibboleth scheme.¹⁶ The Access Management Federation controls Shibboleth access in the UK,¹⁷ and users agree to abide by current licensing rules before being granted any access, which lapses if they leave an institution.

However, a decision was taken to monitor internally use of the archive in the first instance to develop an understanding of the user community and measure interest in the resources, before the potential adoption of a single-sign-on system such as Shibboleth. Accordingly, access is by email application to the project team, with potential users required to state their reasons for access and agree to abide by the terms of use. The team maintains a list of all registered users and can grant access to the resources through time-limited log-ins (typically for a period of three years, suitable time to complete a research project or doctorate), which can be renewed as necessary. While it is impossible to prevent users from breaking this agreement governing their use of the materials, this is an eventuality that is beyond the project team's reasonable control, and is clearly a challenge facing numerous other archives and similar sites. Accordingly, all commercially-sensitive materials (all audio, video and musical items and some paperwork) have been placed behind a layer of access control, with the remaining items (textual resources) available to all users, with information such as telephone numbers and email addresses redacted from the digital resources.

Prioritization

The sheer volume of material in the collection and the extremely large number of items of metadata meant that it was necessary to prioritize particular projects, which raises the question of how to identify which items from a collection should be selected. Ultimately the answer depends on the criteria on which the decision is based: the quality or success of a film; the perceived aesthetic quality or success of a score; the amount of materials relating to a particular film or program held in the collection; or a particular research need. For example, taking two of the films Jones has scored, *The Last of the Mohicans* and *Molly*, there are conflicting reasons for prioritizing one over the other. While *The Last of the Mohicans* is more widely known as a film, there are almost no materials for it in the Archive. However, the Archive includes a great deal of interesting paperwork alongside audio and video files for *Molly*, which also fits a specific area of research for the monograph on Jones that is one of the research project outputs.¹⁸ Indeed, the availability of a wide range of materials despite the film being relatively unknown is the

¹⁶ Shibboleth, "How Shibboleth Works: Basic Concepts," Shibboleth (N.D.) <https://shibboleth.net/about/basic.html> [6 January 2016].

¹⁷ JISC Collections and Janet Limited, "How it Works," The UK Access Management Federation for Education and Research (N.D.) <http://www.ukfederation.org.uk/content/Documents/HowItWorks> [6 January 2016].

¹⁸ David Cooper, Ian Sapiro, and Laura Anderson, *The Screen Music of Trevor Jones: Technology, Process, Production* (Ashgate, forthcoming).

reason that all of the examples given in this article are from Molly. The picture becomes more complex still if the interests and expectations of the broader user community are taken into account, such as members of the public who might engage with publications arising from the research, and might expect a section on *The Last of the Mohicans* in a book on the film and television scores of Trevor Jones.

The implications of including or omitting a particular film or television program can also impact on the direction of future research, and the project team had to consider whether the decisions taken when prioritizing some projects over others could result in the generation of a particular canon of Jones's work. Furthermore, there is a risk that broad scholarly awareness of some types of film-score production resources may be limited owing to the decisions taken during the course of the project. Some degree of prioritization was always likely when working with the archival materials, given the quantity of items and metadata and the limited period of funded research time, though some of the potential problems stemming from it are mitigated by this discussion of the issues, and additional information outlining the full breadth and depth of the archive on the website.

Testing

Once all of the digital Trevor Jones items are in the University repository and archive website is completed, it will be important to test the interface and connectivity thoroughly before the online archive is launched officially. Koseluk notes in relation to database testing that "one must have an idea in advance of how users may react to material in order to correct misconceptions in the product before mass distribution."¹⁹ The testing of the Jones website and linked repository will be carried out by a range of stakeholders including the project team, selected film-music researchers, members of the University of Leeds Library, IT Services and Research Data Management teams, and some public users from external groups that have worked with the research team over the course of the project. Time has been built into the project schedule to allow for development and refinement of the website after this period of initial testing, with a further trial use period ahead of the public launch of the website in the final months of the project.

Conclusion

This article has attempted to map out the three broad areas of developing an audio-visual archive: digitizing, organizing, and managing the resources. It has been shown that the process of digitizing is shaped by the timescale of a project, the selection of file formats, and storage concerns, and cost may, of course, also be an issue. Organization of the digital materials requires the creation of a comprehensive metadata schema that not only enables identification of individual items and basic navigation of the collection, but also takes into account the current and possible future uses of the materials. Finally, management of an audio-visual archive is an ongoing consideration that seeks to balance shareholder concerns with research-project priorities, while granting and restricting access to the materials in the collection as appropriate. Prioritization is a

¹⁹ Koseluk, "Digital Preservation of Archival Material," 83.

factor across all of these phases of activity, with decisions taken at any stage not only having implications for the rest of the research project, but also perhaps on how a resource might be structured and used, and on the ways in which the materials in a collection are received and understood. Over the course of the Trevor Jones project, the immense value of engaging with support services has been increasingly apparent, notably during the planning stage of this large archival project. The expertise and support of staff at the University of Leeds Library, and the RoaDMaP and Research Data Management teams were invaluable to the success of this project. They helped significantly with shaping the project infrastructure to ensure that stakeholder concerns were respected while also creating an online audio-visual archive of optimum usefulness to scholars and students and interest to the public, now and in the future.

References

Coalson, Josh. 2014. About the FLAC Format. FLAC – Free Lossless Audio Codec. https://xiph.org/flac/documentation_format_overview.html (accessed 6 January 2016).

Cooper, David, Ian Sapiro, and Laura Anderson. Forthcoming 2017. *The Screen Music of Trevor Jones: Technology, Process, Production*. Farnham: Ashgate.

Gibson, Gerald G. 1996. *Magnetic Tape Deterioration: Recognition, Recovery, and Prevention*. UNESCO. <http://www.unesco.org/webworld/ramp/html/r9704e/r9704e11.htm> (accessed 6 November 2015). Originally presented at the IASA Conference, Perugia, 26 August 1996.

JISC. 2015. *Digital File Formats*. JISC Digital Media. http://www.jiscdigitalmedia.ac.uk/infokit/file_formats/digital-file-formats (accessed 14 December 2015).

JISC Collections and Janet Limited. n.d. *How it Works*. The UK Access Management Federation for Education and Research. <http://www.ukfederation.org.uk/content/Documents/HowItWorks> (accessed 6 January 2016).

Koseluk, William. 2004. *Digital Preservation of Archival Material*. In *A Handbook to Twentieth-Century Musical Sketches*, ed. Patricia Hall and Friedemann Sallis. Cambridge: Cambridge University Press, 74-84.

Plichta, Bartek and Mark Kornbluh. 2002. *Digitizing Speech Recordings for Archival Purposes*. *Historical Voices*. http://www.historicalvoices.org/papers/audio_digitization.pdf (accessed 14 December 2015).

Schaller, Erika. 2004. *The Classification of Musical Sketches exemplified in the catalogue of the Archivio Luigi Nono*. In *A Handbook to Twentieth-Century Musical Sketches*, ed. Patricia Hall and Friedemann Sallis. Cambridge: Cambridge University Press, 59-73.

Shiboleth. n.d. How Shiboleth Works: Basic Concepts, Shiboleth.
<https://shibboleth.net/about/basic.html> (accessed 6 January 2016).

University of Leeds. 2016. The Trevor Jones Archive. Screen Music.
<http://www.screenmusic.leeds.ac.uk>.

Winters, Ben and Miguel Mera. 2009. Film and Television Music Sources in the UK and Ireland. *Brio* 46, no. 2, 37–65.