Show me a Strathspey: Taking Steps to Digitize Tune Collections

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Abstract

Purpose – The present article describes an AHRC research project into Scottish fiddle music, and the important considerations of music digitisation, access and discovery in designing the website that will be one of the project's enduring outcomes.
Design/Methodology/Approach – The paper is a general review of existing online indices to music repertoires; some of the general problems associated with selecting metadata and indexing such material; and a survey of various recent and contemporary projects into the digital encoding of musical notation for online use.
Findings – The questions addressed during the design of the Bass Culture project database serve to highlight the importance of cooperation between musicologists, information specialists and computer scientists, and the benefits of having researchers with strengths in more than one of these disciplines. The Music Encoding Initiative proves an effective means of providing digital access to the Scottish fiddle tune repertoire.
Originality/value– The digital encoding of music notation is still comparatively cutting-edge; the Bass Culture project is thus a useful exemplar for interdisciplinary collaboration between musicologists, information specialists and computer scientists, and addresses issues which are likely to be applicable to future projects of this nature.
Keywords: Online music indices, Music databases, Digital music software, Music Encoding Initiative, Scottish fiddle music, Scottish dance music
Article Classification: Case Study

Introduction

Scottish country dance tunes have been associated with performance on the violin ('fiddle', in common parlance) for at least three centuries. Originally, the fiddler was accompanied by a cello,

which provided a simple bassline and a regular beat to help the dancers keep time. This is still possible, of course, but from the mid-eighteenth to mid-nineteenth centuries, surviving published tune-books reveal a story of changing accompaniment styles. One of the main changes was the increasing use of a keyboard instrument alongside or eventually replacing the cello. Around the turn of the eighteenth to nineteenth centuries, a harp was another popular alternative. The accompaniments became more intricate to suit the new instrumentation. Both piano and harp were as likely to be used for private, domestic entertainment as to accompany dances, so in these circumstances what was originally dance-music now had a different function.

Although Scottish dance music is still alive and well, many traditional musicians enjoy exploring the vast repertoire of these historic collections. Sourcing these collections has, however, presented problems. The original publications are rare and generally reside in library special collections, and only a few have been reproduced in facsimile or new editions. Digitised scores are an excellent solution to the problem, but instrumentalists and scholars alike still need to use indexes and other finding tools in order to access materials and discover further repertoire. These tools need to indicate the names of tunes, how the tunes go, what key they are in, and where they can be found, both at the volume and library collection level. Librarians working with musicians need to know what is now technically possible at these various levels, and it is in everyone's interest to stay abreast of interesting projects and facilities.

One particular index was compiled just before online databases became mainstream in the field of traditional music. The contents of over 300 Scottish fiddle tune-books from the late seventeenth to late nineteenth centuries are listed in Charles Gore's *The Scottish Fiddle Music Index* (Gore 1994), a respected index of thousands of fiddle tunes, which was later released digitally as *The Scottish Music Index*. (Gore n.d.) With recent technological advancements, it became evident that more could be done to aid the discovery and exploration of this repertoire, so the contents of this online listing formed the starting-point for a three-year research project into the basslines and accompaniments of the core Scottish dance music repertoire from the late eighteenth and early nineteenth centuries.

The *Bass Culture in Scottish Musical Traditions* project (2012-2015) was funded by the UK Arts and Humanities Research Council, with researchers from the Universities of Glasgow and Cambridge, and the Royal Conservatoire of Scotland. The final outcome of this project is a website, 'Historical Music of Scotland', which will be examined below. Whilst the fiddle repertoire was explored in Glasgow, the Cambridge-based research examined a similar aspect of the bagpipe's classical repertoire (known as *piobaireachd* in Gaelic, or 'pibroch' in English). The present article is confined to discussion of the fiddle music aspect of the project, and particularly concerns itself with issues of digitisation and discovery, viewed in the context of similar projects in other musical contexts.

The Fiddle Music: Planning and Execution of the Project

Although some books of Scottish dance tunes contain only the unaccompanied tunes, it is more usual to find some kind of accompaniment. Much as guitar chords are indicated by symbols in a modern pop or jazz compilation, chords were indicated in the eighteenth century by means of a 'figured bass'. Elegant, typically Baroque basslines could be played by a cellist, a harpsichord player, or both, with numbers and symbols above the bassline guiding the harpsichord player's choice of chords, as illustrated below. (Fig.1)

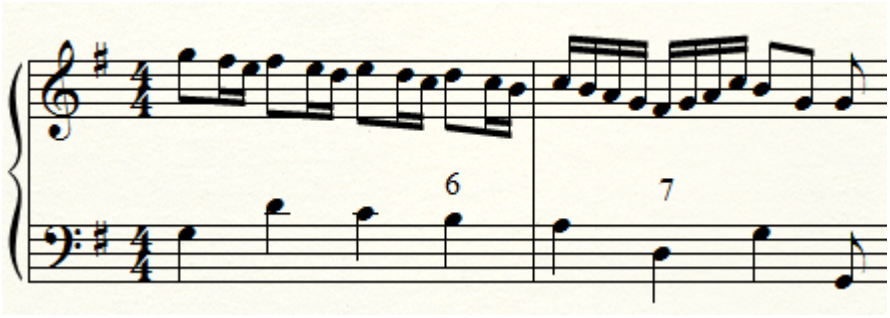

Fig.1. Figured bass notation

In time, these gave way to elementary basslines doing little more than marking time for dancers and sketching a basic harmonic structure. Sometimes the cellist would only have one or two pitches to repeat during a whole dance. As the cello and harpsichord gave way to the piano, however, the accompaniments became more active and harmonically fuller. Rather than the cellist playing a simple bassline, and an optional harpsichord playing a few chords, the pianist's accompaniment grew more elaborate.

The research project commenced with the listing and subsequent viewing of over two hundred collections within the chosen period. A vast database accumulated, including editions and titles unlisted in Gore's index. Annotations were made not only about collections and editions, but also about the musical content and accompaniment styles, not to mention brief biographical notes of the compilers, placing their musical and publishing activities within the context of the times and places in which they lived.

Outcomes of the project were to include scholarly papers and articles, actual performances and recordings, and the abovementioned multiple-function website which would provide commentary, aid discovery, host whole digitised sources, and enable close comparison not only of different sources, but also the same tunes in different editions or different compilations altogether. The two part-time researchers were Dr David McGuinness, a Senior Lecturer in Music, with the present author as Affiliate Postdoctoral Research Assistant, dual-qualified in musicology and librarianship. Technological support was provided by Neil Mcdermott, the University of Glasgow's Resource Development Officer within the School of Culture and Creative Arts, and two successive System Developers - initially a dual-qualified music graduate and software developer, and latterly another computer-experienced doctoral musicologist (Zoltan Komives and Luca Guariento, respectively).

Digital Progress: Access

Web technology over the past two decades has made considerable advances. Library catalogues, union catalogues (e.g., WorldCat (OCLC n.d.), or the UK academic Copac (Jisc & RLUK n.d.), and indices of musical repertoires theoretically make discovery and retrieval far easier than ever before. In researching the Scottish fiddle music repertoire, such websites were invaluable. Copac, our primary resource, which was not available to Gore at the time of his own researches, can now be augmented by specialist listings, such as the online catalogue of the EFDSS Vaughan Williams Library in London (English Folk Dance and Song Society & Vaughan Williams Memorial Library n.d.), or the web-access organised in Dundee by the Friends of the Wighton Collection to an online index no longer hosted by the library authority holding the collection. (Friends of Wighton n.d.)

However, musicians and musicologists have requirements that go beyond even the most sophisticated of indices, and the situation is complicated by a number of factors. These can be identified specifically, but not exclusively, as follows:-

1. Some indices were wholly devised prior to the digital age, e.g. the British Union Catalogue of Early Music. (Schnapper & Schnapper 1957) Others began in print and were subsequently reproduced and/or continued as CD-ROMs or online, such as the vast and scholarly-renowned RISM, not universally available unless individuals have physical and/or online access to large libraries and subscription databases. (RISM n.d.) Very recently, the RISM printed music listings A/1 and B/1 have become freely available online, but they only list collection titles and not their contents. Additionally, the largest library collections are still not entirely catalogued online, so scholars will not discover everything available without either library staff assistance or physical access to old card catalogues. The same applies to culturally significant collections in regional centres, which may have been catalogued in the pre-digital age, but have never attracted funding either for retrospective conversion or for raising awareness of the collections' existence. The Atholl Collection of Scottish music in the A. K. Bell Library in Perth, UK, is a pertinent example.
2. Even in the most carefully catalogued rare book collections, it is not always possible to distinguish the smallest points of difference between different editions, and physical comparisons between books in different library collections are generally impossible except by digital means.
3. In the folk music sphere, there are various indices to tunes, using different codes to identify the particular melodies by tune outline or title. Obviously, different listings have different features, strengths and weaknesses, and may or may not be subject to updating. Moreover, there is no single standard identification code: various approaches have been taken to encoding the melodic outline, quite often involving simplifying the general outline of a tune, rather than comparing every note and decoration within the phrase.
4. A codified incipit (i.e., opening phrase) of a tune is helpful for identification, but it is not the tune itself, and may be of limited value to the musician simply wanting to know 'how the tune goes'. For example, a code enumerating what happens on the strong beats of the first two bars (say, four crotchet beats in each bar) does not equate to a proper transcription of the tune with all its extra ornamentation, 'scotch snap' rhythms and additional decorative notes between the beats. (To give an example in a different field, one might preview a portion of an actual ordnance survey map on a supplier's website, prior to making a journey, but a roughly drawn sketch of the main roads would hardly constitute a preview of any value at all, except to confirm that the map covered the right geographical area.) Meanwhile, the accompaniments are far less likely to have been commented upon, since so many are formulaic and can be roughly assigned to different categories.
5. The scholar of early printed texts has both 'free' finding resources such as the full-text searchability of Google books or the Internet Library of Early Journals, (eLib Electronic Libraries Programme et al. n.d.) and also vast specialist subscription databases such as Eighteenth Century Collections Online. (Gale Cengage Learning n.d.) However, the situation is by no means as satisfactory for musicologists seeking tunes, whether an unidentified scribble in a manuscript collection, or indeed a named or unnamed tune or more extended work in a whole or incomplete published edition.

6. Digitised music manuscripts and publications alike suffer the dual inconvenience of patchy discoverability, and often only elementary metadata. Thus, the Special Collections of Printed Music in the National Library of Scotland's Digital Gallery are comparatively easy to find online (National Library of Scotland n.d.), with individual tunes named; and the collections are often picked up by IMSLP (the "Petrucci Music Library") (IMSLP & Petrucci Music Library n.d.) or Internet Archive (Internet Archive & Archive.org n.d.). The wider repertoire of early music sources *not* held by major libraries is harder to trace; and additionally, there are instances where only melodies, but not their accompaniments, are available digitally, or where smaller publishers make generous quantities of digitised material available, but may lack the detailed metadata, or prove harder for the unaffiliated scholar or lone musician to find.
7. The ownership and hosting of a particular website by an individual or organisation can lead to an index becoming dated in appearance, not being updated in content or, worst of all, becoming inaccessible when funding or hosting arrangements cease. Thus, for example, *Early American Secular Music and its European Sources, 1589-1839: an Index*, from the Colonial Music Institute, remains immensely useful in content, but now looks dated and may never offer access to digitised material. (Colonial Music Institute & Keller 2002) Gore's *The Scottish Music Index* does not list all extant copies even in the UK. Dundee City Libraries used project funding to index the Wighton Collection to a detailed level, but hosting arrangements fell into difficulties, and the present access to the index via the Friends of the Wighton Collection is laudable, but lacks some of the functionality of the original website.

A website for today's musicians

A three-year project in which nearly 300 sources were physically examined, documented and their salient features listed by two part-time researchers, plainly has certain limitations as to the extent of its output. The challenge to the research team, and in particular to the software developers, has been to fill the gap between the deficiencies of earlier indices, and the potential to create something much larger in due course. However, the overriding goal has been to transcend the capabilities of a mere finding tool, whilst offering much more than a collection of digital images. This would be achieved by combining the best possible access via detailed metadata provision, whilst also providing the equivalent of full text access to the musical material itself, and high-quality digital images of the collections themselves. (Just as a literary scholar needs to be able to search for distinct phrases, so a musician or musicologist needs to be able to search for specific *musical* phrases.)

Whilst the website at http://hms.scot provides extensive commentary and bibliographical listing, it would have been impossible to have provided 100 percent transcriptions of each piece in every collection. The majority are, of course, available through Gore's encoded melodic incipits, though the disadvantages of such a system have already been discussed. Some twenty key musical sources have, nonetheless, been fully digitised, and as many incipits as possible were fully and accurately transcribed within these collections, complete with their associated basslines. It is anticipated that further funding will at some stage be sourced to enable the website to be extended, perhaps providing access to more of this repertoire, or indeed to other Scottish musical repertoire. More UK source locations have been traced than were listed by Gore, but public library and overseas locations remain undiscovered.

Many new digital advancements have evolved in music in recent years, and some remarkable projects have been executed. These have not always entailed encoding musical notation. For example, the Online Chopin Variorum Edition project ran between 2005-2009, funded by the Andrew Mellon Foundation with further support from Royal Holloway, University of London, and the Centre for Computing in the Humanities at King's College London, offering unsurpassed capabilities of comparing different editions of Chopin's piano music, bar-by-bar (the musical equivalent of sentence-by-sentence), but the comparison is by digital images rather than digitally encoded notation.(Kings College London n.d.)

The uploading of quality digital images without further dynamic digital engagement is now quite commonplace. Libraries with digitization programmes – such as the National Library of Scotland's Digital Gallery, or the e-codices - Virtual Manuscript Library of Switzerland (University of Fribourg n.d.) – are making vast quantities of historic material widely available, thus facilitating further engagement on many levels.

Additionally, a number of initiatives have resulted in software enabling musical notation to be encoded, analysed and manipulated. These not only enable musicians to find music, but also to experiment with different interpretations, and even collaborate in editing it. Various projects are noteworthy in this regard:

- An early encoding software called Humdrum was hosted at the Cognitive and Systematic Music Laboratory (CSML) at Ohio State University; the online handbook was uploaded in 1999, and the website cites a number of successful smallish projects using it. In 2009, Craig Sapp created a converter from Humdrum to MEI (see below), suggesting that Humdrum's future may be somewhat short-term. (Huron & Ohio State University. School of Music 1999)
- The music version of XML mark-up, Music XML, reached version 3.0 in 2011, and is widely used. (MakeMusic Inc. 2015)
- The Music Encoding Initiative (MEI) began in 1999, with its first International Symposium on Music Information Retrieval in 2000. Supported by the (American) National Endowment for the Humanities and the Deutsche Forschungsgemeinschaft, MEI is now a "non-profit community-based organization", with a Board of management being elected in December 2014. (Music Encoding Initiative n.d.) An outstanding recent example of MEI in use can be found in The Lost Voices Project (Freedman & Haverford College n.d.), offering "dynamic digital editions" of *Les Livres de Chansons Nouvelles,* a collection of vocal music by Nicolas Du Chemin (1549-1568). Musicologists are enabled to examine variant transcriptions and even interact with reconstructions of missing parts.
- The SIMSSA (Single Interface for Music Score Searching and Analysis) Project in Montreal uses elements of MEI, and ran from 2011 to 2014, giving rise to four sub-projects: 'Cantus Ultimus' and 'Liber Usualis' provide annotated access to mediæval manuscripts and a modern edition of plainsong sources, the latter offering sophisticated search facility by melodic outline and text, whilst 'ELVIS' is concerned with computer music analysis, and 'Online Score Analysis' offers further opportunities for musicologists to interrogate, analyse and even automatically orchestrate scores online. (McGill University Schulich School of Music n.d.)

The Bass Culture project's first software developer came with extensive MEI experience, and this understanding of its capabilities naturally influenced the decision as to which technology to employ. His background facilitated the development of a metadata proforma which would enable incipits entered using Sibelius notation software to be interrogated by the end-user, with MEI encoding running behind the scenes. Metadata is entered in fields compatible with FRBR (Functional Requirements for Bibliographic Records), with the aim of producing a full and comprehensive description, complete with musical incipits, of each book which has been digitised, and as much detail as possible of all of the other investigated collections.

It will be clear from the above analysis that whilst librarians excel at the creation of detailed metadata, dynamic digital access to music collections has the best likelihood of success where musicologists, librarians and computer scientists work together on such projects. Moreover, the job does not stop at the complex programming running 'behind the scenes', because the final website needs to be visually pleasing as well as technically fit-for-purpose. For this reason, the Bass Culture Project also worked with a consultant web-designer.

In gathering data for the present article, the author was left keenly aware that many digital music initiatives are project-funded, and the future of such databases will always depend on the ability of project-leaders to source follow-on funding. The technology itself has been in a state of flux, with a variety of approaches being taken to the digital encoding of source-data, and the scene will doubtless look very different in the next decade and beyond. Nonetheless, it is exciting to realise that such cutting-edge initiatives will bear fruit and become part of the learning environment for the next generation of students and researchers alike.

The Bass Culture project itself went live in beta format at http://hms.scot in October 2015, with the full launch taking place in March 2016. A project blog can be found at http://bassculture.info/. (University of Glasgow et al. n.d.; University of Glasgow n.d.)

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