The Medieval Music Database

1. Preamble

The La Trobe University Medieval Music Database provides access to most of the music of the middle ages by combining colour images of original manuscripts, transcriptions of these into modern notation and references to all editions, facsimiles, scholarly literature and recordings. It is one of the largest musical databases of its kind and the only one which allows the user to search a repertoire of 10,000 works by text, descriptor or melody. Links to the site are on every major musicological website; it is used as a basic reference by scholars worldwide. This site averages some 110,000 hits per month from more than 50 domains; 600 megabytes per month are currently being downloaded.

In the recent crisis in university funding and the downsizing of many humanities departments in Australian universities, the Music Department at La Trobe University was closed at the end of 1999. The Medieval Music Database is still currently maintained on the La Trobe University library server, but its continuing availability is threatened by the lack of an academic department to support it. $750,000 of Australian Research Council and other funds have gone into the development of this database: it is a unique resource and exemplifies Australian initiative. Specialized software was developed for the encoding of medieval music (SCRIBE) which has been marketed internationally since 1988. This is used in many universities which have specialized research interests in this field, including Heidelberg, Oxford, Padua and Stanford.

A unique feature of the database is its ability to deliver both an image of the original source and a score in modern musical notation to facilitate modern performance. On the present website, a JPEG image of the first line of the music is displayed for purposes of identification. Not yet on the website, but already completed, are scores of each work in PDF format, translations of the Italian and French texts into English and five CDs of studio recordings of selected works. The intellectual property of the databases, the modern scores and the recordings has been assigned to the present writer; copyright of the colour images of the original manuscripts belongs to the libraries which own them. The State Libraries of Victoria and New South Wales have authorized the use of the images on the Net.

In addition to the sources already available, which include an important antiphonal in the State Library of Victoria, two manuscripts from the State Library of New South Wales are in process of being added, and negotiations are current with the Biblioteca Medicea Laurenziana in Florence to extend the database into Italian libraries. The Vatican Library has shown enthusiastic interest. On a recent visit to Assisi, three manuscripts of the earliest adaptations of the liturgy of the Roman Curia for Franciscan use were digitized, and may be added to the database in the near future, along with the earliest source from Santa Croce in Florence. The digital availability of these sources makes them universally accessible while preserving the unique and precious manuscripts themselves. Other projects which provide electronic access to cultural artifacts are currently receiving strong support from the European Community and the Italian Government. In a recent report prepared by the Italian specialist firm Ifnet, this project was identified as worthy of Italian Government backing.

1 It contains bibliographic data on all of the music known to have been written in the fourteenth century (3,198 works by 150 composers from 427 manuscripts) and the musical scores of an annual cycle of Gregorian chant (6,000 items) together with colour images of an original manuscript in which these are found (3,400 items).

2 http://www.ifnet.it/
This database is in need of institutional support. Ideally the institution would have a strong presence on the Internet, an international network of libraries and museums as well as clients in the fields of education, music and art history. There is potential for income from the downloading of PDF files of full scores, computer-generated files of the music and printed subsets of the data, including facsimiles of manuscripts on CD-ROM and printed copy. As is necessary with every database whose contents represent an active area of research, it will need to be maintained to keep abreast with contemporary scholarship, to add new manuscripts and to move in step with changes in computer software and hardware.

2. History of the Database

The La Trobe University Medieval Music Database is the result of combining two originally independent projects, both begun in 1984. The first was a study of a fifteen-volume set of medieval choirbooks, written in Perugia in the first decades of the fourteenth century, which contain a complete annual cycle of Gregorian chant. This project was undertaken by Professor Margaret Manion (Fine Arts, University of Melbourne) and John Stinson (Music, La Trobe University). For this project a specialized computer program (SCRIBE) was written by Brian Parish and John Stinson which enabled the encoding, storing, searching and retrieval of medieval music in its original notation. Over the following ten years the entire contents of the Perugian choirbooks was encoded, and the collection checked against other medieval manuscripts of the same religious order. The result is a thoroughly checked collection of chant in medieval notation, together with a suite of programs (written originally for dBASE, currently for Visual FoxPro) which translate the medieval notation into a form which can be read by Score, for many years the industry-standard program for modern music notation. The resultant SCRIBE database is now

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3 See also Ted Chrisfield, Richard Cosgrove and John Stinson, 'Building scholarly online multimedia collections and services' in *The Electronic Library* Vol. 18 no. 5 (2000): 328-335; also on line at [http://www.emerald-library.com/](http://www.emerald-library.com/)
the largest database of medieval melodies which preserves the original notation. Its encoding language has been expanded to include all notational styles used between the eighth and the sixteenth centuries, including the coloured notations used in the very complicated music of the late fourteenth century, which uses red as well as black notation. The development of this program and its database has been supported by the Australian Research Council as well as by La Trobe and Melbourne Universities.

The second project, directed by Professor John Griffiths of the University of Melbourne and John Stinson of La Trobe University, had as its aim to make digital recordings of ‘a representative sample’ of the music of the fourteenth century. 150 secular works of the fourteenth century were recorded: many have been published in a series of five CDs on the Move label. During the course of the project, many other goals were achieved, including complete revisions of the French and Italian texts of poems set to music in the fourteenth century, and a database of every manuscript, facsimile, scholarly study and recording of every one of the 3,198 works. This database is not just a listing of works: the texts and English translations are of interest to literary scholars and historians as well as musicians; and the extensive cross-referencing of works, composers and manuscripts has revealed many lacunae in standard reference books such as *RISM* and *Polyphonic Music of the Fourteenth Century*. This database was launched onto the Internet in 1994. The texts and translations were deliberately not included in the Internet version as it was not considered prudent to make this material, whose copyright is owned by the literary collaborators in the project (Professor Giovanni Carsaniga and Dr Jan Pinder) freely available. They are quite willing to make these texts and translations available if some reasonable remuneration is returned. The Fourteenth-century Music Recording Project was supported over six years by the Australian Research Council, La Trobe University and the University of Melbourne.

Together the combined two databases give a comprehensive view of almost all of the music known to have existed in the late middle ages. There is material which does not yet appear on this combined database: the troubadour and trouvere repertoires, Aquitanian and Notre Dame polyphony, variant versions of Gregorian chants from different dioceses, other manuscript versions, etc. As manuscripts of both secular music and chant were often highly decorated and illuminated, the pictures contained in these manuscripts have not been included (except for two manuscripts). The addition of further chant manuscripts would enhance the musical information and greatly expand the use of the material by art historians.

### 3. Maintaining the Database

The database in its present format exists in two sections: Music of the Fourteenth Century, which is bibliographical; and Liturgical Chant, which is a complete annual cycle of chants searchable by text, descriptor and music. In the context of the transferal of the database from La Trobe University to another institution, *maintaining* the database means essentially keeping the data abreast with new publications and the occasional discovery, and keeping the software current with other software and hardware developments; *developing* it means expanding the number of manuscripts indexed. The following notes are intended to assist those who are involved in the process of moving the database from its present site to one which will both maintain and develop the substantial work of the last seventeen years.
3.1 The Bibliographical Database

Between 1984 and 1990 La Trobe University, the University of Melbourne and the Australian Research Council supported the development of a comprehensive inventory of all of the music known to have existed in the fourteenth century. This was pioneering work, as before this project the extent of the repertoire was not precisely known. The standard edition of the music, *Polyphonic Music of the Fourteenth Century* (Monaco: L'Oiseau Lyre, 1956-1992) published some 1748 works; the present database identifies 3,198 works. Each work is listed with all of its manuscript sources, every edition, facsimile, scholarly publication (monograph, PhD thesis, journal article) and recording (from the beginning of the twentieth century to the present). When the composer of the work is known, bibliographical data on the composer, his or her life, any relevant documents, studies of the composer's works and recordings are identified. Some 150 composers are identified, to whom about half of the total repertoire can be attributed. The 457 manuscripts in which the works survive are also identified, sources of inventories of their contents listed, together with facsimiles and codicological studies.

Maintaining this database means entering into the database the bibliographical citation of every facsimile, edition, scholarly publication and recording of each one of the 3,198 works. Over the past seventeen years this has been done by extensive use of inter-library loans and an excellent library of microfilms, editions, facsimiles, monographs and serials provided by La Trobe University. Every one of more than 5,000 items which appear in the database have actually been sighted and either perused or studied in detail, as each case demanded. The criteria for a study to be included in the database were that it must cite either a line of text or a musical example from one of the 3,198 works in the repertoire. It was not possible to purchase every recording, as many are now rare collector's items. Publishers' catalogues were found to be sometimes misleading: e.g. catalogues provided from the archives of L'Oiseau Lyre before its purchase by Decca in the 1950's were on occasion a statement of intent which was never realized. We are confident that the recordings listed on the database are fairly comprehensive up to the advent of CDs.

It must be clear that to maintain the database in the same way will assume the availability of library resources rich in specialized serial subscriptions, omnivorous of relevant monographs and new editions; and also the availability of someone expert in the field which will be able to make the scholarly judgment of the relevance of new publications to the data. There are some specialized bibliographical tools on which the future maintenance may have to rely, for example *Medioevo Musicale* (available on CD-ROM, published annually), *RILM* (on line, as well as hard copy and CD-ROM) and *Music Index* (CD-ROM and monthly hard copy with annual cumulations). Even with these tools, extensive use of inter-library loans will be anticipated, as well as multi-lingual skills and familiarity with the repertoire. The languages used in the database to date have been English, German, French, Italian, Spanish and Polish.

In practice, entry of the new bibliographical data has been streamlined by the development of specialized software. Each repertoire item, composer, manuscript and bibliographical item has been assigned a unique identifier. When perusing a new publication, its brief title is entered into the bibliographical database: if its full record is already held, the relevant specialized keywords (i.e. the unique repertoire, composer or
manuscript identifiers) and the page numbers on which they appear are entered; if the short title is not found, the full bibliographical record is entered, together with the relevant specialized keywords and page numbers. Periodically, special programs were run with the new data to produce the HTML files. This two-tiered system (primary entry into FoxPro, periodic generation of HTML files and the uploading of these to the Web) is clumsy but secure.

This system was developed before the ready availability of web-ready databases. The programming of the present system was done by the musicologist who learned as early as 1984 that to tackle such a huge project as all of the known music of a whole century, even one a long time ago, he would have to learn to program. But the skills he developed were based on DOS, and the world of Object Oriented Programming has passed him by. It is time to re-think the technique of maintaining the data.

In summary, in addition to the necessary re-thinking of the technical structures of the database and preparing it for a new home and current web technology, the services of a staff member with good language skills and a sound familiarity with the material would seem to be necessary for a minimum of one day per week. This should be an ongoing position, and should preferably by someone who will have a continuing association with the new host institution in the long term.

### 3.2 Liturgical Chant Database

#### 3.2.1 Scope

In 1984 the study of a fifteen-volume set of choirbooks in Perugia, written for the Dominican order at the beginning of the fourteenth century, was begun by Manion and Stinson. The latter's contribution to this project was the development of specialized software, SCRIBE, which would enable the encoding of every significant element written by a medieval scribe into a musical manuscript. Ten years later the complete annual cycle of chant was completed. Because the Dominicans had very strict rules about the copying of chant books, this cycle, based on the Perugian set, was found to have a very high correlation with other Dominican sources, including the two exemplars from which Dominicans were instructed to copy their books, and also a splendid antiphonal owned by the State Library of Victoria. Because every syllable of the Latin text, every liturgical rubric and every note of the chants was entered into the SCRIBE database, this could be used as a textual, liturgical and musical index of any Dominican manuscript. With appropriate editing, it could also be the basis of indexing any manuscript of liturgical music.

Dominican chant sources were based on the Cistercian tradition, which had introduced some melodic 'reforms' late in the twelfth century. The Dominicans revised these 'reforms' in 1256 to produce their own version. So while the SCRIBE database is a reliable electronic version of Dominican chant, manuscripts from other orders and cathedral sources will need to be carefully checked before assuming that
the melody in non-Dominican sources to the same text is the same as the one held in the SCRIBE database.

There are currently no other musical databases of liturgical chant on or off the Web which permit one to search by text, rubric or melody. Some, like the Cantus database (begun by Professor Ruth Steiner of the Catholic University of America), contain only text; others, like the Index of Gregorian Chant and the Archangelus Project, do not contain the whole melody, only the incipit and explicit -- the very parts in which one would expect most consistency. Still others, like Andrew Hughes' Late Medieval Liturgical Offices, use material derived from SCRIBE.

3.2.2 Maintenance:

A characteristic of medieval texts is the frequent use of contractions, usually indicated by a tild (~) or a full stop. The editorial policy used in entering texts into the Scribe database was to expand all contractions, the expansion being surrounded by square brackets. These brackets are maintained in the transcription of the music onto modern notation but removed in the text fields over which the search engine operates. Without such expansions and without removing the square brackets the search for a particular word would be unreliable, as every possible contraction would need to be searched. The texts have also been normalized according to the Hésbert's Corpus Antiphonalium Officii and modern editions of the missal and breviary. As the reform of the breviary which followed the Council of Trent reduced the liturgical texts to some 10% of what is now known to have previously existed, it was not always possible for those entering the text to have the benefit of a guide free of contractions to assist them. In this way many errors in Latin orthography have entered the database: these need to be corrected.

The software program which was created to make this database possible, SCRIBE, began to be developed in 1983 and has been marketed internationally since 1987. This program was a child of its time: various versions were written during the development stage in Basic and Fortran; the current version, now ten years old, is in Turbo Paschal. It is still a DOS program; and in spite of its antiquity, still has no rival. Recent developments in hardware and software have meant that it will not run on Windows operating systems after Windows 95, and not even on that with Pentium II, III or IV chips. It needs to be ported into the domain of contemporary hardware and software. Recent applications for SCRIBE for use in significant projects include the Czech National Academy of Sciences (April 2000), the Pacific Academy of Ecclesiastical Music (February 2001) as well as from individual scholars in Belgium, Brazil, Germany, Spain and the United States have not been fulfilled because SCRIBE needs to run on an out-of-date computer. It is very difficult to quantify the cost of re-developing SCRIBE for modern computing; even the modest but steady stream of enquiries would not make its redevelopment a commercial proposition.

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4 http://publish.uwo.ca/~cantus/
5 http://www.cantusgregorianus.com/
6 http://www.chass.utoronto.ca/medieval/LMLO.html
The most cost-effective way of maintaining the database is to continue to use SCRIBE on a pre-Pentium II computer running Windows 95 or DOS.

3.2.3 Expansion:

To develop this unique source of information on the central core of the Christian musical tradition by adding other manuscripts, beginning with those in Australia, it will be necessary to correlate each work in each manuscript with those already in SCRIBE, edit the encoded data for those items which correspond to the Dominican material and encode completely those melodies which are not already held. This is labour-intensive but extremely valuable, as the current hit-rate approaching 110,000 per month testifies.

4. International Developments and Links

Agreement in principle was made in August 2000 with Professor Bill Kent, director of the Monash Research Centre in Prato, Italy, for him to host a mirror site of the Medieval Music Database. The advantage of this to him is that it would establish an important research tool in a centre close to many of the great libraries where important manuscripts are held; the advantage for the database is that it would then become linked to the university network covering the whole of Europe, thus providing users with a very much faster response time than is currently possible from Australia. Another mirror site, situated in North America, would enhance the speed at which the database could be accessed in the USA.

Initial discussions have also been held with the Director of the Laurentian Library, Dr.essa Franca Ardunini, for the application of the techniques used in the liturgical database to manuscripts in her collection. Current research projects (Liturgical History of the basilica of San Lorenzo, Florence, Gaston, Howard and Stinson; to be published by Brepols in 2002; The Corali of Santa Croce in Florence, Stinson; both these projects are funded by the ARC) are adding many important Italian manuscripts to research data.

5. The role of La Trobe University Library

Medieval Music database development and maintenance

The MMDB has very much been a collaborative effort between the research and scholarship of John Stinson and the central role of the of the La Trobe University Library in supporting research and learning activities over a number of years. Without the

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7 Ted Chrisfield, Richard Cosgrove and John Stinson, 'Building scholarly online multimedia collections and services' in The Electronic Library Vol. 18 no. 5 (2000): 328-335; also on line at http://www.emerald-library.com/
continuing support over the following twenty years, it could not have developed to the fine collection it is today. The Medieval Music Database has made the fruits of scholarly research available to the world in a format which is now becoming common, that of a web-based searchable electronic database. Even though it is now more than a decade since SCRIBE first marketed internationally, there is no other database which facilitates musical research by providing a search engine which responds to melodic as well as text-based queries and which returns both bibliographic information, transcriptions into modern notation and images of original manuscripts. Its current use by some 110,000 users per month from more than 50 domains confirms its usefulness.

The major areas of support and development have been in the following areas.

5.1 Collection development

La Trobe University had a good general collection of scores, recordings and monographs relevant to medieval music, built up from the beginnings of its music department, initially the collection did lack some specialized monographs, microfilms and facsimiles of medieval manuscripts. In 1981 a substantial inter-library lending arrangement was implemented between La Trobe university and the, then, Canberra College of Advanced Education of medieval musical materials. This collection was eventually returned to Canberra, but in the meantime a systematic expansion of the La Trobe collection was undertaken. Almost all of the manuscripts of fourteenth-century music are now held, either in printed facsimile (some in colour), or on microfilm; all of the principal editions of the music, most of the journals in which scholarship in this area is published and a good collection of detailed monographs and editions of related music theory treatises. This research collection has made participation in international conferences and the publication of research papers possible. This collection, and in particular the continuing subscription to journals and new publications, was an essential foundation for the development of the MMDB.

5.2 Inter – Library Loans and document delivery

In 1984 the ARC-funded *Fourteenth-century Music Recording Project*, under the direction of John Stinson and Professor John Griffiths of the University of Melbourne, set out to record a 'representative sample' of the music of the fourteenth century. In the research undertaken to support these recordings, the complete contents of very manuscript containing fourteenth-century music were identified, and every monograph, journal article and doctoral thesis relevant to the research was obtained. This meant a very large-scale acquisition of materials on inter-library loan. Again, this library infrastructure support was critical to the development of the database.

5.3 Library Research and Development project support and collaboration

Beginning in 1993 there has been a close working relationship between the research of John Stinson and the research and development projects undertaken by the Library. This collaboration has benefitted both parties and allowed the MMDB to develop, to be modified and adapted to new requirements and eventually to have manuscript images
added. Unfortunately, since the closure of the music department in 1999, this has largely been restricted to keeping the current version running, correcting errors which have been pointed out, and providing reports on database use.

A number of particular Library research and development projects have also directly supported the MMDB development.

**Digital AV Access Trial CDROM project**

![Main Menu Screen of the CDROM - which links to a range of multimedia resources](image)

In 1994 the Library AV Division developed a multimedia CDROM disc in association with a Melbourne Multimedia project Company, *Cadability*, using content provided by interested members of the University staff from a range of disciplines. The purpose being to investigate the current capabilities of multimedia delivery, using images, music and a number of MPEG video files. John Stinson contributed sound recordings and manuscripts from his disciplinary area.

**Library Research Committee**

In 1994 a project was funded under the auspices of the Library research committee which enabled the transformation of the data provided by Stinson (text files generated from the FoxPro databases) to the web-based database using Gopher technology.

This project was subsequently reported on in a paper by Library staff at the *Ausweb '95* Conference.

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8 Galante, V. and Forsyth, B., ‘An academic Library Provides Access to Local Research Data’, Conference proceedings, ausweb97@scu.edu.au
In 1995 the La Trobe University Library received a National Priority (Reserve) und Grant of $92,500 to support the development of its Visual Database.

The Objectives of this project were:

- To improve the range of visual information resources accessible to students and staff at rural campuses.
- To provide a source of visual materials for use by staff exploiting digital technologies in delivering course materials to students at rural sites.
- To provide a mechanism for the sharing of digital information resources throughout the University.
- To ensure that the Library (at all campuses) is well placed, through the development of resources, skills and experience to take advantage of further opportunities in remote delivery of digital information as they emerge.

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9 Chrisfield, T. ‘The developing digital academic library’, in McNaught, C., Teaching with Technology at La Trobe, Academic Development Unit, La Trobe University, Bundoora, 1997
This database currently underpins the MMDB and much of the expertise which was developed in this project has assisted the further development of the MMDB.

The AV database was developed on the existing Library UNIX web server using mSQL as the database engine, and Perl and CGI for database form queries and HTML generation.

The manuscript capture and Web publication used the infrastructure and expertise developed in the LID project.

Customization of the database has also been done by both John Stinson and the Library Image Database contract programmer, Gareth Davies, using LID project funds. This basically enabled John Stinson to port data from the Library gopher site to the current version.

The possibility of web-based music resources, both scores and sound, was discussed in a paper presented at the 1996 IAML Conference, 'Medieval Music on the Web: Musical resources for the 21st Century'.

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6. Conclusion

The Database of Medieval Music began as one of the outcomes of collaborative projects between La Trobe University and the University of Melbourne, both begun in 1984. With the closure of the music department at La Trobe in December 1999, institutional support was sought for the continuance of the database, which by then was attracting 85,000 hits per month from an international spread of internet domains. Detailed costings were provided to two Melbourne research libraries in response to the enthusiastic welcome by academic specialists in the field. To date, no written response has been received from either university. The Australian Catholic University, which offers an excellent and specialised course in church music and whose senior officers have acknowledged the relevance of this database to the mission of the university, has expressed interest in hosting the database. Unfortunately its library resources in this field are not strong, and without substantial expansion of its holdings would not be able to maintain the standards of bibliographical data on which the international reputation of this database rests.

In the interests of those many thousands of clients the database has developed internationally since 1994, it may well be necessary to come to some arrangement with one of the many overseas libraries which have actively sought this source. It would be with much regret that this valuable and innovative research tool be moved off-shore: but such may well be the fate of yet another product of Australian research funding and Australian scholarship, the result of short-sighted and expedient academic decision making.
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