troja

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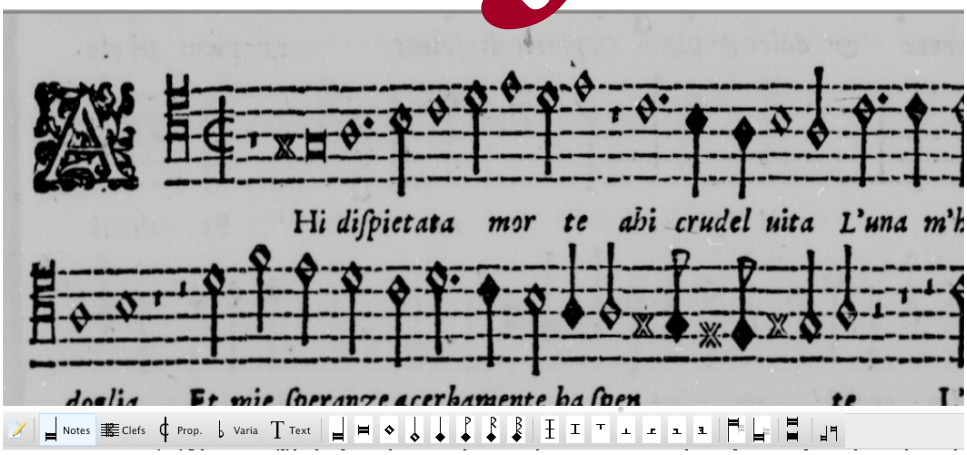

(Re-)Constructing Renaissance Music

Perspectives from the Digital Humanities and Music Theory

2018

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Perspectives from the Digital Humanities and Music Theory

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von
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in Verbindung mit Laurent Pugin

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Klaus Pietschmann

Vorwort

Das troja-Kolloquium des Jahres 2018 stand unter dem Titel »(Re-)Constructing Renaissance Music – Perspectives from the Digital Humanities and Music Theory«. Es thematisierte zwei zentrale Bereiche der gegenwärtigen Renaissancemusikforschung: die Erfassung und Analyse größerer Werk- und Quellengruppen mit Hilfe digitaler Methoden einerseits sowie andererseits die Rekonstruktion fragmentarisch überlieferter Kompositionen des 15. und 16. Jahrhunderts. In Zusammenarbeit mit der Abteilung Musiktheorie der Hochschule für Musik an der Johannes Gutenberg-Universität Mainz war es dabei das Ziel, einen Überblick über die verschiedenen die Renaissance betreffen Arbeitsfelder der Digital Musicology zu bieten und daran anknüpfend Schnittstellen zu von der Musiktheorie ausgehenden Annäherungen an künstlerische Produktionsprozesse im Bereich der Improvisation und der Komposition zu diskutieren. Im vorliegenden Jahrbuch finden sich alle Beiträge des ersten sowie drei Texte des zweiten Kolloquiumsteils dokumentiert.

Am Beginn steht der als Abendvortrag zur Tagungseröffnung gehaltene Beitrag von Richard Freedman, der als Einstieg einen breit angelegten Überblick über grundsätzliche Herangehensweisen und Erkenntniswege der Musikwissenschaft im digitalen Zeitalter bietet und dabei die großen Themenbereiche Notation, analytisches Verständnis und Zitationsmöglichkeiten sowie Zukunftsperspektiven adressiert. Den Auftakt der Referate bildete Julie Cummings Plädoyer für die Anwendung digitaler Methoden in der musikwissenschaftlichen Forschung, das die Potentiale unter Nachzeichnung ihrer eigenen schrittweisen Aneignung der entsprechenden Arbeitsweisen anschaulich ausführt. Konkrete analytische Anwendungsmöglichkeiten eines vollständig kodierten Werkbestands thematisiert Jesse Rodin in seinem Beitrag zu dem von ihm geleiteten *Josquin Research Project*. Die außerordentlichen Möglichkeiten der datenbankgestützten Erfassung musikalischer Quellen stellt exemplarisch der Beitrag von Andrea Lindmayr-Brandl zu dem von ihr entwickelten *Verzeichnis deutscher Musikfrühdrucke* vor. Im Rahmen des Forschungsprogramms *Ricercar* am Centre d'études supérieures de la Renaissance in Tours werden mehrere sehr unterschiedliche digitale Projekte durchgeführt, die im Beitrag von Camilla Cavicchi vorgestellt werden. Laurent Pugin skizziert die Genese und die Perspektiven der *Marenzio Online Digital Edition* (MODE) und zeigt dabei das komplexe Ineinandergreifen unterschiedlicher Entwicklungen der *Music Encoding Initiative* (MEI), der damit verbundenen

Rendering Software Library *Verovio* sowie weiterer tools wie insbesondere *Aruspix* und Verfahren der Optical Music Recognition (OMR) auf. Den Abschluss des ersten Kolloquiumsteils bildet die Vorstellung des digitalen Verzeichnisses der Werke Giovanni Pierluigi da Palestrinas von Peter Ackermann, das insofern grundsätzlich neue Wege beschreitet, als sämtliche erfasste Quellen vollständig in Lilipond diplomatisch übertragen werden und durchsuchbar sind.

Der zweite Tagungsteil ist durch drei Beiträge vertreten, die unterschiedliche Formen unvollständiger Überlieferung von Musik des 15. und 16. Jahrhunderts repräsentieren. Die neuerdings Josquin Desprez zugeschriebene Chanson *Au bois, au bois ma dame* identifiziert Jaap van Benthem als Kontrafaktur, der ursprünglich eine weitere Vertonung des bekannten Liedes *Petite camusette* zugrunde gelegen haben dürfte. Handelt es sich hierbei mutmaßlich um eine defizitäre Überlieferung der Textunterlegung, so stehen im Beitrag von Paul Kolb drei Gaspar van Weerbeke zugeschriebene Chansons im unvollständigen Stimmbuchsatz I-Fc Basevi 2442 im Zentrum, zu denen er unterschiedliche moderne Vervollständigungen vergleichend diskutiert. Schließlich stellt Philippe Canguilhem von Theoretikern des 16. Jahrhunderts beschriebene Techniken der als *si placet*-Praxis bezeichneten improvisierten Hinzufügung von Stimmen zu mehrstimmigen Kompositionen vor und rundet damit diesen Ausschnitt ab. Weitere Referate hatten Philip Weller (†), David J. Burn, Immanuel Ott, Fabrice Fitch, Oliver Korte und Wolfgang Fuhrmann gehalten.

Die Konzeption des ersten Kolloquiumsteils erfolgte gemeinsam mit Laurent Pugin, für den zweiten Teil zeichneten Wolfgang Fuhrmann und Immanuel Ott verantwortlich. Ihnen allen sei für die hervorragende Zusammenarbeit ebenso wie auch den Referentinnen und Referenten sowie insbesondere den Beitragenden zu diesem Band an dieser Stelle herzlich gedankt. Großer Dank gebührt auch Stephan Münch für die Einrichtung und redaktionelle Betreuung sowie Chantal Köppl und Stephan Summers für die Übersetzung der Beiträge von Philippe Canguilhem und Jesse Rodin ins Deutsche.

Richard Freedman

Advancing Music Scholarship in a Digital Age: A View from the Renaissance

New technologies of digital writing and reproduction have made music portable and repeatable, and thus increasingly independent of its divine origins in figures like mythic Orpheus, the preternaturally consummate composer-performer. Differentiating author from interpreter, first notation, then printing, then sound recording have presented musicians with a series of contradictory effects. On one hand these forms seemed to offer composers the means to fantasize about having their imagined music reach the ears and minds of listeners unmediated by the less-than-divine realizations of human performers. But at the same time, each new form of representation (in graphical notation, in print, and later in sound recording) re-opened the musical text to new kinds of uses or transformations. Technological transformations of music and music making have been especially profound during the last century, as anyone knows who has considered the works and writings of figures like the composer Edgar Varèse, or pianist Glenn Gould. But technologies of musical reproduction hold a pivotal place in the world of early music, in the legacies of Leonin (called by Anonymous IV the notator of the Magnus liber organi), of Guillaume de Machaut (perhaps the first composer to curate his own archive), and for Orlando di Lasso (the first to be utterly self-conscious about print).

Now Musikwissenschaftler (and Musikwissenschaftlerinnen) are also being drawn into the process of technological change: we once viewed print (books, journals, editions) as the durable means through which we put our best ideas before colleagues and the wider musical public in durable form. But as digital texts remake the world of scholarship as surely as YouTube and iTunes have remade the curatorial function of the recording industry, critical authority and responsibility are changing, too. Digital editions can be shared across any computer system, and can preserve with remarkable detail almost any level of intervention in a text, and distinguish my vision of a text from yours. It is an inherently destabilizing medium, both layered and collaborative. The tools of the trade are reshaping scholarly cultures, no less than artistic ones, in exciting (but also challenging) ways. This essay attempts to survey some of these developments in three large sections: Notations, Readings, and Citations. In each we will consider some of the general developments in the world of digital scholarship in recent years, and in each we will also pause to explore some of the special needs of music scholarship. Many of these musical projects focus on Renaissance repertories, a circumstance that owes much to the spirit of collaboration that has always thrived in the field.

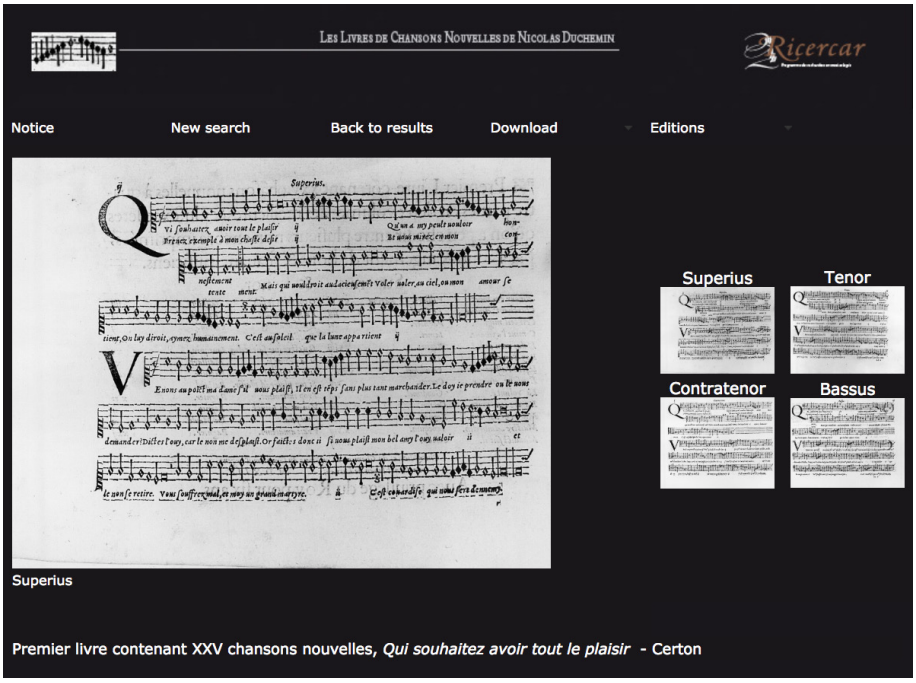


Figure 1. Sample image of digital facsimiles of Renaissance partbooks, from *Les livres de Chansons nouvelles de Nicolas Du Chemin* (Tours, 2014) URL: http://ricercar.cesr.univ-tours.fr/3-programmes/EMN/Duchemin/pages/notice.asp?numnotice=178&voice=S, accessed September 7, 2018.

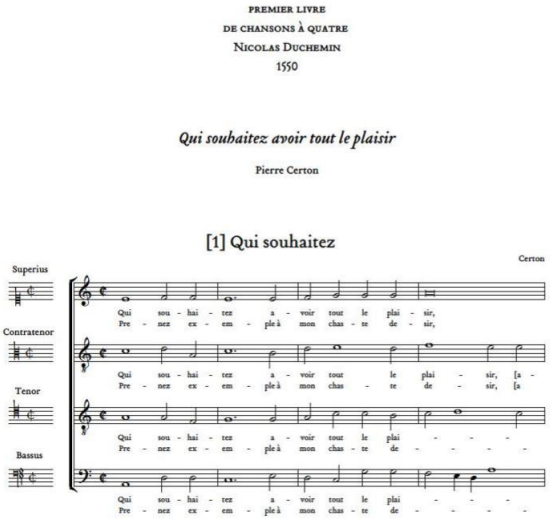


Figure 2. Engraved modern edition (PDF format) of the composition presented in Figure 1, from *Les livres de Chansons nouvelles de Nicolas Du Chemin* (Tours, 2014) URL: http://ricercar.cesr.univ-tours.fr/3-programmes/EMN/Duchemin/sources/15507-01/15507-01-pdf-moderne.pdf, accessed September 7, 2018.

I. Notations

For roughly the last decade I have sustained a productive collaboration with Philippe Vendrix and his capable team of the Programme Ricercar at the Centre d'Études Supérieures de la Renaissance (CESR) in Tours.[1] Together we've explored an expanding set of Renaissance repertories through a rapidly-developing array of tools and methods. The beginnings now seem humble: a digital archive of 16 sets of partbooks published in mid-16th-century Paris by Nicolas Du Chemin, complete with high-quality images and expertly-engraved modern editions in PDF format. There was musicological value here, we thought: modern editions of nearly four hundred »new« chansons, presented according to the editorial »sets« that would have been familiar to the musicians who first sang from them over 450 years ago (see Figures 1 and 2).[2]

This sort of editorial work is quite familiar to our musicological colleagues: the transcription into modern score and notation of materials originally notated in partbooks or other separated materials, in which performers normally read from their own parts. Modern editors also resolve certain ambiguities never fully preserved in the original notation, such as the precise alignment of text and music, and the indication of accidentals (commonly called *musica ficta*) that were understood but unwritten. These are the familiar tradecraft of musicological work. In the digital domain, however, we can see with the help of machine no less than human eyes. Consider, for instance, two representations of the title page of a recent book by our colleague David Fallows. In one, *graphical* conventions (boldface, italics, placement on the page) convey the essential information about the names presented here—a personal name as title, and as author. In another, we can imagine a markup that identifies the *logical* relationship between the names: that Fallows is the author; Josquin is the title (see Figure 3).

1 URL: http://ricercar.cesr.univ-tours.fr/, accessed August 23, 2018.

2 Our work on Du Chemin's publications consists of two complementary web sites: *Les livres de Chansons nouvelles de Nicolas Du Chemin* (Tours, 2012–2014), URL: http://ricercar.cesr.univ-tours.fr/3-programmes/EMN/Duchemin/, and *The Lost Voices Project* (Haverford, PA, 2012–2014), URL: http://digitalduchemin.org/. The first offers digital facsimiles (in TIFF format), modern editions (in PDF format), commentaries, and a searchable database of the set. The second provides critical digital editions, a database of thousands of analytic observations, and over 100 modern reconstructions of contratenor and bassus parts from pieces found in the last five volumes of the series, which survive in an incomplete state. Further on these projects, see Freedman, »The Renaissance Chanson Goes Digital: digitalduchemin.org,« *Early Music* 42 (2014), pp. 567–78 and Freedman, Jamie Apgar and Micah Walter, »In Search of Lost Voices,« *Journal of the Alamire Foundation* 9/2 (Autumn 2017), pp. 319–53. For *The Lost Voices Project* web application code (Andrew Hankinson, Raffaele Viglianti, and Micah Walter, developers) see URL: https://github.com/DuChemin.

Figure 3. Title page of David Fallows, *Josquin* (Turnhout, Belgium, 2009): Graphical and Logical Representation of Author and Title.

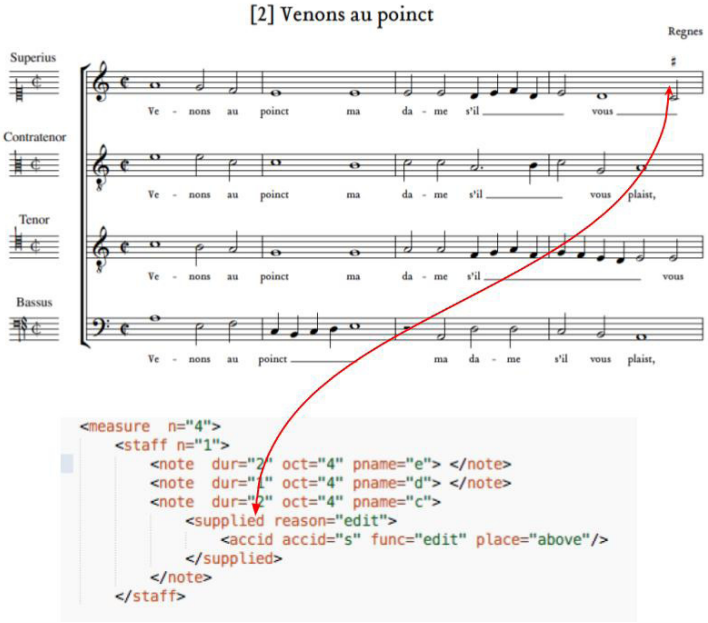


Figure 4. A graphical modern edition of a chanson by Nicolas Regnes, *Venons au poinct*, with indication of editorial accidental (*musica ficta*) above the staff, and the same accidental as it is represented in a simplied MEI encoding of measure 4 from the superius part. From *Les livres de Chansons nouvelles de Nicolas Du Chemin*. URL: http://ricercar.cesr.univ-tours.fr/3-programmes/EMN/Duchemin/sources/15507-02/15507-02-pdf-moderne.pdf, accessed September 7, 2018.

Western musical notation of course is a symbolic system. Trained musicians understand these signs as the script for the realization of tone. As an aside, we might observe that the German language nicely preserves this distinction between *Schrift* and *Ton*; English language speakers conflate the visual and aural phenomena as a single concept: note. Scholarly editions add their own complexities to these symbolic scores, using graphical conventions to make distinctions between what was in the original notation and what has been supplied by a modern editor, or to indicate alternative readings found in different copies of the same composition. Two sets of examples from recent Ricercar projects help to demonstrate the differences between graphical and logical representations of music. The first (from *The Lost Voices Project*), shows editorial accidentals (musica ficta) above the staff and in digital form (see Figure 4). Another, from the *Gesualdo Online* project (with critical editions and reconstructions of the infamous Neapolitan composer's music) shows how variant readings in different sources can be encoded in digital form (see Figure 5).[3]

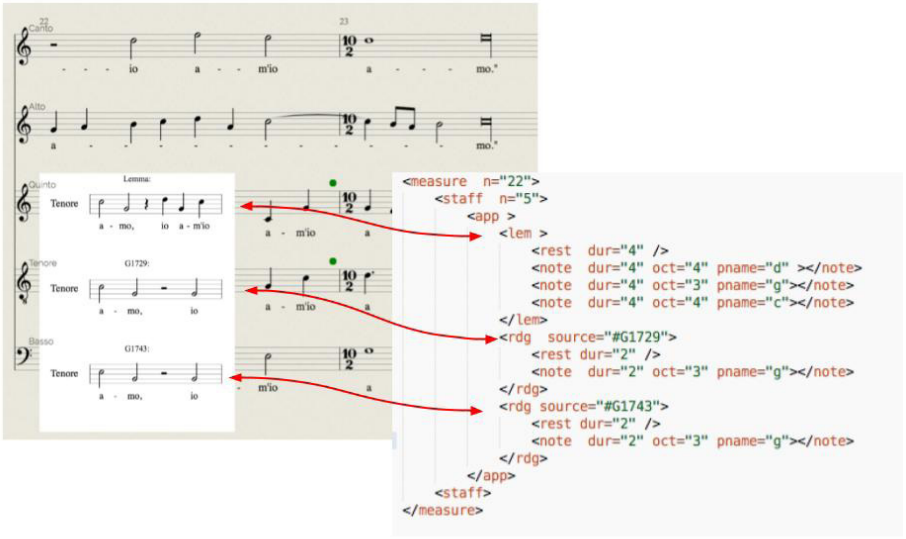


Figure 5. An excerpt from Gesualdo's *Bell'angioletta de la vaghe piume*, showing graphical score with variant readings alongside digital encodings of the same passage. A composite image from *Gesualdo Online*, URL: https://ricercar.gesualdo-online.cesr.univ-tours.fr/items/show/5989, accessed August 23, 2018.

3 *Gesualdo Online* (Tours, 2016). URL: http://ricercar.gesualdo-online.cesr.univ-tours.fr, accessed August 23, 2018. The Omeka content management system used in *Gesualdo Online* is available for use by anyone. See *TiKiT Musica*, Acatus Informatique, developers (URL: http://www.acatus.fr/). Code at URL: https://github.com/Acatus-dev/tikit-musica.

Symbolic notation will continue to serve those of us with human eyes, ears, and hands quite well. But the logical markup of the sort just illustrated invites us to consider ways of reading (and using) musical texts that are otherwise impossible on the flat printed page. By virtue of their declared structure, digital texts remain open to interrogation, adaptation, or re-use beyond the particular aim imagined by the scholars who originally prepared them. The effect is profoundly disorienting: thanks to structured encodings known as XML (for »extensible markup languages«) one scholar can make a transcription of a text, but another person can search it, add variant readings, suggest alternative readings, make annotations, or reconstruct missing parts without ever effacing the original work. Unlike the real thing, these digital palimpsests are infinitely reusable but also indefinitely recoverable. They are held up as the acid-free paper of the computer age.

For the last two decades *The Text Encoding Initiative* (TEI) has put the power of XML technology to work in the service of a wide range of scholars concerned with literary works and historical documents.[4] Consider, for instance, *The English Broadside Ballad Archive,* which has assembled a vast archive of facsimiles, transcriptions, and research tools relating to this important genre of popular literature of the sixteenth through early eighteenth centuries.[5] The same TEI file contains both graphical and logical markup, and is used to produce both a diplomatic rendering of the original (complete with italics for the names of the characters in the story) and a modern edition in regularized format (complete with header fields for terms that will provide the basis of digital indices, such as »first line« and »refrain«; see Figures 6 and 7).

Musicologists, too, are making use of the TEI. The *Tasso in Music Project*, directed by Emiliano Ricciardi at the University of Massachusetts in Amherst, Mass, for instance, is using TEI to explore the complex source traditions represented in hundreds of settings of lyrics by the great poet.[6] The poetry found in these music books sometimes corresponds closely to the version preserved in Tasso's authorized publications, but in other cases reflects manuscript versions of his poetry that circulated in advance of those prints (see Figure 8 for a summary of the readings assembled for a single poem from musical and literary sources alike). The *Tasso in Music Project* will allow readers to compare these readings in a dynamic environment, switching among divergent readings as they relate to the

4 *The Text Encoding Initiative* is an open-source standard maintained by governing consortium. See URL: http://www.tei-c.org/, accessed August 23, 2018.

5 *The English Broadside Ballad Archive*, Patricia Fullerton, Director. URL: https://ebba.english.ucsb.edu/, accessed August 23, 2018.

6 *Tasso in Music Project*, Emiliano Ricciardi, Director. URL: http://www.tassomusic.org, accessed August 23, 2018.

Figure 6. *A New Ballad of Saint George and the Dragon*, digital facsimile from *The Early English Ballad Archive*. URL: https://ebba.english.ucsb.edu/ballad/34079/image, accessed August 23, 2018.

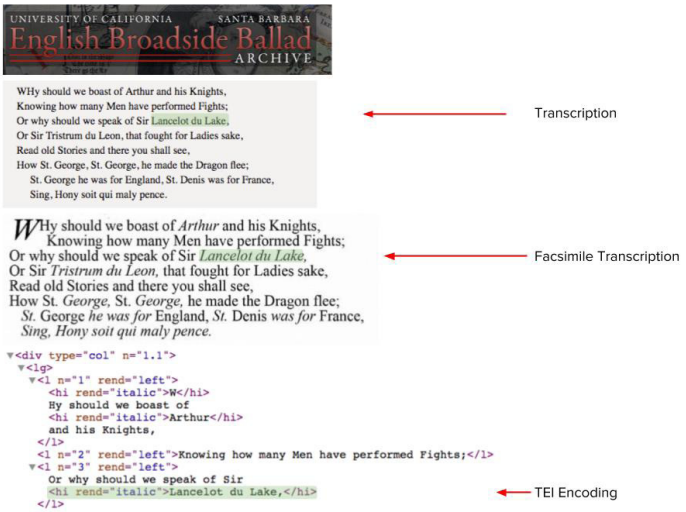


Figure 7. *A New Ballad of Saint George and the Dragon*, two editions produced from the same digital encoding, from *The Early English Ballad Archive*. URLs: https://ebba.english.ucsb.edu/ballad/34079/transcription and https://ebba.english.ucsb.edu/ballad/34079/xml, accessed August 23. 2018.

musical and literary source traditions. And because the TEI encodings are durable and extensible, they can also be re-used in subsequent work by others, who might (for instance) want to make some large-scale comparison of which composers tended to follow which sources of Tasso's poetry.

There is much more to *The Tasso in Music Project* than this, but for the moment, we will pause to consider the *Music Encoding Initiative*.[7] The MEI is not a tool for engraving music (like Sibelius, Finale, MuseScore or any of the other fine programs for graphical representation). Like the TEI just explored, it is a structured standard that accommodates the full range of bibliographical and critical details that are essential to any scholarly approach to musical texts—it keeps the data (the notes) together with the metadata (where they came from; who selected them), all in a way that remains open to re-use, inquiry, and study by the scholarly community. Indeed, during the last decade we have seen the rapid development of a wide array of projects and tools that make MEI a practical standard for a range of exciting research projects. MEI was the technology behind the examples we have just encountered from *Gesualdo Online* and *The Lost Voices Project*. And it

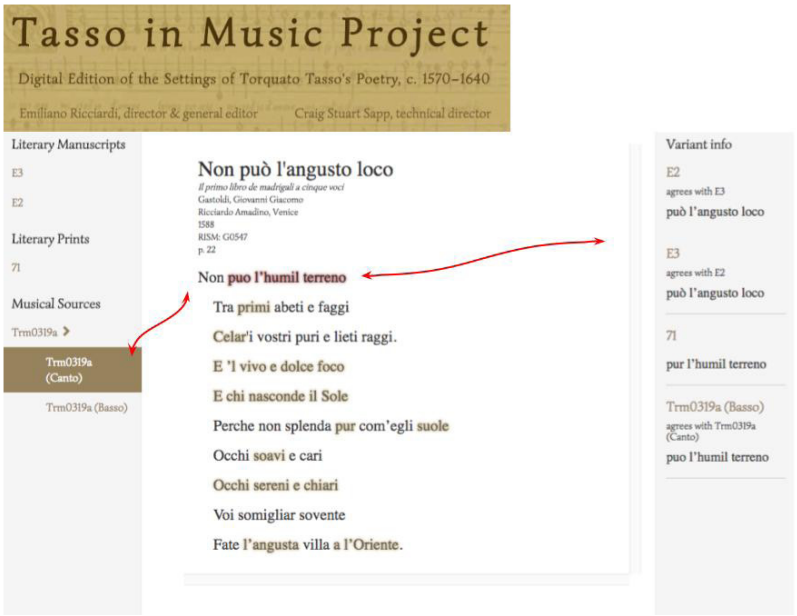


Figure 8. Modern edition and variant readings for Tasso's *Non può l'angusto loco*, from *The Tasso in Music Project*. URL: http://www.tassomusic.org/variorum/#source/Trm0319a-Canto, accessed August 23, 2018.

7 *The Music Encoding Initiative* (URL: http://music-encoding.org/, accessed August 23, 2018), like The TEI, is maintained on a collaborative basis, with ongoing support from the Akademie der Wissenschaften und der Literatur in Mainz. URL: http://www.adwmainz.de/startseite.html, accessed August 23, 2018.

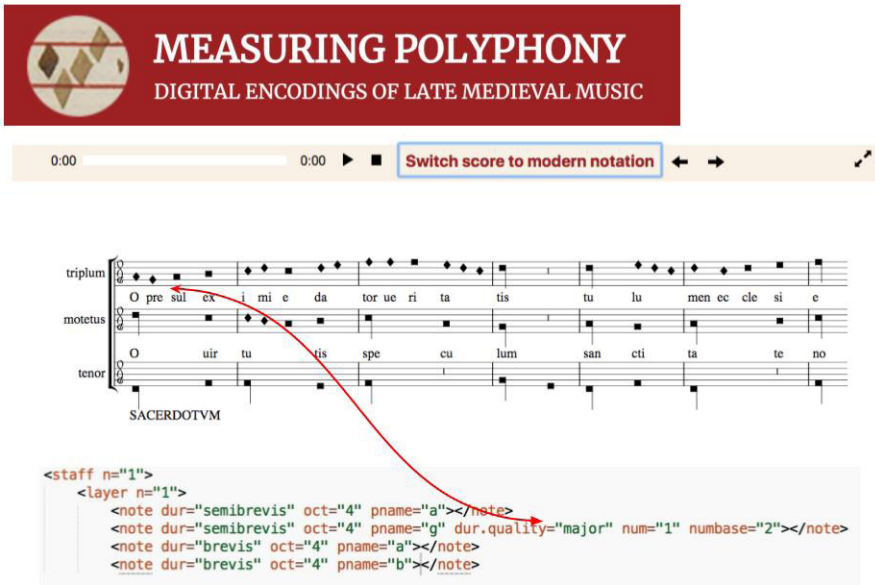


Figure 9. MEI encoding and diplomatic transcription of a motet from the Montpellier Manuscript (ca. 1300), from *Measuring Polyphony*, Karen Desmond, Project Director. The MEI has been simplified somewhat for clarity, omitting information about the verbal texts and also the XML ID's. URL: http://measuringpolyphony.org/display.html?/assets/mensural/306_MENSURAL.mei, accessed September 7, 2018.

is being used in a wide range of other scholarly projects. Work on early music is especially rich in this respect, in part because it provokes us to adopt a new self-consciousness about the relationships between systems of notation and the musical patterns they prescribe. This is particularly helpful for those who are interested in early music, for whom modern notation has often obscured musical thought even as it has made individual pieces accessible for readers whose native musical literacy is bound up with modern scores and not the subtleties of mensural notation. Indeed, two other projects are explicitly concerned with the power of digital tools to help us probe the complexities of rhythmic notation itself.

Karen Desmond's *Measuring Polyphony* project, for instance, aims to produce digital editions of fourteenth-century motets using the mensural module of MEI.[8] Formalizing the musical logic behind the symbols, Desmond's editions encode the meanings of the notes no less than the graphical forms themselves. In the piece shown in Figure 9, for instance, two otherwise identical semibreves must

8 *Measuring Polyphony*, Karen Desmond, Director. URL: http://measuringpolyphony.org/, accessed August 23, 2018.

by the rules of mensural notation be performed differently. The modern edition captures the sounding sense of the passage; the diplomatic edition conveys its graphical form. Both are represented via MEI. And by virtue of their declared structure, multiple encodings of this sort could be explored in a search for corpus-wide patterns of notational usage, no less than musical pattern.[9]

A project centered on the theoretical writings of Johannes Tinctoris (under the direction of Ron Woodley, Jeffrey Dean, and David Lewis) takes things one step further, imagining what they call »a 21st-century response to a challenge posed by the notation of late medieval music as told by the 15th-century music theorist Johannes Tinctoris.«[10] They imagine a machine-assisted »expert system« that will put Tinctoris's theoretical writings to the test against the evidence of 15th-century notation to see if his rules can be modeled as the logical basis of a machine-assisted mode of reading and transcription. Here *Schrift* itself is the focus of the inquiry, testing the limits both of Tinctoris's reasoning and our capacities to encode and manipulate digital representations of musical signs. The result will be of interest to a wide range of users—those who want to read mensural notation, those curious to understand the relationship between notation, rhythm, and counterpoint, and those keen to understand the systems of knowledge that make such notation possible in the first place.

II. Readings

We have already noted how the advent of digital musical texts allows us to produce dynamic critical editions that are as useful to scholars as they are to performers. *Gesualdo Online* (as we saw) allows users to rearrange an edition to reflect to any base text, or even some combination of them. The structured encodings, moreover, permit us to read synoptically across many pieces simultaneously, assembling instances of any detail we might want to study: just the rhythmic variants, or only those involving chromatic alterations, or perhaps to search for the overall pattern of agreement among sources across many compositions. But in recent years formats such as MEI have invited scholars to think about new modes of reading musical texts on a previously unimaginable scale.

9 For the MEI encodings of the piece shown in Figure 9, see http://measuringpolyphony.org/display.html?/assets/mensural/306_MENSURAL.mei, accessed September 20, 2018.

10 *Johannes Tinctoris: Complete Theoretical Works*, Ron Woodley, Jeffrey Dean, and David Lewis, Directors. URL: http://earlymusictheory.org/Tinctoris/#, accessed August 23, 2018. The quoted passage is from the original project proposal, given on the accompanying blog for the project. URL: http://earlymusictheory.org/blog/, accessed August 23, 2018.

Each of us has spent long years of study acquiring a mental storehouse of the patterns and preferences that typify a given composer or style. Such human expertise can never be replaced. But now it can be made newly legible, shared with others via databases, controlled vocabularies, and systems of discovery and citation. Echoing a seemingly absurd question posed by digital scholar Gregory Crane[11] (»what do you do with a million books?«), various projects on Renaissance music are exploring what it might be like to read many hundreds of compositions (and perhaps millions of notes) at once. What questions might one pose of such repositories? What might the responses look like? And how might such distant readings of music relate to our detailed, up-close considerations of individual musical works?

The Du Chemin corpus, for instance, had a glaring gap that suddenly seemed like an opportunity: the last five sets of partbooks were incomplete, since the book containing the contratenor and bassus voices has not survived. (In all, about 120 of almost 400 compositions were affected in this way.) The phenomenon is hardly unique, as many here can attest, for there are hundreds of similar instances of fragmentary or damaged sources (and pieces) scattered throughout the repertories of the period. Regarded from a purely musical standpoint, the task of reconstructing pieces from the Du Chemin books was not as difficult as it might be for other repertories, inasmuch as these pieces were built according to a tightly-controlled vocabulary of contrapuntal types—cadences, stretto fugues, and other interval patterns. And so with the help of scholars like Peter Schubert, Julie Cumming, Jesse Rodin (among others) we pooled our collective expertise as a handbook of the style (this thesaurus of examples runs to some 150 pages).[12] This shared vocabulary of concepts and examples became a training manual for a dozen graduate students who went in search of these musical patterns among the extant complete pieces. Together they compiled a database of some 11,000 detailed observations of patterns. These data could themselves be viewed from a distance using a variety of tools, both visual and computational. In one experiment, we mapped hundreds of cadences by tone and type as a chord diagram (see Figure 10).[13] In another we build a computational similarity network, which uncovered whole constellations of cadential types, here mapped according to a

11 Gregory Crane, »What Do You Do with a Million Books?,« *D-Lib Magazine* 12/3 (March 2016). URL: http://www.dlib.org/dlib/march06/crane/03crane.html, accessed August 23, 2018.

12 The Thesaurus is available for download via the companion Editor's Forum for *The Lost Voices Project*, at URL: https://sites.google.com/haverford.edu/lostvoices/home, accessed February 14, 2020.

13 For links to the visualization tools, see http://digitalduchemin.org/, accessed August 23, 2018. The challenge of interpreting these data are considered in Freedman »Close and Distant Reading: Data Analysis meets the Renaissance Chanson,« *The Oxford Handbook of Corpus Studies*, ed. Daniel Shanahan (Oxford University Press, in press).

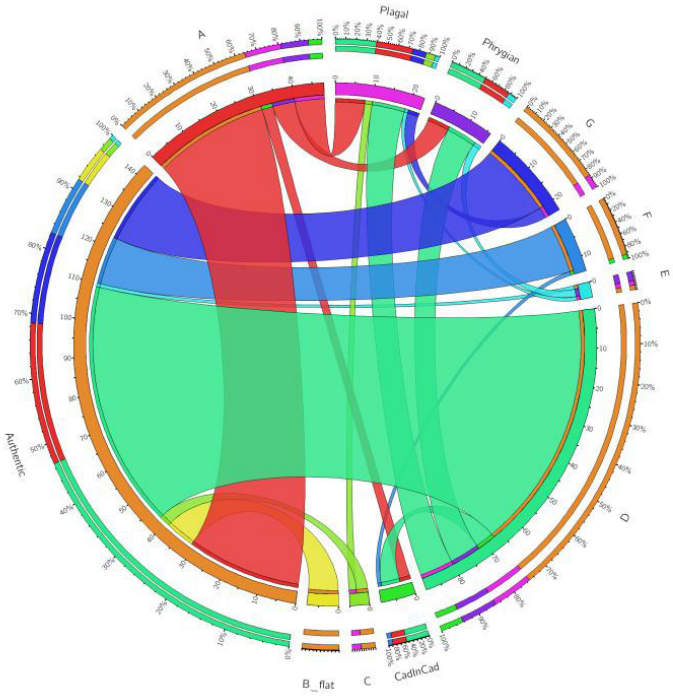


Figure 10. *The Lost Voices Project*: Visualization of Cadences as Chord Diagram.

half-dozen shared factors: not only the final tone and type, but also voice roles, neighboring cadences, etc. (see Figure 11). (The algorithm that rests behind this, by the way, is the same algorithm that allows Google to discover related material on the internet.)

Visualizations like these are strange to behold, for they represent patterns only manifest from a great distance. But our detailed inventory of musical types in the Du Chemin corpus was also put to work up close in the service of the lost voices. The same students who made the original observations also used the database to help them imagine what the lost voices might have sounded like (they composed over 100 reconstructions in all). Our search engine allowed us to sift and sort the observed patterns according to dozens of criteria, through which it was quickly possible to propose a likely solution. The resulting reconstructions were encoded using MEI, which allowed us to navigate rapidly among the local musical details and also to present rival reconstructions for debate and discussion.

The Lost Voices Project used machines to help us navigate among thousands of readings undertaken by human eyes and ears. But some other projects are explo-

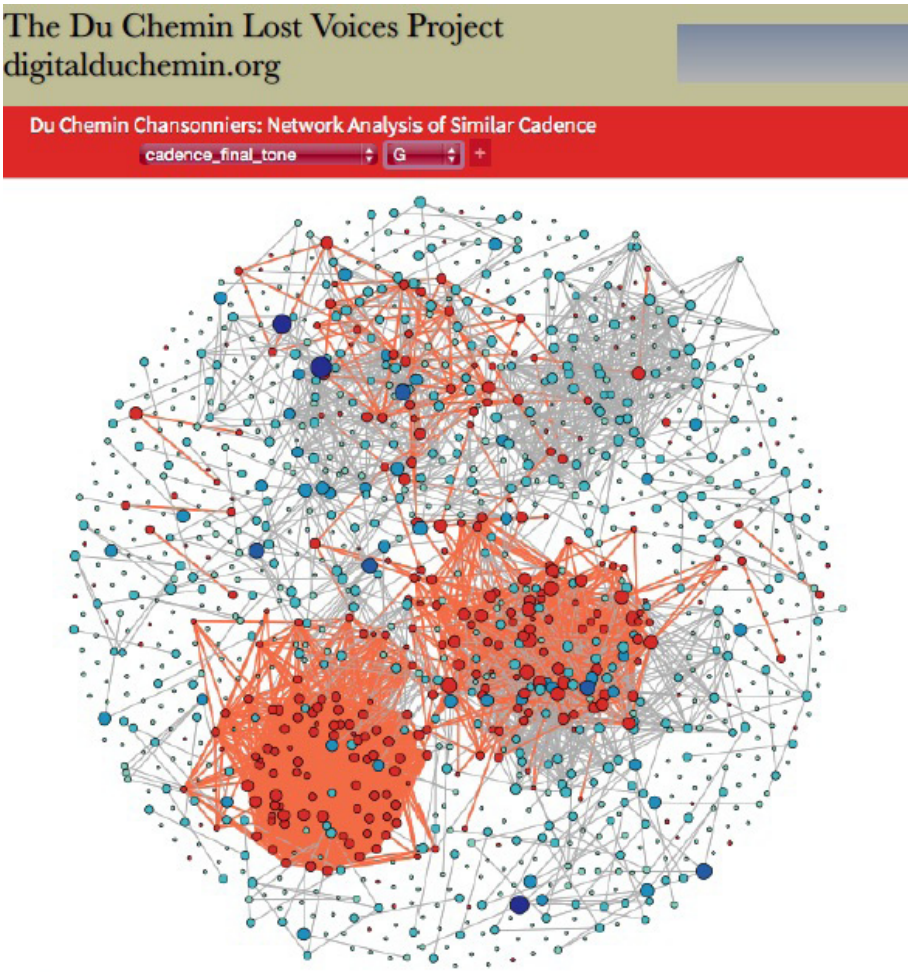


Figure 11. *The Lost Voices Project*: Visualization of Cadences as Similarity Network.

ring what it might mean to let the machines do some of the reading on our behalf, leaving us the harder job of formulating meaningful questions to ask them, and interpreting the answers they provide. Jesse Rodin's *Josquin Research Project*, for instance, shows us the truly staggering potential of such assisted reading. It presents encoded versions of all pieces ascribed to Josquin (and much else from the years around 1500, too), in all some 1000 pieces (and well over a million

notes!).[14] All of it can be rapidly searched for all sorts of strings and patterns: rhythms, intervals, ranges, parallel octaves and fifths. The engine returns results rendered in modern scores (with the relevant passages highlighted in orange). The original aim of the project was to probe questions of authenticity (given the many works dubiously attributed to Josquin this is no small problem). But meanwhile the portal opens music of the long fifteenth century to all sorts of systematic inquiry about melodic style, rhythmic patterning, and contrapuntal design.

The scores of the *Josquin Research Project* (JRP) are available in a variety of digital forms, including MEI. But the corpus-based search function at the core of the project relies on another format for the same information: HumDrum, that makes rapid work of finding strings of all sorts. Indeed, the tools developed for the JRP by Craig Sapp (and more recently, by Alexander Morgan from McGill University) are also available for anyone to use via the *Verovio HumDrum Viewer*, an open-source tool that will ingest any of a variety of digital encodings, render the music in modern notation (directly in any browser), and then perform a dazzling array of pattern and string searches (for points of imitation, for contrapuntal dissonance, no less than melodic or rhythmic patterns).[15] The tool will be used in the *Tasso in Music* project.

The advent of machine learning based on musical data is also upon us. Julie Cumming, Cory McKay, and their colleagues at McGill University are using software called *jSymbolic* to undertake some automatic classification of Renaissance musical scores with impressive results.[16] They can, for instance, distinguish between the compositional style of Josquin and Pierre de la Rue with an accuracy rate

14 *The Josquin Research Project*, Jesse Rodin, Director. URL: http://josquin.stanford.edu/, accessed September 20, 2018. For a recent review of the project and the possibilities it provides for scholars, see Andrew Kirkman, »The Josquin Research Project by Jesse Rodin and Craig Sapp,« *Journal of the American Musicological Society* 68/2 (Summer 2015), pp. 455–65. DOI: 10.1525/jams.2015.68.2.455.

15 *Verovio Humdrum Viewer*, Craig Sapp, developer. URL: http://verovio.humdrum.org/. Some of the new features in this system were created by Alex Morgan while he was a graduate student at McGill University. See URL: https://groups.google.com/forum/#!topic/musicology-announce-2/YfUZgFDdwjE), accessed August 23, 2018.

16 Corey Mckay, Tristano Tenaglia, Julie Cumming, and Ichiro Fujinaga, »Using Statistical Feature Extraction to Distinguish the Styles of Different Composers,« Paper presented at the 45th Medieval and Renaissance Music Conference 2017, Prague, Czech Republic, 4–8 July 2017. Under the guidance of Cumming and Fujinaga, researchers at McGill are at work on a wide range of projects that explore the possibilities of machine-assisted analysis of musical patterns. See *Single Interface for Music Score Searching and Analysis project* (SIMSSA), Ichiro Fujinaga and Julie Cumming, Directors. URL: simssa.ca/, accessed August 23, 2018). Renaissance repertories figure importantly in this work. See David Garfinkle, Claire Arthur, Peter Schubert, and Ichiro Fujinaga, »PatternFinder Content-Based Music Retrieval with music21,« *Proceedings of the 4th International Workshop on Digital Libraries for Musicology, Shanghai, China, October 28, 2017*. DOI: 10.1145/3144749.3144751. Developed by Myke Cuthbert, music21 is a suite of Python scripts for the analysis of encoded musical scores. See URL: http://web.mit.edu/music21/, accessed August 23, 2018.

of more than 85% – an impressive achievement that few experts could manage. They extract features from a training repertory of secure pieces, including range of voices, levels of rhythmic variety, the proportion of melodic leaps or steps, dissonances among parts, and many other factors. Statistical analysis then reveals where (among these secure pieces) the preferences of one composer can be distinguished from another (La Rue tends to have more vertical octaves and fourths in his music; Josquin tends to have more vertical unisons and thirds). Some scholars worry that work like this will soon make humans obsolete, as we outsource the labor of reading (and listening) to artificial eyes and ears. But that is far from the case: the machines find patterns only when guided by human expertise, who must declare their methods, criteria for selection, and encoding if their results are to be meaningful to others.

III. Citations

The question of how we will cite and share our knowledge remains the next big challenge for digital work. From proof text to commentary, and from quotation to paraphrase, the mechanisms of citation are the lifeblood of scholarly discourse. Renaissance humanists were obsessed with these modes of discourse, as we can see in a page from English Bishop John Fisher's anti-Lutheran *Defensio Regie Assertionis* (printed in Köln in 1525).[17] The marginal quotation marks indicate passages drawn from the writings of Martin Luther, who in turn cites a particular Psalm as it appears on a particular part of a page of his original Hebrew Psalter (in Luther's words: »in fine ultimae paginae litterae B 12 versus«). The result is a graphical riot of reference (see Figure 12) to texts and to their emplacement on particular pages of particular books. The conversation is certainly polemical, but the citations are not easy to follow, and are almost impossible to check unless armed with the same editions of the same books under discussion.

Today scholars interested in Biblical and classical texts rely on canonical citations rather than the idiosyncratic »at the bottom of a certain page in a certain book« references of the sort just encountered. Digital resources like the *Canonical Text Services*,[18] coordinate collections, indexes, and texts in ways that help to resolve references to standard corpora, linking passage-level citations to digital corpora like the *Perseus Digital Library*. CTS provides structured Universal

17 Bishop (Köln, 1525). For a facsimile of this page (and the entire book), see the digital collection of the Bayerische Staatsbibliothek (Munich), at URL: https://daten.digitale-sammlungen.de/~db/0002/bsb00023859/images/index.html?seite=25&fip=193.174.98.30.

18 *Canonical Text Services* can be consulted at URL: http://cite-architecture.github.io/cts/, accessed August 23, 2018.

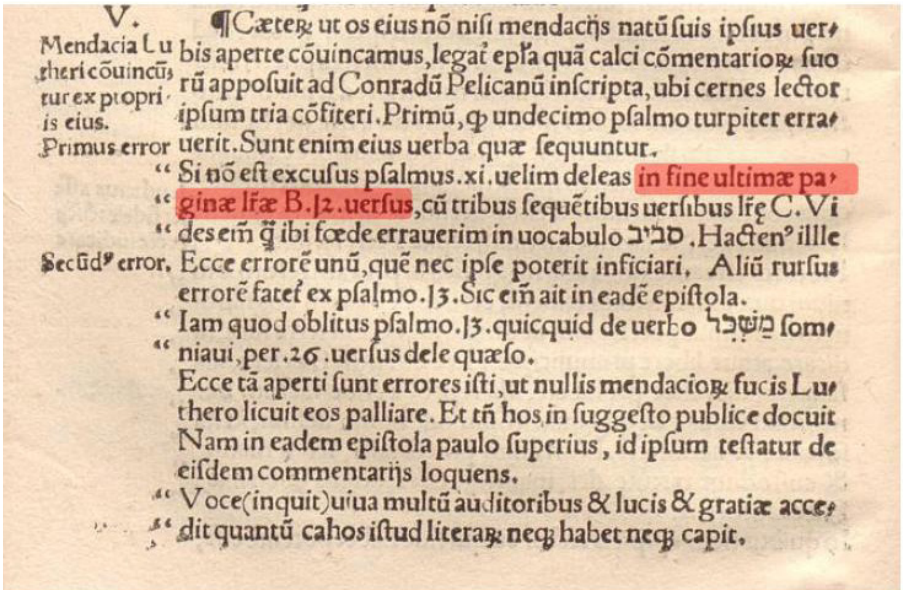

V.
Mendacia Lutheri cõuincũtur ex propriis eius.
Primus error
Secũd⁹ error.
¶Cæteꝝ ut os eius nõ niſi mendacꝫ natũ ſuis ipſius uerbis aperte cõuincamus, legat epl̃a quã calci cõmentarioꝝ ſuorũ appoſuit ad Conradũ Pelicanũ inſcripta, ubi cernes lectorem ipſum tria cõfiteri. Primũ, ꝙ undecimo pſalmo turpiter erauerit. Sunt enim eius uerba quæ ſequuntur.
" Si nõ eſt excuſus pſalmus. xi. uelim deleas in fine ultimæ pa-
" ginæ lr̃æ B. .12. uerſus, cũ tribus ſequẽtibus uerſibus lr̃ę C. Vi
" des eĩm q̃ ibi fœde errauerim in uocabulo סביב. Hacten⁹ illle
Ecce errorẽ unũ, quẽ nec ipſe poterit inficiari. Aliũ rurſus errorẽ fatet ex pſalmo. 13. Sic eĩm ait in eadẽ epiſtola.
" Iam quod oblitus pſalmo. 13. quicquid de uerbo מַשְׂכִּיל ſom-
" niaui, per. 26. uerſus dele quæſo.
Ecce tã aperti ſunt errores iſti, ut nullis mendacioꝝ fucis Luthero licuit eos palliare. Et tñ hos in ſuggeſto publice docuit Nam in eadem epiſtola paulo ſuperius, id ipſum teſtatur de eiſdem commentariꝫ loquens.
" Voce(inquit) uiua multũ auditoribus & lucis & gratiæ acce-
" dit quantũ cahos iſtud literaꝝ neqꝫ habet neqꝫ capit.

Figure 12. Bishop John Fisher, *Defensio Regie Assertionis* (Köln, 1525), Fol. 4ᵛ [highlights added].

Resource Numbers in ways that define corpus, language, work, section and verse. The digital canonical reference to Chapter 1, Verse 26 of the *Iliad*, for instance, is »urn:cts:greekLit:tlg0012.tlg001:1.26«, which can be used by resources like the *Perseus Digital Library* to build a persistent URL that will take a reader to any of a number of digital editions or facsimiles of the section in question.[19]

Now thanks to the efforts of our colleague Raffaele Viglianti, we are able to cite musical texts with similarly logical precision, and in ways that go beyond the generic, bar-level containers we often rely upon. His *Enhancing Music Notation Addressability* (EMA) format follows a standard sequence of elements that allow the citation and retrieval of »any combination of notes in any combination of staves and bars from any encoded score anywhere on the web« (see Figure 13).[20]

19 *The Perseus Digital Library*, URL: http://catalog.perseus.org, accessed August 23, 2018. For links to editions of the passage of the Iliad just mentioned, see URL: http://catalog.perseus.org/catalog/urn:cts:greekLit:tlg0012.tlg001, accessed August 23, 2018.

20 *Music Addressability API*, Raffaele Viglianti, developer. URLs: http://mith.us/ema/ and https://github.com/umd-mith/ema/, accessed August 23, 2018. See Viglianti, »The Music Addressability API: A draft specification for addressing portions of music notation on the web,« *Proceedings of the Third International Digital Libraries for Musicology Workshop (DLfM 2016), New York, USA — August 12–12, 2016*, pp. 57–60. URL: http://dl.acm.org/citation.cfm?id=2970044.2970056 and https://mith.umd.edu/music-addressability-api/, accessedAugust 23, 2018.

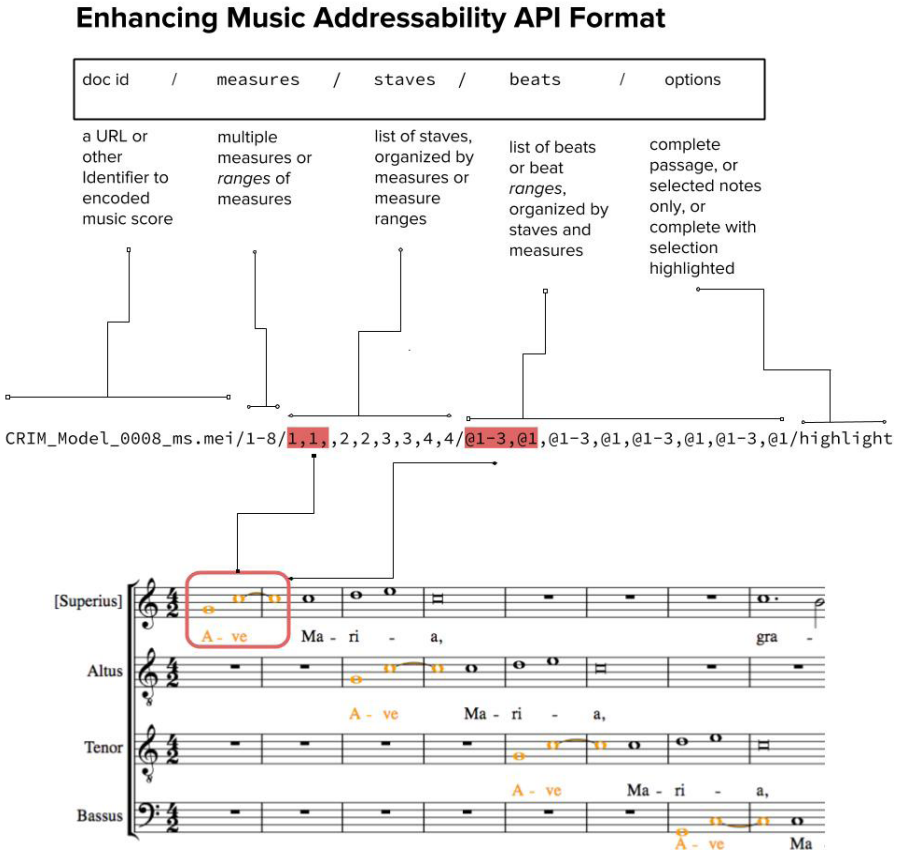


Figure 13. EMA Selection Explained, showing URL, score, and highlights.

For those of us using MEI files, Raffaele has also created an *Open Music Addressability Service* (OMAS) that makes the creation of citations a matter of point and click: MEI files are rendered in any browser using Laurent Pugin's *Verovio* javascript tool.[21] The user clicks to select notes, then Raffaele's service creates a unique URL that will return the same passage at a moment's notice. Such citations can be used as portable examples in traditional narrative arguments. But we can also imagine modelling them as publications in their own right, parts of critical assertions about the material at hand, expressed in digital form, including various

21 *Verovio*, Laurent Pugin, developer. JavaScript application to render MEI files as notation directly in any HTML5 browser; URL: http://www.verovio.org, accessed August 23, 2018. Code at URL: https://github.com/rism-ch/verovio, accessed August 23, 2018.

modes of identification, annotation, or interpretation. Architects of the semantic web call such mapped relationships among entities »ontologies,« and they can be published as durable digital objects in their own right, using standards such as *Open Annotation*[22] and *Linked Open Data*[23]. In their simplest form, ontologies like these take the form of tripartite data structures (»triples,« in the parlance of the widely-used *Resource Description Framework*[24]) consisting of linked concepts, like »gene X causes disease Y in humans«. The *subject* (gene X) is linked to the *object* (human disease Y) by a *predicate* (causation). Such assertions are not simply data, but are claims made by someone about something, and thus require information about the *provenance* of the claim: its author, its motivation, its validity, as well as any specific vocabularies.

Colleagues in the visual arts are exploring shared vocabularies that will help us discover connections among concepts, styles, and figures used in many different forms and media. The *Emblematica Online* project, for instance, links thousands of didactic and moralizing images of the sixteenth through eighteenth centuries with conceptual markers drawn from the *Iconclass*[25] vocabularies widely used in the study of representation. The *Iconclass* system uses hierarchical categories of related themes and concepts, including forms from the natural and man-made world, as well as notions of time, emotion, and power. An emblem containing stringed instruments (as we see in Figures 14 and 15, for instance), might be associated with *Iconclass* label 48C7322 (among others), situating that specific image in a series of increasingly broad concepts: musical instruments, music, the arts, and culture.[26] A web of semantic triples in turn variously identifies the specific image in which the symbol appeared, the physical source of the image, and the persons or project responsible for making the assertion in the first place. Such tags are of course a powerful system of cross-indexing and discovery. Paired with the semantic logic of *Open Annotation*, moreover, they expose deeper patterns of claim and counterclaim among participating scholars, since each annotation is in

22 On the *Open Annotation* standard, see URL: http://www.openannotation.org/, accessed August 23, 2018. *Open Annotation* is used in *The Shelley-Godwin Archive*, Elizabeth Denlinger and Neil Frastat, Project Directors. URL: http://shelleygodwinarchive.org/about/, accessed August 23, 2018.

23 For information on the *Linked Open Data* concept, see URL: http://linkeddata.org/, accessed August 23, 2018.

24 *The Resource Description Framework* is a standard model for data interchange on the web. See URL: https://www.w3.org/RDF/, accessed August 23, 2018.

25 The *Iconclass* project is developing multi-lingual vocabularies for the description and annotation of cultural objects and forms. See URL: http://iconclass.org/, accessed August 23, 2018.

26 View this *Iconclass* category at URL: http://iconclass.org/rkd/48C732/, accessed August 23, 2018.

Descriptors for this Emblem (Iconclass Headings)

86(DIE HERTZENS MUSIC) - proverbs, sayings, etc. (DIE HERTZENS MUSIC)
48C73 - musical instruments; group of musical instruments
56BB19 - Consolation
11A2 - Divine Nature
57A8 - Gratitude; 'Gratitudine', 'Memoria grata de beneficii ricevuti' (Ripa)
31A22210 - heart symbolism
48C702 - magic power of music

Figure 14. *Die Hertzens Music*, from the *Emblematica Online* Project. URL: http://emblematica.grainger.illinois.edu/detail/emblem/E018901.

fact a critical assertion about something.[27] The semantic capacities of *Linked Open Data* are key to this work.

How might such technologies be adapted for the study of early music? Biographical identifiers are one clear need, for with them we will be able to distinguish between persons with the same name, or the same person referred to by different names. Resource such as The *Virtual Internet Authority File*, for instance, helps us distinguish among the many names of Josquin des Prez the Renaissance composer (active in the years around 1500) and Josquin des Prez the Belgian funk

27 *Emblematica Online*, Mara Wade, et al., Directors. URL: http://emblematica.grainger.illinois.edu/, accessed August 23, 2018. For a detailed explanation of the promise and challenge of using Linked Open Data in the context of their project, see their interim report, Timothy Cole, Myung-Ja Han, Thomas Kilton, and Mara Wade, »Annotation of Digitized Emblematica, Final Report,« Open Annotation Collaboration Phase II (Champaign-Urbana: University of Illinois College of Liberal Arts and Sciences, Department of Germanic Languages and Literatures, 2012). URL: http://emblematica.grainger.illinois.edu/EmblematicaFinalReport.pdf, accessed September 7, 2018.

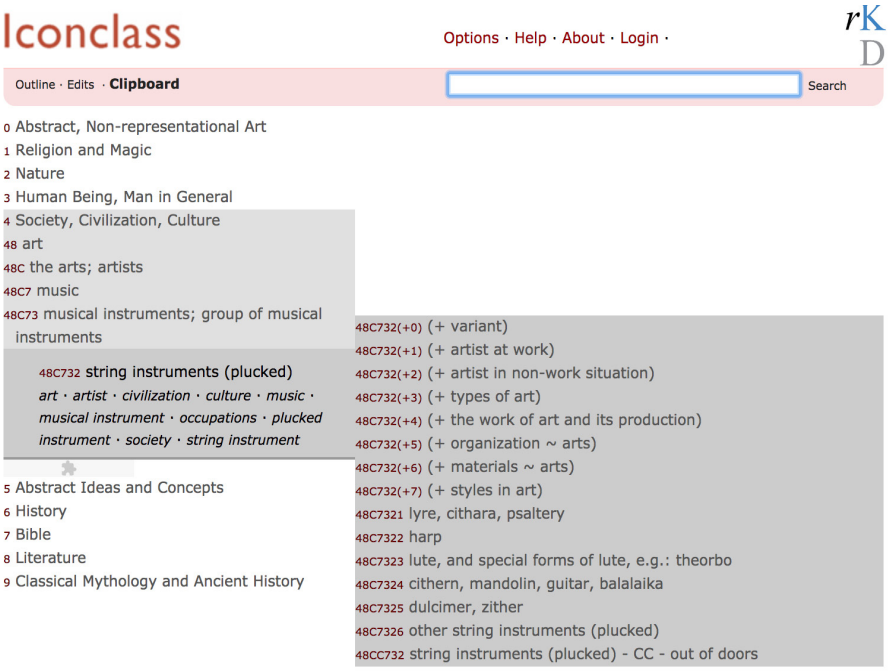


Figure 15. Iconclass summary. URL: http://iconclass.org/rkd/48C732/.

bass player active since the 1970's.[28] But if such systems of interoperable identification are to work we will also need to find some agreement on terms for the many »roles« that musicians fulfill. *The Music Ontology* has mapped out the sorts of roles we typically encounter in the world of popular recorded forms of music heard today (such as arranger, producer, sound engineer, and so on).[29] But for the classical concert tradition and early music in particular, we can imagine many other roles not available in that resource. The Renaissance Josquin (for instance) was not simply a musician or even exclusively a composer, but was, depending on the particular document or context at hand a singer, a cleric, an employee, a rival, a venerated master, or any of a number of other possible roles, only some of which are available to his modern-day namesake. Indeed, some other digital projects on music show us that the roles we enact in music could be quite varied.

28 *Virtual Internet Authority File*. URL: https://viaf.org/, accessed August 23, 2018. For the Renaissance Josquin, one *Virtual Internet Authority File* identifier is URL: viaf.org/viaf/100226284/#Josquin_des_Prez_1521, accessed August 23, 2018. For his modern namesake, see URL: https://viaf.org/viaf/23829271/#Josquin_des_Prez, accessed August 23, 2018.

29 See *The Music Ontology* at http://musicontology.com/, accessed September 6, 2018.

In her work on a circle of traditional Irish musicians, for instance, Lynnsey Weissenberger has imagined the multiple semantic triples that might connect two fiddlers in a variety of ways: as parent, mentor, model, and so on (see Figure 16).[30]

The *Linked Jazz* project, to cite another example of this sort of semantic elaboration of musical roles, has undertaken a systematic markup of connections among dozens of jazz players of the 20th century, based on archival interviews and other documents in which one musician mentions their connection with another, as collaborator, rival, mentor, pupil, and so on.[31] The resulting semantic network of relationships is then made available via various tools that help users explore the

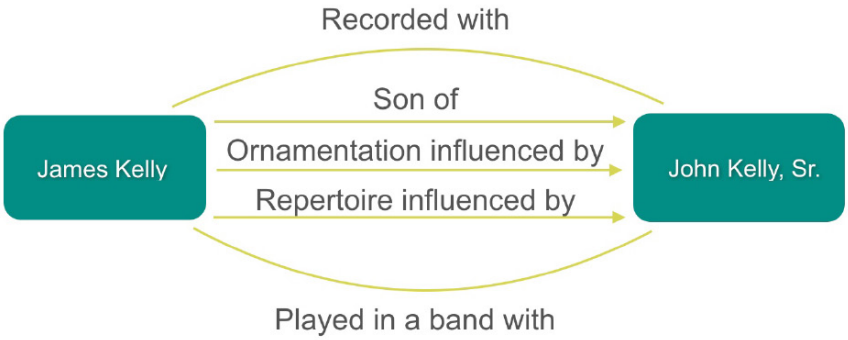


Figure 16. John Kelly Relationships, from Lynnsey Weissenberger Study

many nuanced connections among players and their roles. Similarly, Music Librarian Sergio Oremas and his colleagues have demonstrated the capacities of *Linked Open Data* to draw connections among people, places, and roles mentioned in music reference materials.[32] Tim Crawford and his colleagues are similarly using *Linked Open Data* to integrate library meta-data.[33]

30 Lynnsey K. Weissenberger, »Stories, Songs, Steps and Tunes: A Linked Data Ontology for Irish Traditional Music and Dance,« *International Society of Knowledge Organization, UK/Ireland Chapter. 2017 Annual Conference, Knowledge Organisation: What's the Story? 11–12 September, 2017, London, United Kingdom*. doi/10.5281/zenodo.1002055.

31 *Linked Jazz*, Cristina Pattuelli, Director. URL: https://linkedjazz.org/, accessed August 23, 2018. The network visualization tool can be explored at URL: https://linkedjazz.org/network/, accessed August 23, 2018.

32 Sergio Oremas and Mohamed Sordo, »Knowledge is Out There: A New Step in the Evolution of Music Libraries,« *Fontes artis musicae* 63 (2016), pp. 285–98.

33 David Weigl, David Lewis, Tim Crawford, Ian Knöpke and Kevin Page, »On providing semantic alignment and unified access to music-library metadata,« *International Journal of Digital Libraries* (2017), pp. 1–23. URL: https://doi.org/10.1007/s00799-017-0223-9, accessed September 7, 2018.

Scholars have also modelled the ways in which *Linked Open Data* can be used to preserve analytic and critical observations about music itself tagging scores, recordings, and other representations of sound with claims made about patterns and gestures heard in particular pieces or performances. Kevin Page and his colleagues in Oxford, for instance, have devised a system whereby listeners might append their insights about particular performances of a work (in the case of their pilot study, operas by Richard Wagner) to a score and recording of that piece.[34] *The Lost Voices Project* has done something similar with some 300 Renaissance chansons, producing some 11,000 analytic observations about the various contrapuntal patterns found throughout the Du Chemin corpus. Each of these »nanopublications« (to borrow a term coined by Tobias Kuhn[35]) in *The Lost Voices Project* includes various machine-readable fields that expose key pieces of information about each claim.[36] Figure 17 shows one such analytic claim, including:

- A permanent URL for this observation.
- A motivation: the aim of identifying or tagging the passages with style-analytic information; in short, a particular vocabulary.
- The semantic details of the tag; in the instance shown in Figure 17, this is a cadence of a particular type, with particular final tone and voice roles.
- Target: in the case of *The Lost Voices Project*, an EMA expression pointing to an MEI file, with precision to the level of individual staves and notes.
- Provenance: the analyst responsible for the observation, and when it was created.

34 Kevin Page, et al., »A Toolkit for Live Annotation of Opera Performance: Experiences Capturing Wagner's Ring Cycle,« *Proceedings of the 16th ISMIR Conference, Málaga, Spain, October 26–30*, 2015. URL: http://ismir2015.uma.es/articles/311_Paper.pdf, accessed September 7, 2018.

35 On the Nanopublication standard, see *Nanopub*, Tobias Kuhn, et al., developers. URL: _http://nanopub.org/wordpress/, accessed September 7, 2018. Further on the uses of the Nanopublication model, see Christine Chichester, et al., *The Open PHACTS Nanopublication Guidelines*, 2012. URL: http://www.nanopub.org//guidelines/1.8/, accessed September 7, 2018, and Stefan Heßbrüggen-Walter, »EMTO Nanopub: An Infrastructure for Collecting Doxographic Facts,« (2012). URL: http://emto-blog.tumblr.com/post/27837095978/emto-nanopub-an-infrastructure-for-collecting, accessed September 7, 2018.

36 In *The Lost Voices Project* each piece was analyzed by two or three participants. The practice was intended as a means to help us generate confidence factors for our work, since redundant claims would have a high degree of reliability. Redundant claims would in addition serve to confirm the reproducibility of results and therefore the validity of the analytic method, too. Such double-keying is entirely compatible with the *Open Annotation* system, since any particular claim can have multiple provenances (just as a single provenance or author might produce multiple claims).

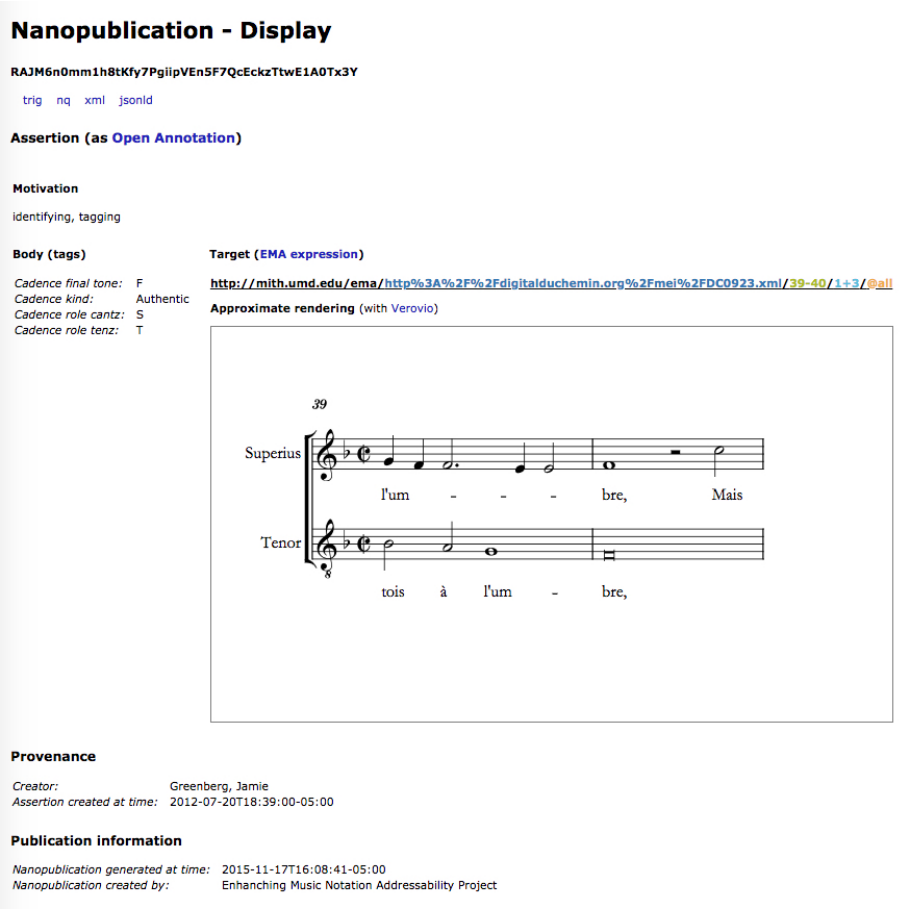


Figure 17. Analysis 7222 from *The Lost Voices Project* rendered as a Nano Publication. URL: http://digitalduchemin.org:8080/nanopub-server/RAJM6n0mm1h8tKfy7PgiipVEn5F7QcEckzTtwE1A0Tx3Y, accessed September 7. 2018.

We can also imagine linking pairs of such annotations (or ontologies) to show relationships among *different* works. Indeed, in my current project (also undertaken in collaboration with the CESR), we are doing just this. *Citations; the Renaissance Imitation Mass* (CRIM) focuses on the so-called »imitation« Mass of the sixteenth century, notable for the ways in which its composers derived new, large-scale

works from pre-existing ones.[37] A chanson, madrigal, or motet would in this way serve as the scaffolding for a much larger cyclic setting of the Ordinary of the Mass, with its five standard movements: Kyrie, Gloria, Credo, Sanctus, and Agnus dei. The relationship between model and Mass was often quite intimate: composers evoked the *sound* of the music they borrowed even as they transformed its contrapuntal *structures and procedures*. Sometimes material is simply quoted, or transposed, in some mechanical way. Other times it is prolonged to fit a new need; other times it is truncated, or even omitted. Thus in addition to the controlled vocabulary of musical types we used in *The Lost Voices Project*, we also require in the case of the Imitation Masses a complementary vocabulary of relationships among works. Moreover, since both the musical schemata and the allusive action are defined according to sets of controlled vocabularies, we can map them as digital objects, which in the case of CRIM might look like »Subject (Excerpt A of Mass 1)> Predicate (Borrows in Manner X)> Object (Excerpt B of Model 2).« This semantic triple will in turn be surrounded with an array of information about who made the assertion and why.

Figure 18 shows an example of one such relationship in graphical form, and in the web interface of the CRIM project itself. In these, we can see how a pair of separate analytic observations involving a motet and a mass (each with its own musical type involving different voices and the contrapuntal pattern they make) are bound together in a higher level relationship involving one or another kinds of quotation, transformation, omission, or new material, all as asserted by one of our project participants.

This growing array of individual analytic observations, in turn, will form the basis of discussion (also hosted the CRIM web site) and scholarly presentations and essays that aim to regard the corpus (and our participants' understanding of it) from larger historical and critical vantage points. In brief, the CRIM project will use the connections between the Masses and their models to answer a number of pressing questions about Renaissance music, both as it was understood in its own time and today. We have already collected 2500 »relationships« of this kind in some dozen Masses and their models. In the coming years we will expand that corpus to perhaps 10,000 relationships, and use them as part of scholarly debate and dialogue.

37 Citations: *The Imitation Renaissance Mass (CRIM)*, Richard Freedman and David Fiala, Directors. See URL: https://sites.google.com/haverford.edu/crim-project/home (accessed August 23, 2018) and URL: http://crimproject.org, accessed February 14, 2020. Further on the Mass corpus, see The Mass Database, produced by the Department of Musicology, University, Johannes Gutenberg-Universität Mainz. URL: http://www.mdb.uni-mainz.de/Default.aspx, accessed August 23, 2018.

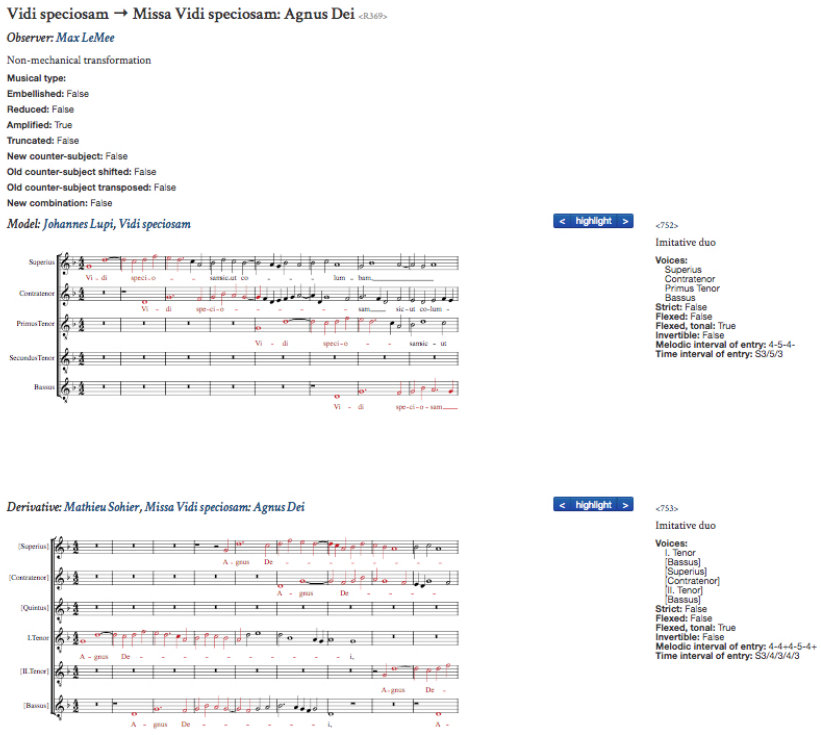


Figure 18. Motet and Imitation Mass, showing relationship and musical types, from CRIM Project. URL: http://crimproject.org/relationships/424/, accessed February 13, 2020.

Next Steps

As we have seen, new media can be put to work in the service of old, inviting new sorts of research questions, and prompting new collaborations. There is much of promise in this work—for musicological work in general and for the complexities of Medieval and Renaissance repertories in particular, as we can see from the several projects considered in this report. It is too soon to predict where digital scholarship is heading during the next few years.[38] But it is likely (regarded from the standpoint of 2018) that we will soon need to think carefully about several of the following:

38 As Laurent Pugin observed during the conference in Mainz, we tend to underestimate the degree of transformation that will take place in the short term, but also overestimate the change in the long run. Only time will tell what comes next.

- Standards for Data and Metadata. We need these as a system of exchange, and also a system of discovery of texts and also of the roles we assume in interacting with them. For the purposes of early music, we might imagine roles such as author, arranger, performer, listener, editor, commentator, analyst, and reconstructor, to mention but a few.

- Representations: Systems like MEI that will permit the layered presentation of musical texts. Such representations are not simply a written page, nor are they the critical apparatus, but something that is a combination of both, capturing both the logical and graphical sense of our original texts. And to the extent that particular resources are capable of being configured according to the needs of a particular reader, we will need to anticipate the need to cite or reproduce those views as part of other arguments, reference, or research.

- Quotable Digital Texts and Resources. It is surprisingly easy to find interesting details in digital resources. Finding them again is a different matter. How will we cite such electronic editions, archives, or databases, which are resistant to the patterns of citation better suited to the printed page?

- Tools for Visualization (of statistical patterns, of geo-spatial data or other mapping applications, or networks of relationships) are other areas ripe for development. They are being used in intellectual history, in social history. They might be useful for musicology, too.

- Musical Queries. Being able to search for a string of notes is not a bad thing. But what else would we like to find? What sorts of patterns might we want to find and describe? How can we teach digital technologies to search for contrapuntal combinations, for formulas, or to discover related types in different pieces and corpora?

- Models for Collaboration. What kinds of scholarly communities will emerge from all of this work? What will it mean to comment on a forum, or to contribute a layer of interpretation to a text edited by someone else? What will such contributions mean for our systems of evaluation and peer review? How will we sustain projects across institutions and departments with very different ways of working?

Only time will tell what scholars will want to do in the next decade, or what tools and texts will prove the most productive and sustainable.

Julie E. Cumming

Why Should Musicologists Do Digital Humanities?

What is digital humanities in music? And what does it mean to »do« digital humanities?[1] Digital humanities can mean access to materials on line: images of musical sources, scores, inventories, bibliographic data. It can mean constructing a database to organize information about music. It includes projects that make use of music in searchable symbolic notation. More broadly, it refers to new ways of presenting, describing, analyzing, visualizing, and explaining music, using computers. There are at least three different reasons to do digital humanities: to do a better and faster version of things we already do; to do new kinds of research using lots of data; and to learn to think in new ways. To demonstrate what digital humanities can bring to musicologists I will describe some of the ways I have used digital humanities in my own research.

To do a better and faster version of things we already do. Musicologists have always looked at manuscripts, compiled inventories, and made editions of music. Digital humanities makes it easier to do these things, and sometimes to do a better job of it. The wonderful online repositories of digital images (such as Gallica and the Bayerische Staatsbibliothek[2]) make it easy to look at manuscripts, to zoom in to look at details, and to compare different sources for the same work without leaving your desk. RISM online makes it possible to search hundreds of inventories, sometimes with links to digital images.[3] Online critical editions have a huge potential for scholars and performers: links from the modern score back to original sources, the opportunity to choose the variant readings you prefer, and to format the edition according to your needs.[4] Wonderful as these new resources are, they do not fundamentally change what we do.

1 For a useful survey of how musicologist understand digital humanities, see Charles Inskip and Frans Wiering, »In Their Own Words: Using Text Analysis to Identify Musicologists' Attitudes towards Technology«, *Proceedings of the 16th International Society for Music Information Retrieval Conference* (2015), pp. 455–61. http://ismir2015.uma.es/articles/171_Paper.pdf. (Accessed January 5, 2019.)

2 For a useful discussion of two major digital repositories of music manuscripts, see Sarah Ann Long, »Review: International Image Interoperability Framework (IIIF); Gallica; e-Codices: Virtual Manuscript Library of Switzerland«, *Journal of the American Musicological Society* 71, no. 2 (2018), pp. 561–72.

3 See www.rism.info/publications.html#c36. Series A is completely online: see https://opac.rism.info/metaopac/start.do?View=rism. (Accessed January 5, 2019.)

4 For Gesualdo Online, a collaborative project directed by Philippe Vendrix, see https://ricercar.gesualdo-online.cesr.univ-tours.fr/; for the Du Chemin Chansonniers, directed by Richard Freedman, see http://ricercar.cesr.univ-tours.fr/3-programmes/EMN/duchemin/; for the soon-to-be released Marenzio edition, see the article by Laurent Pugin in thi s issue of *Troja*. (Accessed January 5, 2019.)

To do new kinds of research using lots of data. Sorting and organizing information, creating tables, and counting things are traditional scholarly activities. But once there are more than a critical number of sources, variants, or occurrences, it is impossible for a single scholar to control data using traditional methods. Relational databases that include metadata about musical works and sources make it possible to collect multiple different kinds of metadata about pieces and sources and discover new things with queries that explore relationships among different kinds of data.

Searchable symbolic music notation formats (such as MIDI, musicXML, and *kern) make it possible to find and count all kinds of musical events in ways that have never before been possible. For an individual to count the vertical thirds in a single piece of music would take hours (and it is almost impossible to avoid mistakes); music analysis software can search for that same piece of musical data over hundreds or thousands of pieces in minutes, and record and visualize the information.

To learn to think in new ways. When working with computers scholars must know exactly what they want (or mean). For example: when searching for vertical thirds between voices, do we want them between all pairs of voices? One particular pair of voices? Do we want only simple thirds, or do we include compound thirds (10ths, 17ths)? Do we want only thirds that come on strong beats, or that last longer than a particular note duration? Having to make these decisions forces scholars to be extremely precise; this precision can lead to new insights.

To illustrate these points I will share some of my own experiences with digital humanities.

I. Relational databases

My first digital humanities work involved organizing and sorting information using relational databases. In my book, *The Motet in the Age of Du Fay*,[5] I set out to look at how the motet changed between c. 1400 and 1474. In order to do that I had to decide which pieces qualified as motets. I took as my model the work of Alastair Fowler, a specialist in English literature. Fowler describes the novel as follows:

> Turning to prose, we find the status of subgenres … enhanced …. »The novel« has assimilated other kinds of prose fiction. A genre so comprehensive can have but a weak unitary force. Indeed the novel has largely ceased to

5 Julie E. Cumming, *The Motet in the Age of Du Fay* (Cambridge, 1999).

> function as a kind [genre] in the ordinary way.[6] … [But] the novel is still a kind, even if one badly in need of subdivision.[7]

I adapted Fowler's approach to the fifteenth-century motet.[8] I located most of the motets found in manuscripts copied between 1400 and 1475, and assigned each to a subgenre (sometimes to more than one). I used a relational database (Paradox) with the following linked tables: pieces, composers (with dates), manuscripts (with *sigla* and dates), modern editions, and subgenres.

This allowed me to use queries to generate lists and tables, a prominent feature of the book. Table 7.1 (p. 149), for example, lists the subgenres found in Bologna Q15 and shows how many examples of each of those subgenres were represented in other sources of the period. Table 9.1 (pp. 187–9) lists all the English cantilenas found in the Trent Codices and Modena X.1.11, including composers and all the concordant sources for each motet. The appendix of »Widely disseminated motets« (pp. 304–305) lists all the motets from the period with four or more sources and provides the number of sources for each one. A surprising finding was that 17 of the 27 motets with four or more sources (63%) are English. My »Index of works« at the end of the book (pp. 384–99) includes the title, composer, subgenre(s), concordant sources, and modern editions of all the works discussed in the book. All these tables were generated using the database software; after assembling the information in the database, I never had to retype a list of pieces or manuscript sigla – I just generated a new table.

My next project focused on the first five printed books of motets: Petrucci's *Motetti A, B, C, libro quarto,* and *a cinque*), published 1502–1505 and 1508.[9] These motet collections, while published in the early sixteenth century, provide a useful sample of the many different kinds of motets composed at the end of the fifteenth century. Using Microsoft Access database software, I collected detailed information on concordant sources and on imitative texture, resulting in articles about the development of imitative textures and the cultural impact of the prints.

My colleague Peter Schubert's ground-breaking article, »Hidden Forms in Palestrina's First Book of Four-Voice Motets«,[10] provided a way to talk about imitative textures with a great deal of precision, by categorizing different »presentation types« of repeated contrapuntal combinations, or modules. I decided to

6 Alastair Fowler, *Kinds of Literature: An Introduction to the Theory of Genres and Modes* (Cambridge, Mass., 1982), p. 118.
7 Ibid., p. 120.
8 Cumming, Motet (cf. fn. 5), pp. 7–9.
9 RISM 1502^{1} (and 2^{nd} ed., $[1505^{7}]$), 1503^{1}, 1504^{1}, 1505^{2}, and 1508^{1}.
10 Peter N. Schubert, »Hidden Forms in Palestrina's First Book of Four-Voice Motets,« *Journal of the American Musicological Society* 60, no. 3 (2007), pp. 483–556.

use his methodology to understand the kinds of imitative textures in the Petrucci motets. I worked with a team of McGill students (Alexis Luko, Catherine Motuz, Alison Kranias, Adalyat Issiyeva, and Michel Vallières) to collect information about presentation types and time and pitch intervals of imitation at the beginning of each *pars* of each of the motets in the five books (174 pieces, with 355 partes). I later worked with another team of students (Remi Chiu, Jane Hatter, Daniel Donnelly, and Edward Melson) to collect information on text-setting for the same passages.[11] This resulted in my paper from 2012, »Text Setting and Imitative Technique in Petrucci's First Five Motet Prints.«[12] My database allowed me to look at the extent to which imitative presentation types corresponded to the type of text setting. I was able to conclude that there was a strong correlation, as I explained in the conclusion of the article:

> As we have seen, over the last quarter of the fifteenth century nonimitative texture and free imitation (combined with melismatic text setting) gradually gave way to a new style resulting from the influence of the chanson, the introduction of syllabic homorhythm, the use of repeated notes, and the syllabic *soggetto*. Here in the Petrucci motet prints we already find the basic elements of sixteenth-century polyphony, in which the repetition of contrapuntal modules is co-ordinated with syllabic text setting to provide clear and memorable *soggetti*.[13]

Peter Schubert and I were doing research into improvised vocal counterpoint in the Renaissance, with a focus on improvisable canon after one time unit, or »stretto *fuga*,« as John Milsom calls it.[14] We found that these improvisable patterns turned up over and over in composed Renaissance music.[15] We were then

11 This research was funded by the Social Sciences and Humanities Research Council of Canada.

12 Julie E. Cumming, »Text Setting and Imitative Technique in Petrucci's First Five Motet Prints,« *The Motet around 1500: On the Relationship of Imitation and Text Treatment?*. Collection »Epitome Musical,« Centre d'études Supérieures de La Renaissance, ed. Thomas Schmidt-Beste (Turnhout, 2012), pp. 63–90.

13 Ibid., p. 90.

14 John Milsom first used the term stretto *fuga* in his article »›Imitatio,‹ ›Intertextuality,‹ and Early Music,« *Citation and Authority in Medieval and Renaissance Musical Culture: Learning from the Learned*, ed. Suzannah Clark and Elizabeth Eva Leach (Woodbridge, 2005), pp. 141–51. Peter Schubert has produced Youtube videos on improvising stretto fuga: Improvising a canon #1: at the 5th above.mp4, https://www.youtube.com/watch?v=n01J393WpKk. (Accessed January 5, 2019.)

15 See Peter Schubert, »From Improvisation to Composition: Three Sixteenth-Century Case Studies,« *Improvising Early Music: The History of Musical Improvisation from the Late Middle Ages to the Early Baroque*. Collected Writings of The Orpheus Institute 11 (Leuven, 2014), pp. 93–130; and Julie E. Cumming, »From Two-Part Framework to Movable Module,« *Medieval Music in Practice: Studies in Honor of Richard Crocker*. Miscellanea 8, ed. Judith Ann Peraino (Middleton, WI., 2013), pp. 175–214.

asked to write an article on imitation for the *Cambridge History of Fifteenth-Century Music*.[16]

We looked at imitative technique across the fifteenth century, finding the earliest examples of stretto *fuga* in the works of Du Fay in the 1420s. We realized that the information collected in the Petrucci database would allow us to search for evidence of improvisable patterns. Stretto *fuga* for more than two voices by definition has the same time unit between entries; this is the presentation type Peter Schubert calls »Periodic entries.«[17] We therefore searched the Petrucci database for examples of Periodic entries at fairly short time intervals, and sorted them by pitch interval of imitation (see Table 1, generated from the Petrucci database).

Table 12.3 *Four-voice stretto* fuga *in points of imitation at the beginnings of* partes *in the first five Petrucci motet prints (15 examples)*
Underlined scale-degree and pitch-interval patterns occur more than once; asterisk (*) indicates that the soggetto is slightly varied

Scale degrees	Pitch interval of imitation	Voices in order of entry	Time interval in semibreves	Petrucci no.	Composer	Title
Conventional stretto *fuga* using invertible counterpoint at the 12th (13)						
5511	+8; −12; +8	T; S; B; A*	2; 2; 2	104	Pinarol	Surge propera amica mea
5511	+8; −12; +8	Ctb; S; B; Cta	1; 1; 1	509	Obrecht	Laudemus nunc
5511	+8; −12; +8	T; S*; T; B	2; 2; 2	304.3	Josquin	Factum est autem cum
5511	+8; −12; +8	T; S; B; A	2; 2; 2	304	Josquin	Factum est autem cum
5511	+8; -12; +8	T; S; B; A	1; 1; 1	325	Anon.	Confitemini domino
5511	+8; −12; +8	T; S; B; A	2; 2; 2	229	Anon.	Hec est illa dulcis rosa
5511	+8; −12; +8	T; S; B; A	2; 2; 2	431	Anon.	O claviger regni celorum (Ex. 12.15)
1155	−8; +12; −8	A; B; S*; T*	1; 1; 1	227	Anon.	Sancta Maria (Ex. 12.16)
1155	−8; +12; −8	A; B; S; T	2; 2; 2	303.3	Josquin	Liber generationis
1155	−8; +12; −8	A; B; S; T	4; 4; 4	439.5	Josquin	Vultum tuum
1155	−8; +5; −8	S; T; A; B	3; 3; 3	436	Brumel	Conceptus hodiernus
1115	+8; −8; +5	B; S; T; A	1; 1; 1	133.2	Ghiselin	Anima mea liquefacta est
1552	+12; −8; +5	B; S; T; A	1; 1; 1	404.3	La Rue	Salve regina (Ex. 12.19)

Table 1. Cumming and Schubert, »The Origins of Pervasive Imitation« (cf. fn. 16), p. 16.

We were able to show that the most common recurring imitative patterns for the Petrucci motets used four-voice improvisable stretto *fuga* (with invertible counterpoint at the twelfth, resulting from the alternation of octaves and twelfths in the pitch intervals of imitation). This allowed us to demonstrate that imitative techniques came out of an improvisatory practice.

I also worked with Paul Yachnin (McGill, English) on a large team grant entitled »Making Publics, 1500–1700: Media, Markets, and Association in Early Modern Europe.«[18] This project focused on the development of new forms of

16 Julie E. Cumming and Peter Schubert, »The Origins of Pervasive Imitation,« in *The Cambridge History of Fifteenth-Century Music*, ed. Anna Maria Busse Berger and Jesse Rodin (Cambridge, 2015), pp. 200–228.

17 Schubert, »Hidden Forms« (cf. fn. 10), pp. 488–9, pp. 498–504.

18 »Making Publics: Media, Markets and Association in Early Modern Europe, 1500–1700« was supported by a Major Collaborative Research Initiative of the Social Sciences and Humanities Research Council of Canada; see www.makingpublics.mcgill.ca. (Accessed January 5, 2019.)

association around cultural projects and science in the early modern period. I decided to look at the impact of the Petrucci motet prints: what was the »public« for the music in the prints?[19] Once again I was able to use my database, this time to understand a cultural issue.

In addition to the table listing all the pieces in the motet prints, I also had a table in the database of all the concordant sources for all the motets, with information on provenance, format (size and layout, print or manuscript, and partbooks or choirbook), contents (what other kinds of pieces were found in the sources), and dates. Information of this kind can tell us a great deal about the creators and users of the sources.[20] I chose to focus on the sources after Petrucci containing two or more of the Petrucci motets, since this suggests that the compilers of these later sources had more than a passing interest in the kinds of pieces found in Petrucci. I then sorted the sources by provenance and format, as shown in Table 2.

Table 6.4 Later Manuscripts and Prints Including More Than One Piece Found in the First Five Petrucci Motet Prints (for Details, See Appendix)

(a) Italian sacred choirbooks (8; 3 include copies from Petrucci)

(b) German mixed sacred choirbooks (4)

(c) Other choirbooks (7, from the Netherlands, Spain, Eastern Europe, and France; 1 Spanish copy of Petrucci)

(d) French *chansons* (6)

(e) Italian *frottole* and *laude* (4; 1 includes copies from Petrucci)

(f) Sacred partbooks, manuscript and print (11; 2 include copies from Petrucci))

(g) Tablature (3; 1 includes copies from Petrucci)

(h) Music theory treatises (5; 4 include copies from Petrucci)

(i) MSS associated with Glareanus (2; both include copies from Petrucci)

Table 2. Cumming, »Petrucci's Publics« (cf. fn. 19), p. 107.

19 Julie E. Cumming, »Petrucci's Publics for the First Motet Prints,« *Making Publics in Early Modern Europe: People, Things, Forms of Knowledge*. Routledge Studies in Renaissance Literature and Culture 13, ed. Paul Edward Yachnin and Bronwen Wilson (New York, 2010), pp. 96–122.

20 See Julie E. Cumming, »Sources and Identity: Composers and Singers in Darnton's Communications Circuit,« *Sources of Identity: Makers, Owners and Users of Music Sources Before 1600*, ed. Tim Shepherd and Lisa Colton (Turnhout, 2017), pp. 25–38. For another study on the origins of the repertoire in the Petrucci motet prints, see Julie E. Cumming, »From Chapel Choirbook to Print Partbook and Back Again,« *Cappelle musicali fra corte, stato e chiesa nell'Italia del rinascimento. Atti del Convegno internazionale Camaiore, 21–23 ottobre 2005*. Historiae musicae cultores 108, ed. Franco Piperno, Gabriella Biagi Ravenni, and Andrea Chegai (Florence, 2007), pp. 373–403.

What Table 2 tells us is that the Petrucci motets were found in sources all over Europe. Categories (a)–(c), large choirbooks, indicate that the motets were performed in ecclesiastical institutions. Categories (d)–(f), containing secular music and partbooks, suggest that the motets were sung in domestic situations and confraternities. Category (g) indicates that the motets were arranged for instruments; and (h)–(i) demonstrate how important the motets were for music theorists.[21] My database provided a way to show the range and diversity of these »publics« for the Petrucci motets.

II. Learning to think in new ways with searchable symbolic notation, using more precise definitions of terms and concepts

The work on imitation I did with the Petrucci database required people to make observations about the music and record them in a database. This turned out to be very effective, but it is also subject to errors, since it is difficult to be completely consistent when looking at music. My McGill colleague Ichiro Fujinaga, a professor in the Music Technology Area of the Schulich School of Music, inspired me to start thinking about using searchable symbolic notation and computer analysis tools. Peter Schubert and I wanted to be able to search for repeated contrapuntal combinations (modules) in Renaissance music, so I applied for and received a grant to fund the development of this kind of tool: »ELVIS: Electronic Locator of Vertical Interval Successions. The first large data-driven research project on musical style.«[22]

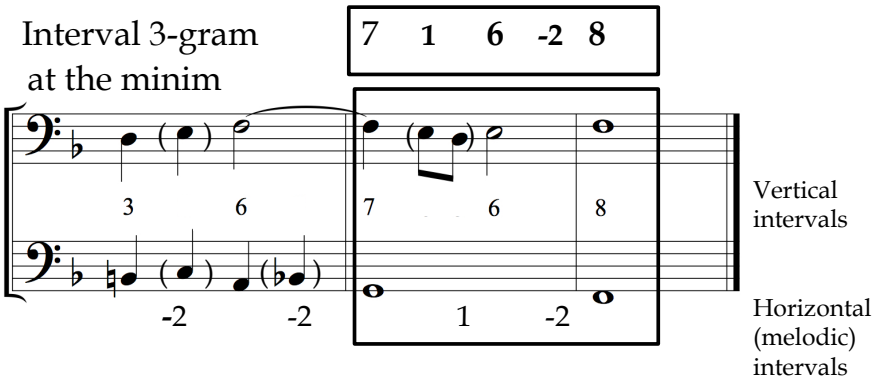
We needed to compile a substantial corpus of music in searchable symbolic notation, so we created the ELVIS database: an online database of searchable scores of polyphonic music 1300–1900, taken from a wide variety of sources, including online repositories and donations of transcriptions from individual scholars. We created a software tool (VIS, for »vertical interval successions«) that can search for repeated contrapuntal patterns; and we did research on musical style using the ELVIS data and tools. Our work took different forms – from a large-scale study

21 See Cristle Collins Judd, *Reading Renaissance Music Theory: Hearing with the Eyes*. Cambridge Studies in Music Theory and Analysis 14 (Cambridge, 2000) for a full discussion of this issue.

22 I was the principal investigator of this Digging into Data Challenge grant, which had an international team. The Canadian co-investigators were Peter Schubert, Ichiro Fujinaga, Jonathan Wild, René Rusch, and Cynthia Leive; we were funded by the Social Sciences and Humanities Council of Canada. Also on the grant, but working on different projects, were Michael Scott Cuthbert and Ian Quinn (USA), Frauke Jürgensen and George Coghill (Scotland). The VIS analysis framework uses Cuthbert and Ariza's music21 (http://web.mit.edu/music21/) as a back end. There is a web application that is not functional right now, and a VIS API. The database and the software can be found at http://elvisproject.ca/. (Accessed January 5, 2019.)

of style change over time, to a focused examination of a small corpus of duos.

VIS was built to focus on interval successions between pairs of voices in polyphonic music. We wanted to find all the occurrences of chunks of counterpoint, defined as successions of vertical intervals linked by horizontal (or melodic) intervals. We looked at interval n-grams (or contrapuntal modules) of different lengths, where n = the number of vertical intervals (see Example 1). An n-gram that occurs more than once in a composition is a »module«: a chunk of counterpoint that is repeated. Our notation for n-grams alternates numbers representing diatonic vertical intervals (7, 6, 8 in the boxed 3-gram in Ex. 1) with numbers representing the horizontal (or melodic) intervals of the lower voice: 1 (unison), -2 (descending second) in the boxed 3-gram. The intervals of the upper voice (which would be -2, +2 for notes at the beginning of the minim in the boxed 3-gram) are not necessary, since they result from the other two sets of numbers. This provides a convenient shorthand notation for a segment of two-voice counterpoint.



Example 1. Interval 3-gram, showing cadential suspension.

When you work with a computer you have to make numerous decisions about exactly what you are looking for. Our decisions affect the results in significant ways.[23]

• What is the sampling rate? Do we look at every attack, every semiminim, minim, semibreve, etc.?

23 We experienced this problem first hand, when we asked two different people to find 3-grams in duos by Josquin and La Rue. They kept getting different values for the occurrences of each 3-gram, and for the total number of 3-grams, although they were using the same corpus. We discovered that they were defining the 3-grams differently; in particular, sustained notes and rests were not defined the same way.

We chose to sample at the minim (i.e. we sampled only vertical intervals at the beginning of each minim). This value corresponds to the basic level of counterpoint in most Renaissance music, and captures cadential suspensions.[24] This meant that we ignored notes (such as passing semiminims or fusae) between each minim (see notes shown in parentheses in Example 1).

• How do you handle sustained notes or repeated notes in both voices?

If you sample at every minim, whenever you have a sustained note in both voices longer than a minim, you will get a 2-gram with no contrapuntal motion at all. We therefore chose to eliminate repeated or sustained notes in both voices after the first minim; the next vertical interval was sampled when one voice changed pitch.

• How do you deal with rests? Can an n-gram extend across a rest?

Because the vertical interval is central to our concept of n-gram, we said that there had to be two voices sounding for each interval in our n-gram. We therefore ended our n-grams on the last sounding minim before a rest in one or both voices; we then started a new string of n-gram after the rest.

• How long should »n« be?

We looked at various values for n, from 2 to 10, but ended up focusing on 3-grams in most of our work. 3-grams are long enough to capture cadential suspensions, but short enough so that there is lots of data (many recurrences of most 3-grams). The longer the value of n, the fewer examples there will be of the n-gram.

One of the major motivations for the ELVIS project was to describe style change using specific data, not just subjective impressions. We therefore decided to look at three-gram distribution over the course of the Renaissance. We assembled test sets for three style periods, named after representative composers for each period: Ockeghem (1440–85), Josquin (1485–1521), and Palestrina (1540–85).[25] We chose to visualize our findings with a figure that combines a Venn diagram, a »3-gram cloud« in which the size of the 3-gram indicates its relative frequency, and a timeline that moves around the diagram from left to right (Figure 1). The diagram includes only repeated interval 3-grams (modules) that constitute greater than 0.2% of the 3-grams in at least one of the test sets.

24 It is also possible to choose different values, depending on the musical context or style. Alexander Morgan, a McGill graduate student who worked with Peter Schubert and me, developed a tool that dynamically finds the appropriate note value to sample for contrapuntal analysis. See his dissertation, »Renaissance Interval-Succession Theory: Treatises and Analysis« (Ph.D dissertation, McGill University Libraries, 2017), http://digitool.Library.McGill.CA/R/?func=dbin-jump-full&object_id=145547. (Accessed January 5, 2019.)

25 Christopher Antila and Julie Cumming, »The VIS Framework: Analyzing Counterpoint in Large Datasets,« *Proceedings of the 15th International Society for Music Information Retrieval Conference* (2014), pp. 71–76: p. 73. http://www.terasoft.com.tw/conf/ismir2014/proceedings/T014_162_Paper.pdf. (Accessed January 5, 2019.)

Most visually striking is the prominence of the cadential suspension, »7 1 6 -2 8.« It is the most common 3-gram in the dataset, and it is shared by all three style periods (as are two other 3-grams that end with the »7 1 6« suspension). The diagram also shows evidence of stylistic change. Most notably, the Josquin and Palestrina test sets show a higher level of repetition than the Ockeghem set. The number of repeated 3-grams is higher in the Josquin test set (with seventeen 3-grams) than either the Ockeghem or Palestrina sets (both with eleven 3-grams). These data suggest an increase in repetition of contrapuntal modules from the Ockeghem to the Josquin generations; most of the repeated 3-grams (modules) in the Josquin generation were retained in the Palestrina generation. Descending parallel 10ths (10 -2 10 -2 10) are especially prominent in the Josquin test set.[26] This approach to describing style change has the potential to work for almost any repertoire.

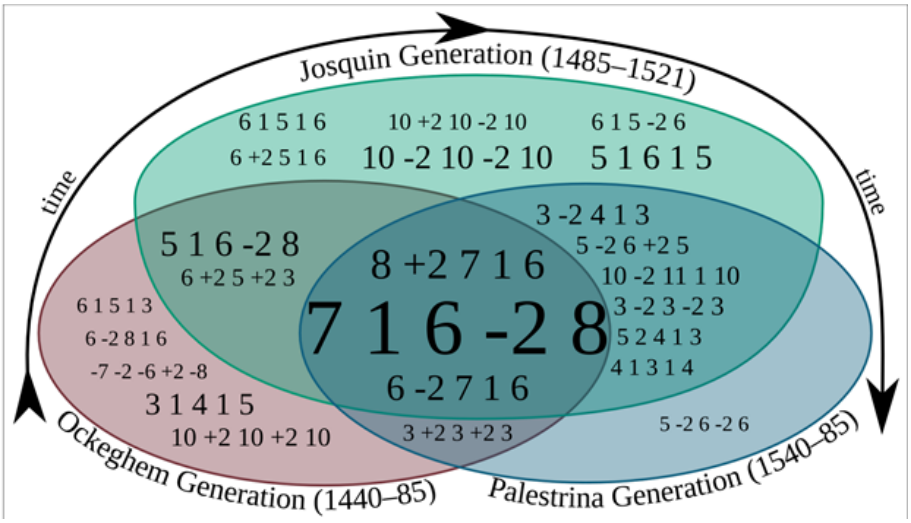


Figure 1. Hybrid Venn diagram, 3-gram cloud, and timeline, from Antila and Cumming, »The VIS Framework« (fn. 26), p. 74.

In another study, Peter Schubert and I looked at contrapuntal repetition of 3-grams in the Lassus duos of 1577.[27]

26 These findings correspond to my claims in Julie E. Cumming, »From Variety to Repetition: The Birth of Imitative Polyphony,« *Yearbook of the Alamire Foundation* 6, ed. Bruno Bouckaert, Eugeen Schreurs, and Ivan Asselman (Peer, Belgium, 2008), pp. 21–44.

27 Orlando di Lasso, *Novae Aliquot … ad duas voces cantiones suavissimae* (Munich, 1577). RISM 1577c (B/I) = L 902 (A/I). For a modern edition see Orlando di Lasso, *The Complete Motets*, vol. 11. Recent Researches in the Music of the Renaissance 103, ed. Peter Bergquist (Madison, WI,

The amount of musical repetition is a style feature that can be used to distinguish pieces, composers, style periods, and genres. In order to determine whether one composer or piece uses more repetition than another, we have to quantify the repetition. The best way to do this is with a computer, since it is difficult for a human to count every repeated musical item accurately.

So what do we mean by repetition? And what exactly do we count? As I sat down to figure this out, I realized that there are at least three different ways to quantify repetition: length of repeated things; number of repetitions of each individual item; number of different things that are repeated. As a test case, we decided to look at all three kinds of repetition in the Lassus duos. We posed the questions as follows.

1. How long are the repeated n-grams? Or: What is the longest n-gram that repeats?
2. How many times do n-grams repeat? Or: What is the largest number of repetitions of any n-gram?
3. How many different repeated n-grams (modules) are there?

We then added the scores for each type of repetition for each duo, to get a total score.

		1. How long?	2. How many times?	3. How many different modules?	Sum of 1, 2, & 3
1	Beatus vir	6	3	6	15
2	**Beatus homo**	3	3	3	9
3	Oculus non vidit	8	2	9	19
4	Justus cor suum	10	2	9	21
5	Expectatio justorum	10	3	4	17
6	Qui sequitur me	4	2	8	14
7	Justi tulerunt	4	2	5	11
8	**Sancti mei**	7	5	10	22
9	Qui vult venire	4	3	9	16
10	Serve bone	4	2	6	12
11	Fulgebunt justi	5	2	8	15
12	Sicut rosa	5	2	8	15

Table 3. Quantifying three different types of repetition in the Lassus vocal duos of 1577. Cells with thick borders contain the highest values in each column; grey cells contain the lowest.

1995). We studied the twelve vocal duos; we did not look at the twelve untexted duos in the book. The initial version of this project, which I discuss here, focused on quantifying contrapuntal repetition in the Lassus duos. It was presented at Med-Ren Certaldo, July 2013: Julie Cumming and Peter Schubert, »Another Lesson from Lassus: Quantifying Contrapuntal Repetition in the duos of 2017,« presented at Med-Ren Certaldo, July 2013. The published version of this paper went in a different direction: see Peter Schubert and Julie Cumming, »Another Lesson from Lassus: Using Computers to Analyse Counterpoint,« *Early Music* 43, no. 4 (2015), pp. 577–86.

Admittedly, the results are not easy to make sense of. We can see that there is a wide variety of values for the different types of repetition across the collection of duos. One duo, no. 8, has a high score of 22 in the final column, while the lowest score in that column, for duo no. 2, is only 9. Even in a very controlled data set like the Lassus duos there can be a wide range of values for different kinds of repetition. But more important than the results for this small set of pieces is the way it caused me to think about repetition. Before I began this project I thought I knew what repetition was; now I see it is a complex problem. Using the computer to study repetition in the Lassus duos forced us to clarify, refine, and expand our definition of repetition. Which type of repetition do we want to quantify? Are different types relevant for different styles of music? Should different types of repetition be weighted for different repertoires?

III. Conclusion

Digital humanities, therefore, has a great deal of potential for musicology and musicologists. In an age where more and more information is available, we need tools that will help us organize, search, compare, and query that information. Now that all scores are created by means of notation editors, we have access to lots of repertoire in searchable symbolic notation. We need to begin to explore its potential, to move beyond general impressions about style and style change, and to use real data to back up our claims.

There are of course significant challenges. How do you find people who can code and read music? How can we retrain in middle age? Digital humanities normally involve working in teams: a musicologist and a programmer, a group of students gathering data or doing transcriptions, a group of colleagues. This is a challenge in a relatively traditional field where the single-author paper or monograph are the principal currency for hiring, tenure, and promotion. There are signs of change, however: granting agencies (based on a science model) are enthusiastic about digital projects and about research teams. Young people are engaged with technology and eager to explore. In a shrinking job market, digital humanities can lead to jobs outside the academy. My experience has proved to me that working with teams of students and colleagues on digital projects makes it possible for all of us to do important research, and teaches us all to think in new ways.

Jesse Rodin

(In) Noten suchen – Das *Josquin Research Project*

Ein ernüchternder Gedanke: Im weit fortgeschrittenen dritten Jahrzehnt des Internetzeitalters liegen keine digitalen Ausgaben des westlichen Musikkanons vor, geschweige denn ein zuverlässiges Mittel zur elektronischen Suche. Zwar bietet das Internet eine große Bandbreite chronologisch vielfältiger Partituren im PDF- und MIDI-Format an.[1] Tools wie *Themefinder* und RISM ermöglichen den Zugriff auf kurze melodische Auszüge aus einem recht umfangreichen Korpus,[2] und Suchmaschinen auf Basis der Optical Musical Recognition (OMR) versprechen, große Datensätze abfragen zu können.[3] Dennoch liefern diese Tools noch nicht den benötigten Zugang.

Um nur ein Beispiel zu nennen: Gegenwärtig gibt es keine Möglichkeit zu untersuchen, wie viele Melodien des 18. Jahrhunderts ihren rhythmischen und intervallischen Gehalt mit den ersten drei Noten des Hauptthemas von Mozarts Symphonie Nr. 40 in g-Moll gemeinsam haben.[4] Es ist nicht möglich zu eruieren, wie häufig dieses Motiv in seiner ursprünglichen Gestalt, zwei Mal in Folge oder in leicht veränderten rhythmischen und melodischen Konfigurationen verwendet wurde, ohne tausende Partiturseiten von Hand zu durchsuchen. Da dies in den meisten Fällen unpraktisch oder gar unmöglich ist, besteht fast immer das Risiko, dass bei der Charakterisierung von Stücken oder Stilen schwerwiegende Fehler gemacht werden. Je größer der Wunsch ist, eine bestimmte Passage als einzig-

1 Die am häufigsten verwendeten Tools sind die Petrucci Music Library (https://imslp.org) und die Choral Public Domain Library (http://www3.cpdl.org/wiki/index.php/Main_Page). Eine weitere wertvolle Ressource ist The McGill Billboard Project: https://ddmal.music.mcgill.ca/research/The_McGill_Billboard_Project_(Chord_Analysis_Dataset)/. Neuerdings bietet auch die Bayerische Staatsbibliothek München eine entsprechende Anwendung an: https://scoresearch.musiconn.de.

2 www.themefinder.org; und https://opac.rism.info/metaopac/start.do?View=rism&SearchType=2&Language=en.

3 An der McGill Universität laufen interessante Forschungen in dieser Richtung, darunter Ichiro Fujinagas »Single Interface for Music Score Searching and Analysis«-Projekt (https://simssa.ca). Siehe außerdem die von Rainer Typke entwickelte www.musipedia.org/. Derzeit müssen sich die meisten OMR-basierten Suchvorgänge auf unkorrigierte, fehlerhafte Daten mit einer Fehlerquote von ca. 5 bis 10% stützen. So nützlich diese Tools auch als grobe Recherchehilfen sein mögen, können sie nur selten zuverlässige Erkenntnisse liefern, nicht zuletzt, weil jeder Fehler aufgrund seines vertikalen (d. h. harmonischen) Zusammenhangs multipliziert wird.

4 Gemeint ist hier natürlich die Themeneröffnung in den Streichern. Mit Hilfe von www.peachnote.com kann man sehr grob sehen, wie häufig diese melodische – nicht rhythmische – Sequenz über einen großen Zeitraum erklingt. Allerdings gibt es keine Möglichkeit, die Suchergebnisse genau zu recherchieren, geschweige denn, sie nach Komponist, Genre etc. zu filtern.

artig zu bewerten, desto wahrscheinlicher können entsprechende Gegenbeispiele beigebracht werden; und je deutlicher für die normative Qualität eines Stückes argumentiert werden soll, desto mehr läuft man Gefahr, dass diesem irrtümlicherweise ein repräsentativer Stellenwert für einen größeren Korpus zugeschrieben wird. Natürlich muss sich jede Wissenschaft mit diesen Problemen in einem gewissen Maße auseinandersetzen; die Vorstellung von totaler »Kontrolle« ist trügerisch und ab einem gewissen Grad unmöglich. Dennoch wäre es fahrlässig, dieses Problem zu ignorieren: Bei aller Überzeugung, dass sich Forschung an digitalen Repertorien lohnt, müssen wir konzedieren, dass bislang nur die Spitze des Eisbergs erschlossen worden ist.

Hier setzt das *Josquin Research Project* (JRP) an. Das 2010 gegründete JRP (https://josquin.stanford.edu) ist eine open-access-Datenbank, die es ermöglicht, einen zentralen Musikkorpus von ca. 1420 bis ca. 1520 auffindbar, durchsuchbar und hörbar zu machen. Jeder kann vollständige Partituren herunterladen, MP3-Dateien anhören und lineare Aspekte von Musik abfragen, darunter melodische, intervallische sowie rhythmische Modelle und Schemata, die vollständig in der Datenbank erfasst sind; das JRP zeigt Suchergebnisse mit hervorgehobenen Übereinstimmungen wie in einer Google-Suche an. Eine Reihe von Analysewerkzeugen gewähren Einblick in die Beschaffenheit eines Werkes, in seine Form, in die Behandlung von Dissonanz, ermöglichen Aussagen zum Vorkommen von Quint- und Oktavparallelen in der Musik eines bestimmten Komponisten oder zur relativen Häufigkeit verschiedener rhythmischer Muster in einer bestimmten Gattung. Aus der Heterogenität einer Vielzahl von Editionen, die jeweils unterschiedlichen Richtlinien folgen, ergibt sich ein Problem: In welcher Beziehung stehen editorische Entscheidungen zur ursprünglichen Mensuralnotation bzgl. der Verbalkung und des Metrums? Sollte ein Schlag durch eine Viertelnote, eine halbe Note oder eine ganze Note repräsentiert werden? Das JRP erleichtert durch seine einheitliche editorische Praxis Vergleiche sowohl mit den Originalquellen als auch mit allen modernen Notenausgaben, die wir herangezogen haben.

Diese Werkzeuge haben schon jetzt einen Zugang zu einer bislang unerreichten Anzahl von Texten eröffnet. Damit verfügen wir über eine neue Art der »Big Data«-Analyse, durch die nicht nur Erkenntnisse über individuelle musikalische Aspekte, sondern über ganze Repertorien gewonnen werden können. Darüber hinaus erschließen sie neue Untersuchungsgebiete und einen differenzierteren Umgang mit einzelnen Werken. Im Folgenden soll der Ursprung und Hintergrund des Projekts dargestellt werden, um im Anschluss daran repräsentative Beispiele vorzustellen, wie die Analysetools des JRP neue Forschungsansätze erschlossen haben. Abschließend sollen einige neue Forschungsergebnisse vorgestellt werden. Obwohl die hier angesprochenen Themen zu einem bestimmten

Grad spezifisch für die Musik des 15. Jahrhunderts sind, lassen sie sich größtenteils auf jedes annotierte Repertorium anwenden. Es mag erstaunen, dass es heute möglich ist, die Kompositionen Ockeghems und Josquins, aber nicht diejenigen Bachs, Beethovens oder Bergs zu durchsuchen und mit digitalen Mitteln zu analysieren. Sicherlich besteht für Tools dieser Art ein enormes Potential, sowohl alte als auch jüngere Musik zu erforschen.

Die Geschichte des Projekts

1998 begann ich mit dem Aufbau einer digitalen Sammlung von Renaissancemusik, indem ich Faksimiles und Partituren in das Notationsprogramm Finale mit Hilfe eines MIDI Keyboards eingab. Ich verfolgte dabei nicht das Ziel, einen beliebigen Korpus zu digitalisieren, sondern nutzte den Computer als ein Tool, um Stücke zu lernen und zu einem besseren Verständnis der Musik zu gelangen. Hierzu spielte ich polyphone Kompositionen Stimme für Stimme in Finale in Echtzeit ein; während ich aufeinanderfolgende Stimmen eingab, wurden zeitgleich die bereits transkribierten Stimmen abgespielt, sodass ich hörte, wie sich das Stück nach und nach zusammensetzte. 2007 umfasste meine persönliche Datenbank mehrere hundert Stücke, die ich für meine eigene Forschung sowie als Grundlage für wissenschaftliche und praktische Editionen nutzte. Zu dieser Zeit fehlten mir jedoch die Mittel, diese Partituren zu durchsuchen, geschweige denn sie digital vergleichen oder ihre musikalischen Parameter analysieren zu können. 2010 gründeten Craig Sapp und ich schließlich das JRP in Kooperation mit dem Center for Computer Assisted Research in the Humanities (CCARH), einer Organisation des Stanford Department of Music, die sich auf die digitale Kodierung von Musik spezialisiert hat; außerdem gründeten wir einen internationalen wissenschaftlichen Beirat. Mit Hilfe von Studenten vergrößerten wir unsere Notendatenbank enorm, beginnend mit den Werken, die Josquin zugeschrieben werden, bis hin zu Werken von Ockeghem, Pierre de la Rue und weiteren, darunter ein wachsender Korpus von anonym überlieferten Werken.

Zunächst wurde das Projekt aus Fördermitteln finanziert, die uns darin unterstützen sollten, ein bekanntes wissenschaftliches Problem zu lösen: Von den ca. 340 Werken, die Josquin in Quellen des 15. und 16. Jahrhunderts zugeschrieben werden, kann nur ein Bruchteil als authentisch gelten.[5] Unser erstes Ziel war es, diese Werke zu digitalisieren, um die Grundlage für eine vergleichende Analyse zu schaffen. Im Rückgriff auf einen Grundlagentext von Joshua Rifkin nannten wir dieses Projekt das »Josquin Research Project« in Anlehnung an das *Rembrandt*

5 Bei der Förderung handelte es sich um einen 2010 Hellman Faculty Scholar Award.

Research Project, welches sich mit ähnlichen Forschungsfragen der Zuschreibung befasst.[6] Aber kurz nachdem wir die Arbeit aufgenommen hatten, wurde schnell deutlich, wie viel mehr dieses Projekt leisten konnte. Innerhalb weniger Monate hatte Sapp eine Suchmaschine entwickelt, mit der wir unsere gesamte musikalische Datenbank abfragen konnten und als Suchergebnis vollständige Partituren erhielten, in denen die Treffer hervorgehoben waren. Bald darauf entwickelte er eine ganze Reihe von Analysewerkzeugen: eine »piano roll«, die eine ausgewählte Partitur graphisch darstellt, indem jede Stimme durch eine spezifische Farbe repräsentiert wird; eine Histogrammanzeige der Stimmumfänge etc. All das führte zu einer konzeptionellen sowie praktischen Ausweitung des Projekts. Wenngleich wir uns weiterhin mit Problemen der Zuschreibung beschäftigten, interessierte uns nun eine größere Bandbreite an Forschungsfragen, die sich mit Beziehungen zwischen Stücken, Komponisten, Genres und sogar ganzer Epochen befassten: Wie verändert sich Stil im Laufe der Zeit? Was unterscheidet ein Lied von einer Messe? Was unterscheidet einen Komponisten von anderen?

Im Laufe der letzten Jahre haben wir das Projekt in verschiedene Richtungen erweitert: durch den Aufbau eines benutzerfreundlichen Webinterfaces, die Zusammenarbeit mit Informatikern und Elektrotechnikern an statistischen Modellen, die Entwicklung diverser Standards für die Kodierung der Musik[7] und die Präsentation unserer Arbeit auf internationaler Ebene. Hierdurch haben wir erkannt, dass die Leistungsfähigkeit des JRP mit der zunehmenden Menge an Musik, die wir in die Datenbank aufnehmen, steigt, sodass sowohl stetig neues Repertoire zur Datenbank hinzugefügt als auch **»Datenspenden« anderer Wissenschaftler** angenommen werden.[8] Derzeit stehen wir kurz davor, ein neues Formanalyse-Tool zu implementieren, das gemeinsam mit den Stanford Libraries entwickelt wurde, und suchen nach Alternativen, um unsere Partituren ins Internet zu stellen, was einen noch besseren Zugang zu den Details einzelner Stücke

6 Joshua Rifkin, »Problems of Authorship in Josquin: Some Impolitic Observations; with a Postscript on *Absalon, fili mi*«, in: *Proceedings of the International Josquin Symposium Utrecht 1986*, hrsg. von Willem Elders und Frits de Haen, Utrecht 1991, S. 45–52.

7 https://wiki.ccarh.org/wiki/Josquin_Project_encoding_standards. Die Vorgehensweise, mit der wir neue Stücke in das JRP einbinden, garantiert ein hohes Maß an Genauigkeit im Hinblick auf den Notentext. Allerdings kodieren wir keine abweichenden Lesarten, da dies die Erweiterung der Datenbank hemmen würde. Wenn das Projekt nicht deutlich besser finanziert wird, gibt es keine Möglichkeit, jede Lesart zu kodieren, ohne die anderen Ziele zu vernachlässigen. In jedem Falle sind die meisten Forschungsfragen, die über das JRP gestellt werden können, nicht auf die vollständige Berücksichtigung aller Varianten angewiesen, von denen die überwältigende Mehrheit nur in äußerst geringem Maße Abweichungen aufweist. In den Fällen, in denen es sinnvoll erscheint, alle überlieferten Lesarten eines Stückes zu Rate zu ziehen, kann fast immer auf moderne Ausgaben zurückgegriffen werden. Es sei ausdrücklich betont, dass das JRP als hilfreiches Tool und nicht als Ersatz für kritische Editionen intendiert ist.

8 Vgl. den unteren Teil der Website https://josquin.stanford.edu/about/.

erlauben würde (z. B. die Möglichkeit, innerhalb eines Stückes zwischen verschiedenen Suchergebnissen in unterschiedlichen Tabs zu wechseln).

Unser Projekt hat anderen Forschungen aus den Digital Humanities viel zu verdanken. Das für unsere Arbeit wichtigste Vorbild ist das Princeton Josquin Project, das unter der Leitung von Lewis Lockwood und Arthur Mendel in den 1970er-Jahren große Fortschritte in den für uns interessanten Gebieten machte.[9] Damals war das Hauptproblem ein technologisches: Das Princeton Project musste noch Lochkarten verwenden, die eine schnelle Dateneingabe und -analyse – gelinde gesagt – sehr erschwerten. Das Projekt und die daraus hervorgegangenen Forschungsergebnisse waren dennoch ein Erfolg, so auch ein Aufsatz von Mendel, der heute eine Grundlage für unsere Arbeit bildet, die nahtlos an seine Erkenntnisse anknüpft.[10]

Drei praktische Anwendungsfelder

Das JRP birgt das Potential, den wissenschaftlichen Diskurs, der um die Musik der Renaissance geführt wird, zu erweitern und unsere Forschungsergebnisse an höheren Standards zu messen. Im Rahmen dieses Aufsatzes soll an drei Beispielen gezeigt werden, wie das JRP genutzt wurde und in Zukunft genutzt werden könnte, um messbare wissenschaftliche Einblicke zu gewinnen.

I. Quintparallelen sind schlecht

Die Josquin-Forschung wird seit Generationen durch methodische Probleme erschwert:[11] Wie soll man den kompositorischen Stil Josquins charakterisieren, dessen Schaffensüberlieferung von unsicheren und widersprüchlichen Zuschreibungen geprägt ist, dessen Biografie deutliche Lücken aufweist und selbst von dessen gesicherten Werken keine Chronologie erstellt werden kann, über dessen

9 Vgl. Arthur Mendel, »Some Preliminary Attempts at Computer-Assisted Style Analysis in Music«, in: *Computers and the Humanities* 4 (1969), S. 41–52; und ders., »Towards Objective Criteria for Establishing Chronology and Authenticity: What Help Can the Computer Give?«, in: *Josquin des Prez: Proceedings of the International Josquin Festival-Conference Held at the Juilliard School at Lincoln Center in New York City, 21–25 June 1971*, hrsg. von Bonnie J. Blackburn und Edward E. Lowinsky, London 1976, S. 297–308.

10 Arthur Mendel, »Towards Objective Criteria« (wie Anm. 9). Sean Gallagher ist eine weitere wesentliche methodische Inspiration, »Syntax and Style: Rhythmic Patterns in the Music of Ockeghem and His Contemporaries«, in: *Johannes Ockeghem: Actes du XIe Colloque international d'études humanistes. Tours, 3–8 février*, 1997, hrsg. von Philippe Vendrix, Paris 1998, S. 681–705.

11 Vgl. hierzu Jesse Rodin, »Josquin and Epistemology«, in: *The Cambridge History of Fifteenth-Century Music 2015*, hrsg. von Anna Maria Busse Berger und Jesse Rodin, Cambridge 2015, S. 119–136.

Persönlichkeit meistens posthume Anekdoten zweifelhafter Glaubwürdigkeit Auskunft geben und über dessen kompositorisches Umfeld noch immer große Kenntnislücken bestehen?

Angesichts dieser fundamentalen Probleme haben wir unsere Urteilsfähigkeit vielfach überschätzt. Häufig wird auf ungenaue Beschreibungen (z. B. der »vorantreibende« Kontrapunkt Josquins – ist sein Kontrapunkt wirklich vorantreibender als andere?) und pauschale Behauptungen (z. B. über die Tendenz des Komponisten, sich nicht zu wiederholen, was er tatsächlich aber häufig tut) zurückgegriffen, anstatt konkrete, vergleichs- und evidenzbasierte Beobachtungen anzustellen. Ein weiteres, kleineres Problem stellt die Neigung dar, sich auf kontrapunktische **»Regeln« zu verlassen, die zwar von späteren Repertoires abge**leitet werden können, aber unsere Sicht auf die Musik des 15. und 16. Jahrhunderts verzerren. Vor allem die bloße Präsenz von parallelen, perfekten Intervallen – insbesondere von Quintparallelen – in einem Josquin zugeschriebenen Werk wird häufig als Beleg dafür angeführt, ihm dieses abzusprechen.

Das »Parallel«-Tool des JRP knüpft an das Princeton Josquin Project an, indem es mit diesem Pauschalurteil aufräumt und Nutzern alle Parallelen perfekter Intervalle in einem ausgewählten Repertorium anzeigt.[12] Zusätzlich zu einer vollständigen Übersicht aller betreffenden Passagen werden Quintparallelen in Partiturauszügen rot, Oktav- und Primparallelen grün markiert.[13] Selbst eine Suche innerhalb der fünfzig Werke, deren Zuschreibung zu Josquin als am gesichertsten gilt, weist ca. 170 Parallelen perfekter Intervalle auf, wie ein Beispiel aus der *Missa Gaudeamus* zeigt (Abb. 1).

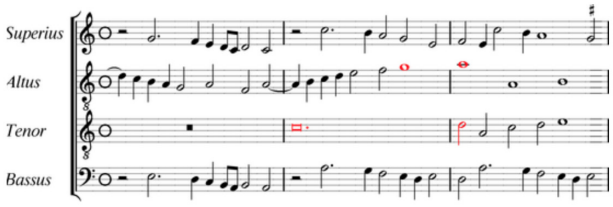


Abbildung 1. Beispiel eines Such-Ergebnisses mit dem »Parallel«-Tool des *Josquin Research Project* (https://josquin.stanford.edu/analysis/parallel/).

Und dennoch (um Rifkin zu zitieren): »there are fifths and there are fifths.«[14] Daher unterscheidet das JRP zwischen sogenannten »harten« Parallelen (»hard

12 https://josquin.stanford.edu/analysis/.

13 Es ist von jeder Werkübersicht (z. B. https://josquin.stanford.edu/work/?id=Ock2004) aus möglich, eine vollständige Partitur zu laden, in der Quint- und Oktavparallelen hervorgehoben sind.

14 Private E-Mail-Korrespondenz (23. März 2017).

parallel motion«), bei denen die parallelgeführten Noten gleichzeitig erklingen, und »weichen« Parallelen, die erst im weiteren Stimmverlauf entstehen.[15] Innerhalb dieser Kategorien kann noch feiner differenziert werden: Welche Stimmen sind für die Parallelbewegung verantwortlich? Wie viele Stimmen erklingen insgesamt? Treten die Quintparallelen in einer kadenzierenden Passage auf? Auf welche Notenwerte ist die Parallele geschrieben (d. h. erscheint sie »zufällig« im fließenden Stimmverlauf oder hat sie eine »strukturelle« Qualität)? Die Möglichkeit, jeden Fall mit anderen abzugleichen, erleichtert diese Art der Analyse, die dringend erforderlich ist, bevor Pauschalurteile gefällt oder gar Werke Josquin abgesprochen werden können.

Einerseits kann sicher festgestellt werden, dass Josquin gelegentlich perfekte Intervalle parallel führte, was angesichts des Umstandes, dass Komponisten seiner Generation keinen Anstoß an Quintparallelen nahmen, Sinn ergibt: Präziser formuliert, wandten sie diese **»Regel« weniger streng an als Palestrina und dessen** Zeitgenossen.[16] Andererseits ist Josquin sehr bedacht darauf, wie und wann er Quintparallelen einführt. Eine Quintparallele wird selbst in seinen »harten« Parallelen dadurch abgemildert, dass die zweite Parallele in kurzen Notenwerten (d. h. *Semiminimae* oder *Fusae*) in einer oder in beiden Stimmen nur sehr beiläufig erklingen kann. In anderen Fällen ist die Parallele, ähnlich wie gelegentlich in Bachs Musik, durch das Hinzufügen von Akzidenzien zu einer kadenzierenden Wendung abgedämpft: Das erste Intervall wird zu einer verminderten statt einer reinen Quinte. Gerade im Vergleich mit anderen Komponisten oder mit Werken, die Josquin nicht eindeutig zugeschrieben werden, zeigt sich, dass er äußerst selten auffällige, »harte« Quintparallelen komponiert.[17] Insgesamt zeigen diese Erkenntnisse, dass die bloße Präsenz von Quint- und Oktavparallelen kaum als Grundlage für Werkzuschreibungen dienen kann. Im Allgemeinen macht das »Parallel«-Tool des JRP deutlich, dass weitere Untersuchungen zu diesem Thema nötig sind.

15 Vgl. https://josquin.stanford.edu/analysis/parallel/.

16 Obwohl das Verbot von Quint- und Oktavparallelen auf das 14. Jahrhundert zurückgeht, ist diese Regel in Josquins Ära in der theoretischen Literatur nicht so prominent wie sie es später einmal wurde. Vgl. Richard L. Crocker, »Discant, Counterpoint, and Harmony«, in: *Journal of the American Musicological Society* 15 (1962), S. 1–21, besonders S. 10–11; und Johannes Tinctoris, *The Art of Counterpoint*, übers. von Albert Seay, Rom 1961 (Musicological Studies and Documents, 5), S. 133–134.

17 Dennoch bleiben einige »schlechte« Parallelen. Vgl. z. B. (in grob chronologischer Folge) *Missa L'homme armé sexti toni*, Credo, T. 243; *Missa Gaudeamus*, Gloria, T. 32–33; *Liber generationis*, T. 124; und *Missa Malheur me bat*, Credo, T. 116. Für den spektakulärsten Fall, vgl. *Missa Faisant regretz*, Credo, T. 122, in dem die Außenstimmen unverhohlen in Duodezimparallelen im homorhythmischen Satz möglicherweise eine Art Tonmalerei darstellen (der Text dazu lautet »unum baptisma«).

II. Edieren ist schwierig

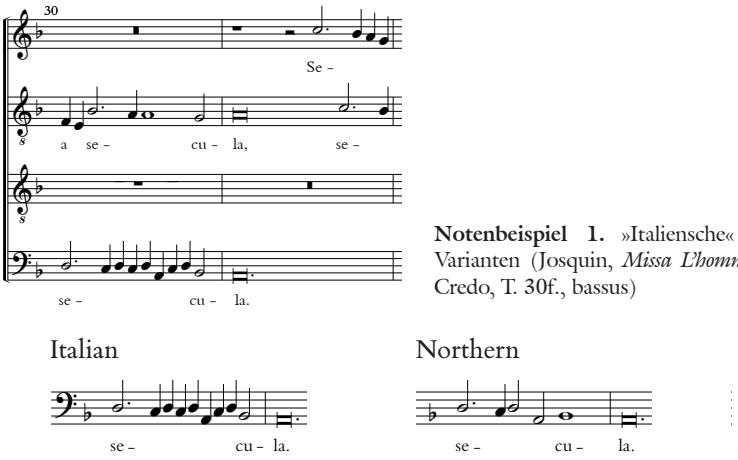
Jeder, der an wissenschaftlichen Editionen arbeitet, wird sich einmal gewünscht haben, dass ein bestimmtes Werk nur anhand einer einzigen Quelle überliefert ist. Auch wenn für die Editionsarbeit mehrere Textzeugen hilfreich sein können (und so frustrierend *unica* sein können), wird sie umso komplexer, wenn zwei, drei oder gar zwanzig Quellen die Grundlage bilden. Dieses Problem verschärft sich zusehends, je mehr Bedeutung der Textkritik beigemessen wird. Auch hier finden sich überall Problemfelder: Zu Repräsentationszwecken aufwendig gestaltete Manuskripte strahlen zwar Autorität aus, überliefern jedoch häufig eine schlechtere Lesart des Notentextes; eine Variante, die scheinbar zwei Quellen in Verbindung zueinander bringt, stattdessen aber wohl eher von verschiedenen Kopisten unabhängig voneinander eingebracht wurde; und offenkundige Eingriffe von genialen komponierenden Schreibern, die sich als zufällige Fehlerkorrekturen von heute nicht mehr erhaltenen Vorlagen erweisen. Diese Fälle werfen ein Schlaglicht auf Fragen, die beim Edieren gestellt werden müssen: Was ist die beste (meist heißt dies: die einfachste) Erklärung für die entdeckte Varianz? Welche Varianten sind bei der Festlegung des Stemmas wichtig und welche nicht? (Die meisten sind es nicht.) Und am wichtigsten: Welche musikalische Lesart diente als Vorlage für die anderen?

Bei der Edition von Josquins *Missa L'homme armé sexti toni* wünschte ich mir häufiger, sie sei ein Unikum, da die Quellen zu dieser Messe so kompliziert wie zahlreich sind: Teile des Werkes sind in 23 Quellen überliefert, darunter neun, die im Zeitraum von ca. 1498–1508 erstellt wurden.[18] Obwohl diese Quellen sich leicht in zwei Hauptgruppen gliedern lassen, »italienische« und »nördliche«, hat keine der beiden eine offensichtliche Priorität, da in diesem Fall beiden eine gemeinsame Vorlage zu Grunde liegt. Daher besteht die angemessenste Lösung darin, beide Quellengruppen in einer Edition zusammenzuführen, wobei der Editor häufig von Fall zu Fall über die Quellenhierarchie entscheiden muss.

In einigen wenigen Passagen liegt die Antwort auf der Hand. Häufiger sind jedoch kreative Lösungen gefragt, um für die Bevorzugung einer bestimmten Quelle zu argumentieren. Hierzu ist es wichtig zu begründen, weshalb eine Quelle im Kontext des Werkes oder der generellen Gewohnheiten des Komponisten plausibler ist, wobei das JRP behilflich sein kann. Der Herausgeber kann sowohl nach melodischen und rhythmischen Varianten im Werk selbst als auch im gesamten Schaffen des Komponisten suchen. Dies ermöglicht Schlussfolgerungen zum Vorkommen bestimmter musikalischer Phänomene innerhalb eines Werks oder

18 Josquin des Prez, *New Edition of the Collected Works* (*New Josquin Edition*), 30 Bde., Amsterdam 1987–2015, Bd. 6, hrsg. von Jesse Rodin; und im beigefügten kritischen Kommentar S. 5–91, besonders S. 25–43.

zu kompositorischen Eigenheiten von Josquin. Diese Folgerungen stellen keine endgültigen Beweise dar, sind aber evidenzbasiert und ermöglichen die größtmögliche Annäherung an eine fundierte Problemlösung.



Notenbeispiel 1. »Italiensche« und »nördliche« Varianten (Josquin, *Missa L'homme armé sexti toni*, Credo, T. 30f., bassus)

Eine besonders komplexe Passage findet sich im Credo (Notenbeispiel 1). In den nördlichen Quellen enthält es ein Duo, in dem der Bassus eine unauffällige Wechselnoten-Figur singt, die eine phrygische Kadenz nach *a* antizipiert. Die Stimmführung ist in den italienischen Quellen hingegen deutlich lebendiger: Nachdem der Bassus auf einer punktierten halben Note *d* angelangt ist, bewegt er sich dann in großen Notenwerten größtenteils zwischen *c* und *d*. So singt er sieben aufeinanderfolgende Viertelnoten vor der abschließenden Kadenz. In keiner Version liegt ein kontrapunktischer Satzfehler oder ein Textierungsproblem vor. Daher muss zwischen zwei Standardinterpretationen entschieden werden: (a) Entweder schmückte der Kopist des »italienischen« Hyparchetyps Josquins Kadenzformel aus oder (b) ein »nördlicher« Kopist verschlankte Josquins exzentrische Roulade.

Die erste Interpretation scheint anfangs plausibler, da Schreiber häufig dazu tendieren, eher auszuschmücken als zu vereinfachen. Tatsächlich sind in den überlieferten italienischen Kopien im Vergleich zu den nördlichen mehr Verzierungen enthalten. Allerdings entspricht diese besondere Art der Ausgestaltung nicht geläufigeren Beispielen. Im Unterschied zu solchen Fällen, in denen der Schreiber einen Terzsprung mit einer Durchgangsnote auffüllt oder eine Kadenzformel mit einer Drehfigur aus zwei oder drei Noten verziert, weist die »raffinierte« Version hier eine viel aufwendigere Behandlung auf als eine minimale Ergänzung. Daher ist zu vermuten, dass die italienische Lesart eine *lectio difficilior* repräsentiert – eine »schwerere« und daher letztlich plausiblere Fassung.

Zur Beantwortung dieser Frage muss noch eine weitere gestellt werden: Wie kann diese melodische Tonfolge sowohl innerhalb der Messe als auch in anderen Kompositionen, deren Zuschreibung zu Josquin gesichert ist, kontextualisiert werden? Ausgehend von der Werkübersicht des JRP für die *Missa L'homme armé sexti toni*[19] können Bezugsmuster gesucht werden, indem die Suchbegriffe eingegeben werden:

Intervall: -2 +2 -2 +2	eine Melodie, die sich schrittweise abwärts, aufwärts, abwärts, aufwärts bewegt
Rhythmus: 2. 4 4 4	eine punktierte halbe Note gefolgt von drei Viertelnoten

Eine teilweise analoge Passage findet sich im Pleni (T. 33–34).[20] Sowohl in der italienischen als auch in der nördlichen Überlieferung beginnt die untere Stimme des Duos eine kreisende Bewegung, die derjenigen im Credo sehr ähnelt. Somit lässt sich zumindest festhalten, dass keine außergewöhnlichen Abweichungen von Josquins melodischer Praxis als Basis für die Edition angenommen werden müssen, wenn man die italienische Lesart dieser Messe als Grundlage wählt.

Das JRP ermöglicht noch einen weiteren Schritt. Eine Suche nach diesen Mustern auf der zentralen Suchseite[21] liefert eine weitere analoge Stelle eines Josquin gesichert zugeschriebenen Werks: das Benedictus der *Missa Malheur me bat* (T. 182), in dem wiederum die Kreisbewegung in der Unterstimme eines Duos erklingt, womit diese Analogie aber endet, da die betreffende Stimme schließlich auf ganz anderem Wege zur Kadenz geführt wird als der Bassus. Die Beziehung wird dennoch deutlich.

Tritt man noch einen weiteren Schritt zurück, so lässt sich beobachten, dass die italienische Überlieferungsvariante Josquins »obsessive compositional personality« abbildet, die ich an anderer Stelle beschrieben habe.[22] Diese drückt sich u. a. in seiner Vorliebe für melodische, kreisende Bewegungen aus, die Kadenzen vorangestellt sind. Auch wenn diese Kompositionsweise kein Alleinstellungsmerkmal Josquins ist, so findet sich diese Figur doch sehr häufig in seinem Schaffen.

All dies beantwortet die Frage wie so oft nicht eindeutig. Es gibt keinen schlagenden Beweis – keine Passage in dieser Messe oder einem anderen Josquin gesichert zugeschriebenen Werk, in dem sich der gleiche Bassus in

19 https://josquin.stanford.edu/work/?id=Jos0602c.

20 Dieses Muster erscheint wieder im Gloria tua (T. 52–53), eine Passage, die abgesehen von der Transposition mit dem Pleni identisch ist.

21 https://josquin.stanford.edu/search/.

22 Jesse Rodin, »An Obsessive Compositional Personality«, in: *Josquin's Rome. Hearing and Composing in the Sistine Chapel*, New York 2012 (AMS Studies in Music), S. 41–97.

seiner kadenzvorbereitenden Funktion findet. Darüber hinaus behält die nördliche Überlieferungsvariante, zu der sich sogar im Kyrie eine Analogie findet (T. **60–61**), **ihre Plausibilität. Auch wenn es schwer vorstellbar ist, dass ein Schreiber** eine einfache Geste so frei ausgestaltet hat, leuchtet es ein, dass ein behutsam vorgehender Kopist die Stelle vereinfacht haben könnte; oder dass er sich (evtl. wahrscheinlicher) mit einem Fehler konfrontiert sah und die sinnvolle Lösung, die in der nördlichen Lesart überliefert ist, festhielt.[23] Insgesamt spricht das Verhältnis von Wahrscheinlichkeiten in Bezug auf die Schreiberpraxis in Verbindung mit Josquins kompositorischen Neigungen hier für die italienische Lesart. Selbst wenn dies nicht mit absoluter Sicherheit festgestellt werden kann, so ermöglicht das JRP es dennoch, die eigenen Argumente und editorischen Entscheidungen auf ihre Stichhaltigkeit zu prüfen.

III. Große Intervalle sind selten – und hilfreich bei Zuschreibungen

Es herrscht Konsens darüber, dass der bedeutendste stilistische Wandel der frankoflämischen Polyphonie des 15. Jahrhunderts um 1480 im Zuge eines Generationenwechsels von Ockeghem, Antoine Busnoys und Johannes Regis zu Josquin, Jacob Obrecht, Heinrich Isaac und La Rue erfolgte.[24] Dieser Wandel wird meist mit dem Aufkommen der Imitation, dem Niedergang der *formes-fixes* Chanson und einer stärkeren Tendenz zur syllabischen Textverteilung erklärt. Die musikalischen Grundelemente und subtilen Veränderungen in der kompositorischen Praxis, die Ockeghem so deutlich von Josquin unterscheiden, sind aber erst oberflächlich untersucht. Eine gründliche Kenntnis der Musik ist eine Vorbedingung, um diesen Wandel beobachten und interpretieren zu können. Dieses Wissen, das durch Hören, Singen und Lesen der Partitur gewonnen wurde, reicht in manchen Fällen jedoch nicht aus, sodass man hier auf »a large mass of facts«[25] zurückgreifen muss, wie Franco Moretti es formuliert hat. In Ermangelung eines Noten-zählenden Heeres braucht es hierfür digitale Werkzeuge.

23 Man beachte die *c-d-Semiminimae*, die drei Mal in der italienischen Version erscheinen (Bsp. 2). Der Kopist des nördlichen Hyparchetyps könnte versehentlich zum dritten Tonwechsel *c-d* gesprungen sein und dabei *c-d-c-d-A-c* ausgelassen haben; die uns überlieferte nördliche Lesart könnte eine plausible Korrektur sein. Im Gegensatz dazu ist es nur schwer vorstellbar, wie die versehentliche Eintragung der zwei Minimae in der nördlichen Version – oder jedes anderen analogen Kopierfehlers – eines Kopisten als Grundlage für das Entstehen der italienischen Lesart gedient haben könnte.

24 Eine frühere Fassung einiger dieser Inhalte habe ich bereits 2012 auf der Tagung der American Musicological Society (New Orleans) mit Clare Bokulich präsentiert. Der Beitrag hieß »A Large Mass of Facts«.

25 Franco Moretti, *Graphs, Maps, Trees: Abstract Models for a Literary History*, London und New York 2005, S. 3.

Vor allem die Tonhöhe ist ein Parameter, der gerade in Bezug auf die Setzweise einfacher melodischer Gesten systematisch erforscht werden muss. Es ist bekannt, dass Ockeghem und seine Zeitgenossen gerne lange melodische Linien komponierten, die schnell einen großen Stimmumfang durchschritten, was die Sänger an ihre Grenzen führte. Ebenso klar ist, dass Josquin und die Komponisten seiner Generation im Gegensatz dazu vermehrt kurze Motive nutzten, die imitiert, sequenziert und mit einem Ostinato versehen werden konnten. Dies wirft die Frage auf, welche dieser beiden Strategien in der melodischen Gestaltung vermehrt auf Tonsprünge zurückgreifen. Die Beantwortung dieser Frage ist sehr vielschichtig (vgl. Tabelle 1 und Abb. 2; in Abb. 2 nutzt jeder Graph einen anderen Maßstab).[26]

Trotz Ockeghems Reputation, melodisch, rhythmisch und auf andere Weise komplex zu schreiben, ist er in Bezug auf große Tonsprünge der konservativste Komponist der oben genannten.[27] Dies mag auf den ersten Blick überraschen, erscheint bei näherem Betrachten aber verständlich: Je heterogener ein kompositorischer Parameter ist, was Carl Dahlhaus »materiale Differenzierung« nennt, desto strenger wird mit benachbarten Parametern umgegangen.[28] Ein paar Beispiele sollen dies verdeutlichen: Rhythmische Komplexität findet sich in Messen des 15. Jahrhunderts nicht im vollen, vierstimmigen Satz, sondern in zweistimmigen Passagen; explizite, ›färbende‹ *mi* und *fa* Zeichen (d. h. Kreuz- und B-Vorzeichen) treten nicht so sehr in dichten polyphonen Passagen auf, sondern häufiger in homorhythmischen Kontexten; und schließlich verzichtet Ockeghem auf häufige, akrobatische Tonsprünge zugunsten der Kultivierung seiner Komplexität. In dieser Hinsicht ist es interessant, dass die Komponistengeneration, die sich um 1480 etablieren konnte, wieder Anschluss an Du Fay suchte und dass Busnoys, der jetzt als eine Art »Übergangsfigur« gesehen wird und einige der stilistischen Entwicklungen des späten 15. Jahrhunderts initiierte, auch bezüglich großer Tonsprünge eine »Übergangsfunktion« inne hatte.[29]

26 Vgl. auch Cory McKay, Julie Cumming und Ichiro Fujinaga, »Characterizing Composers Using jSymbolic2 Features«, in: *Extended Abstracts for the Late-Breaking Demo Session of the 18th International Society for Music Information Retrieval Conference, Suzhou, China, 2017*, https://ismir2017.ismir.net/.

27 Im Durchschnitt nutzt La Rue Oktavsprünge etwas seltener als Ockeghem, allerdings verwendet er Sextsprünge mehr als doppelt so häufig.

28 Dieser Punkt ist eng mit Dahlhaus' Unterscheidung von »materialer« und »funktionaler« Differenzierung verknüpft; vgl. *Analysis and Value Judgment*, trans. Siegmund Levarie, New York 1983, S. 43–45, ursprünglich erschienen als: *Analyse und Werturteil*, Mainz 1970 (Musikpädagogik. Forschung und Lehre 8), S. 50–54. Ich möchte Sean Gallagher für den persönlichen Austausch seiner Ideen zu diesem Thema danken.

29 Es ist erstaunlich, dass Quintsprünge sich als weniger ergiebig erweisen. Fünf oder sechs der hier behandelten Komponisten komponieren zwischen 26.3 (gesichert Josquin) und 30.3 (Du Fay) Quintsprünge pro 1000 Noten – eine enge Verteilung. De Orto schreibt im Durchschnitt 35.7 Quintsprünge pro 1000 Noten.

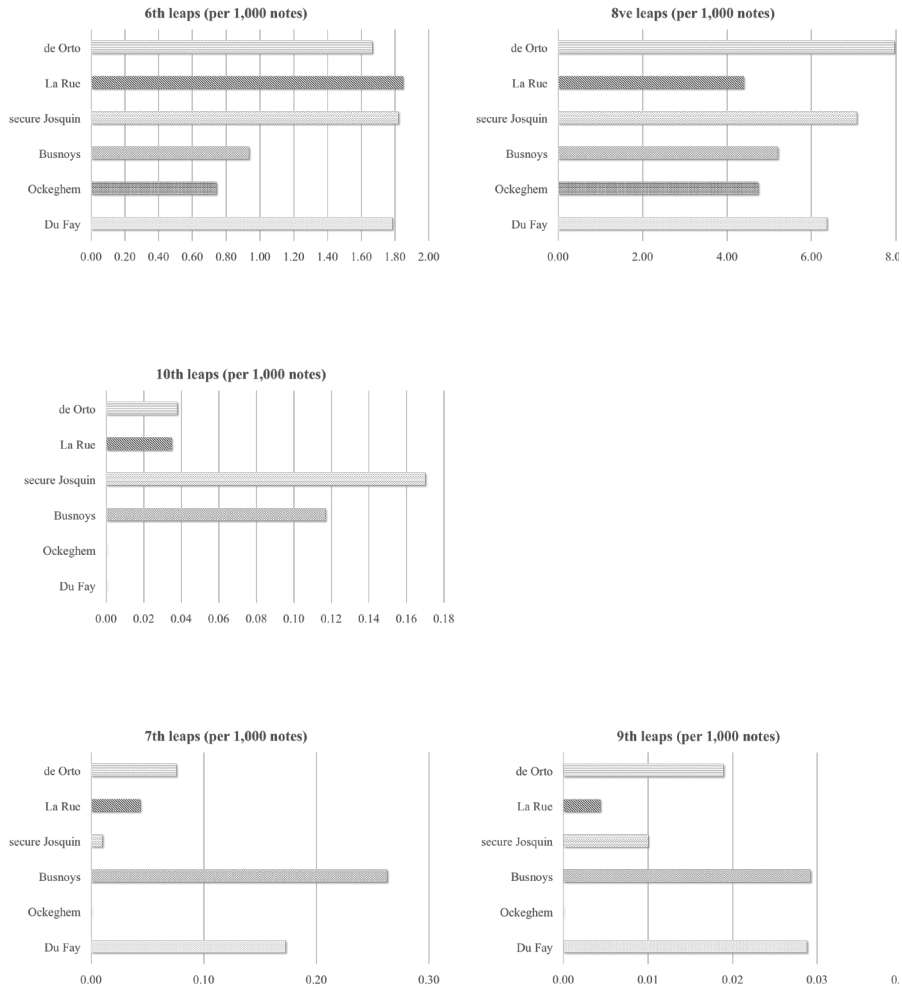


Abbildung 2. Große Sprünge in der Musik einiger Komponisten des 15. Jahrhunderts.

Was Oktavsprünge angeht, so ähnelt La Rues Vorgehensweise der Ockeghems, wodurch sie als deutlich konservativer einzuordnen ist als die Praxis seiner Zeitgenossen. Im Kontext seiner Messen bedeutet dies, dass im Durchschnitt vier Oktavsprünge pro Messensatz zu erwarten sind im Vergleich zu sieben oder acht in den Kompositionen Marbrianus de Ortos und Josquins. Je nach Blickwinkel mag dieser Unterschied gering erscheinen. Allerdings darf davon ausgegangen werden, dass diese Differenz signifikant ist, da sie auf einem Datensatz von über 500.000 Noten (knapp der Hälfte aller Noten, die das JRP insgesamt umfasst)

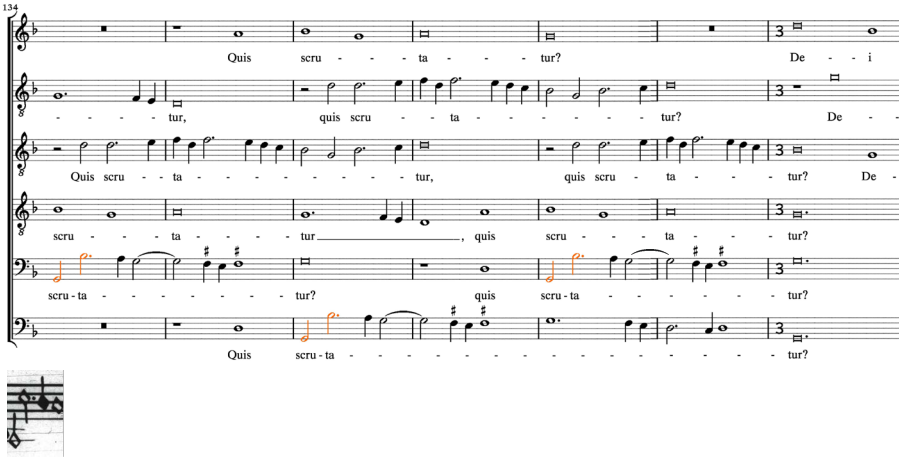
basiert. Die große Anzahl an Beispielen – selbst Ockeghems überlieferte Werke enthalten mehr als 400 Oktavsprünge – erfordert weitere Untersuchungen.

Im nochmaligen Rückgriff auf die grobe Einteilung nach Generationen (siehe Tabelle 1 und Abb. 2) zeigt sich, dass diese Aufteilung auch auf die größten Intervallsprünge im Repertorium angewendet werden kann. Es existieren nahezu keine Dezimsprünge in der Musik Ockeghems oder Du Fays. Während dies durchaus auch für die Musik de Ortos und La Rues gilt, ist Josquin (bislang) der einzige Komponist, in dessen Werken sich gleich mehrere Beispiele für Tonsprünge dieser Art aufzeigen lassen.[30] Diese Dezimsprünge treten besonders in kirchenmusikalischen Kompositionen zu vier oder mehr Stimmen gehäuft auf und finden sich meist im Altus und Bassus. Sie sind mit zwei Ausnahmen immer aufsteigend und knapp drei Viertel dieser Sprünge sind auf kurze Notenwerte (*Minima* oder gar *Semiminima*) gesetzt. Manchmal erscheinen sie in Form einer repetitiven Geste, wie die drei dicht aufeinanderfolgenden Dezimen aus *Preter rerum seriem* verdeutlichen (vgl. Notenbeispiel 2). In dieser Passage katapultieren sich die beiden Bassus-Stimmen sukzessive in eine mittlere Stimmlage. Vergleichbar mit etwa der Hälfte aller Dezimsprünge Josquins münden auch diese Anstiege jeweils in eine Kadenz, die eine Terz unterhalb des höchsten Tones liegt und deren Intensität (vermutlich) durch die schneidende Dissonanz von *fis* und *f*' gesteigert wird. Tatsächlich erreicht diese Musik gegen Ende der *secunda pars* ihren Höhepunkt, nach welchem die dichte Polyphonie, innerhalb derer die Dezimsprünge auftreten, plötzlich von einem deutlich leichteren Dreiermetrum abgelöst wird.

Anhand dieser Passage wie auch an anderen ähnlichen Stellen zeigt sich, dass Josquin sich eine Art melodische Athletik zu Nutze machte, die andere Komponisten des 15. Jahrhunderts meist vermieden. Diese durch größere Intervallsprünge gekennzeichnete Stimmführung hat allerdings zur Folge, dass dem Komponisten nur eingeschränkte kompositorische Möglichkeiten nach Oktav- oder Dezimsprüngen verbleiben. Ein Komponist wie Ockeghem hätte Sprünge dieser Art womöglich vermieden, um sich nicht von solchen Konventionen einschränken zu lassen: So zeigt sich wiederum, dass sich eine heterogene Behandlung der Melodik auf benachbarte musikalische Parameter begrenzend auswirkt.

Die Untersuchung von Septimsprüngen erweist sich als unkomplizierter, da kaum ein Komponist dieser Zeit sie schreibt. Du Fay und de Orto konfrontieren Sänger nur selten mit dieser ungewöhnlichen melodischen Wendung; noch seltener findet sie sich bei La Rue, Ockeghem und zuletzt bei Josquin, wenn man

30 Im gesamten vom JRP kuratierten Repertorium finden sich nur zwei größere Sprünge: Dies sind zwei Duodezimsprünge in der Vertonung von *O Venus Bant*, die sowohl Josquin als auch Gaspar zugeschrieben wird (NJE 27.29). Wie zu vermuten war, erscheinen beide Sprünge im Contratenor.



Notenbeispiel 2. Dezim-Sprünge in Josquin's *Preter rerum seriem*, T. 134–140.

zunächst nur die ihm gesichert zugeschriebenen Werken in den Blick nimmt.[31] Die einzige Ausnahme bildet in diesem Zusammenhang bislang Busnoys, der Septimsprünge vergleichsweise häufig komponiert; hier treten sie vor allem im Contratenor seiner Chansons auf, einem Stimmtypus, der besonders durch Tonsprünge charakterisiert ist.[32] Glücklicherweise hilft diese Erkenntnis bei der Klärung eines Zuschreibungsproblems: Das berühmte Lied *Quand ce viendra*, das Busnoys im Laborde- und Dijon-Chansonnier zugeschrieben ist, aber »hocken-gem« in Escorial B, weist zwei Septimsprünge auf, die jeweils im Contratenor auftreten.[33] In Anbetracht dessen, dass keiner der vier Septimsprünge Ockeghems in der Contratenor-Stimme einer Chanson zu finden ist, darf die Zuschreibung von *Quand ce viendra* zu Busnoys als gesichert gelten.

Noch seltener als Septimen sind Nonensprünge, für die sich eines der außergewöhnlichsten Beispiele unter den gesicherten Zuschreibungen Josquins gegen Ende des Gloria aus der *Missa Malheur me bat* kurz vor dem Wiedereinsatz des klimaktischen Materials findet, das den Messensatz zum Ende führt.[34] In T. 144 springt die Altus-Stimme auf ihre höchste Note (*a'*), um danach das hohe *g'* drei Takte lang zu halten (T. 145–47). Der Superius kehrt wiederholt auf seine höchste

31 Die zwei Fälle, in denen Septimsprünge doch nachweisbar sind, finden sich im *Miserere mei deus*, T. 218, Tenor 2 und im *Virgo salutiferi/Ave Maria*, T. 78, Bassus.

32 Diese Gebrauchsweise findet sich in acht von insgesamt neun Beispielen; der letzte tritt im Superius der *Missa L'homme armé* auf.

33 Zu den Quellen vgl. David Fallows, *A Catalogue of Polyphonic Songs 1415–1480*, Oxford 1999, S. 335–336.

34 Für eine Edition vgl. https://josquin.stanford.edu/cgi-bin/jrp?a=notationEditText&f=Jos0901b.

Note (*e*") in Dezimparallelen mit dem Bassus zurück, bevor er zur abschließenden Kadenz absteigt (T. 150). In diesem Kontext erweist sich der Altus-Sprung als klimaktisch, gar als triumphierend, indem der Altus den affektiven Höhepunkt des Satzes einleitet. Die Passage verdeutlicht den überwältigenden Effekt, den diese außergewöhnliche Kompositionsweise hat.[35]

Auf dieser Grundlage ist es möglich, das JRP zu nutzen, um ein weiteres, komplizierteres Zuschreibungsproblem anzusprechen: Die *Missa Une musque de Biscaye*, ein Stück, das möglicherweise mit Josquins Chanson gleichen Namens verwechselt worden ist.[36] Wie Rob Wegman angemerkt hat, ist diese Messe in mehreren Quellen überliefert, von denen jede eine Zuschreibung zu Josquin erhält; darüber hinaus zählt die früheste von ihnen (Berlin 40021, ca. 1495–97 kopiert) zu den ältesten überlieferten Quellen von Josquins Messvertonungen.[37] Dennoch haben Jaap van Benthem und Rifkin festgestellt, dass all diese Quellen eine Vielzahl von Fehlern verbindet, sodass die mehrfachen Zuschreibungen zu Josquin sich effektiv auf eine einzige reduzieren lassen.[38] Für sich genommen bildet dies kein Argument gegen Josquins Autorschaft, zumal das relativ frühe Datum von Berlin 40021 ein gewisses Maß an Autorität auszustrahlen scheint.[39] Dennoch mahnen mehrere Überlegungen zur Vorsicht, darunter die geographische Entfernung des Manuskripts von Josquin (vermutlich wurde es in Süddeuts chland kopiert), das Fehlen mehrerer Überlieferungen mit Zuschreibung, eine Reihe stilistischer Ungereimtheiten im Vergleich zum Korpus der gesichertsten Werke[40] Josquins sowie die Möglichkeit einer Verwechslung mit der Josquin gesichert zugeschriebenen Chanson *Une musque de Biscaye*.[41]

35 Der einzige andere gesichert zugeschriebene Fall findet sich in *Vultum tuum*, Altus, T. 428–429, in dem große Notenwerte (Brevis – Brevis) den besonderen Charakter des Sprungs dämpfen.

36 Die folgende Analyse setzt den Ansatz zweier früherer computerbasierten Untersuchungen fort: Mendel, »Towards Objective Criteria« (wie Anm. 9), S. 300–302; sowie Anne-Emmanuelle Ceulemans, »A Stylistic Investigation of *Missa Une mousse de Biscaye*, in the Light of Its Attribution to Josquin des Prez«, in: *Tijdschrift van de Koninklijke Vereniging voor Nederlandse Muziekgeschiedenis* 48 (1998), S. 30–50.

37 Rob C. Wegman, »Who Was Josquin?«, in: *The Josquin Companion*, hrsg. von Richard Sherr, New York und Oxford 2000, S. 21–50, besonders S. 30–33.

38 Jaap van Benthem, »Was ›Une mousse de Biscaye‹ Really Appreciated by L'ami Baudichon?«, in: *Muziek & Wetenschap* 4 (1991), S. 175–94; und Joshua Rifkin, »Masses and Evidence: Petrucci's Josquin«, unveröffentlichter Aufsatz. Vgl. auch Bonnie J. Blackburn, »Masses Based on Popular Songs and Solmization Syllables«, in: The Josquin Companion (wie Anm. 37), S. 51–87, hier: S. 72–76.

39 In seinem 2010 für die *New Josquin Edition* erschienenen Band verteidigt Martin Just die Autorschaft Josquins (Bd. 5, kritischer Bericht, S. 79–89). Vgl. auch die dort zitierte zusätzliche Forschungsliteratur.

40 Vgl. Wegmans angebrachte methodische Kritik von van Benthems komparativer Analyse in »Who Was Josquin?« (wie Anm. 37).

41 Justs Vorschlag (*New Josquin Edition*, Bd. 5, kritischer Kommentar, S. 82), dass Werke mit ähnlichen Titeln unterschiedlicher Genres nicht verwechselt wurden, wird durch Kompositionen wie die *Missa Missus est angelus* widerlegt, die auf Josquins vierstimmiger Motette basiert und sowohl ihm als auch Moulu zugeschrieben wird.

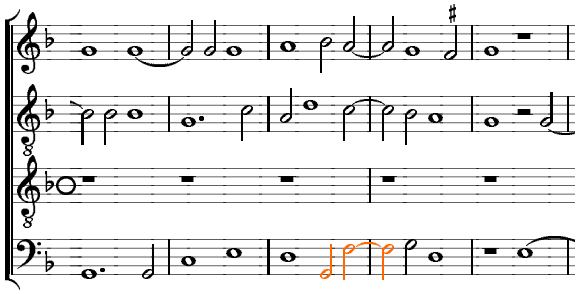
In der Messe findet sich ein seltener Nonensprung im Kyrie/Agnus Dei (T. 83–84, *b-c*").42 Dieser Sprung ist nicht nur auf kurze Notenwerte komponiert (*Minima* – punktierte *Minima*), sondern erscheint auch in der prominentesten Stimme, dem Superius. Die zwei bereits erwähnten Nonensprünge aus den Josquin gesichert zugeschriebenen Werken treten im Altus auf und in großen bzw. relativ großen Notenwerten, sodass dies eine ganz andere musikalische Situation konstituiert. Selbst wenn die Suche auf alle 300 Werke Josquins ausgedehnt wird, die das JRP derzeit aufgenommen hat (und deren Zuschreibung zu Josquin in vielen Fällen zweifelhaft erscheint), kann nur ein weiterer Nonensprung gefunden werden. Dieser tritt tatsächlich im Superius in entsprechenden Notenwerten (*Semibrevis* – *Minima*) in der Missa *Sub tuum presidium* auf, die nahezu sicher von La Rue komponiert wurde.43 Einerseits erscheint es beunruhigend, dass sich eine solch charakteristische Geste in einem Werk eines vermutlich anderen Komponisten findet. Andererseits reicht dieser eine Sprung auf Grund der außergewöhnlichen Seltenheit von Nonensprüngen nicht aus, als Beweis gegen Josquins Autorschaft herangezogen zu werden. Als stilistische »Fingerabdrücke« erweisen sich Nonensprünge somit nicht als sonderlich hilfreich; ihre exotische Qualität (derzeit enthält das JRP insgesamt nur neun Beispiele und damit einem Anteil von unter eins von 100.000) deutet darauf hin, dass Komponisten sie bewusst einsetzten. Statistiken können dazu beitragen, musikalische Erscheinungsformen innerhalb eines bestimmten Werkes aufzuzeigen, die nicht dem einem Komponisten zugeschriebenen Stil entsprechen. Solche Merkmale gewinnen an Bedeutung, wenn sie aller Wahrscheinlichkeit nach unbewusst eingesetzt wurden.

Bedeutsamer sind daher die vier Septimsprünge in dieser Messe: dies entspricht einem Sprung unter 1500 Noten, d.h. im Durchschnitt fünfzig Mal häufiger als im gesichert zugeschriebenen Korpus.[44] Alle vier Beispiele treten im Bassus mit der Tonfolge *G* zu *f* auf. Wenn man das Blickfeld auf das gesamte Repertorium des JRP erweitert, sind die Ergebnisse verblüffend. Trotz der relativen Seltenheit von Septimsprüngen im Vergleich zu häufigeren Intervallen sind sie mit knapp 100 Fällen in der gesamten Datenbank vergleichsweise häufig vertreten,

42 In dieser Messe ist das Agnus Dei mit dem Kyrie (»Agnus super Kyrie«) identisch.

43 Gloria, T. 53–54. Zu der Messe liegen fünf Zuschreibungen zu La Rue vor, nur eine Quelle von 1539 schreibt sie Josquin zu. Um dies zu kontextualisieren, sei darauf hingewiesen, dass es im gesamten Repertorium, das zurzeit im JRP aufgenommen ist, neun Nonensprünge gibt. Die übrigen Beispiele finden sich bei Agricola, *Missa Malheur me bat*, Sanctus, T. 36, Bassus; Busnoys, *Quelque pauvre homme II*, T. 48–49, Contratenor; Gaspar, *Ave regina celorum mater*, Motette V im *Quam pulchra es*-Zyklus, T. 58–59, Altus; Du Fay, *Resvellies vous*, T. 52–53, Contratenor; und de Orto, *D'ung aultre amer*, T. 12–13, Bassus. In den ersten drei Passagen ist wenigstens eine der zwei Noten des Tonsprungs eine *Minima*.

44 Diese treten auf im Gloria, T. 4 und 44–45, im Credo, T. 121 und im Sanctus, T. 157–58; bis auf den letzten Fall weisen sie kurze Notenwerte auf. Die gesamte Messe besteht aus 6.154 Noten.



Notenbeispiel 3. Sept-Sprung in der *Missa Une Musque de Biscaye* (T. 121).

womit sie bei Zuschreibungsproblemen helfen können.[45] Septimsprünge folgen grundsätzlich dem Modell der *Missa Une musque de Biscaye*: ein Anstieg des Bassus von der Finalis zur Septime darüber. Die untere Note erklingt meist auf dem Schlag, worauf eine Kadenz zur Finalis folgt (vgl. Notenbeispiel 3 von einem der zwei Beispiele aus der Messe). Dennoch lassen sich diese Tendenzen nicht in den Werken feststellen, die Josquin gesichert zugeschrieben sind und stattdessen den Septimsprung nutzen, um motivische Wiederholung oder eine *fuga* zu ermöglichen. Selbst wenn der »Josquin«-Korpus auf die Werke erweitert wird, die ihm weniger sicher zugeschrieben werden, bleibt die Korrelation zwischen Septimen mit melodischem Gehalt und motivischer Repetition bestehen, wohingegen sich zur *Une musque*-Messe keine Analogien finden.[46] Ist es möglich, dass Josquin in nur einem Stück mehr Septimsprünge als üblich komponierte und jedes Mal eine konventionelle Form wählte, die er andernfalls vermied? Auch wenn dies theoretisch denkbar ist, so ist dies nicht wahrscheinlich.

Es gibt somit einen weiteren Grund, Josquins Autorschaft der *Missa Una musque de Biscaye* anzuzweifeln. In einem Fall wie diesem sprechen die Argumente, das Werk Josquin abzusprechen, für sich; es ist nicht nötig, einen Autor zu identifizieren, der mit größerer Wahrscheinlichkeit die Messe komponierte. Digitale Tools können nicht dabei helfen, eine solche Identifizierung mit Sicher-

45 Diese Praxis habe ich bereits für die Musik Busnoys' untersucht; eine signifikante Anzahl weiterer Beispiele könnte hier angeführt werden. Vgl. u. a. Anonymus, *Donne vidue/Tarrach barach/Jeus diray*, T. 77; Du Fay, *Craindre vous vueil*, T. 24 und *Adieu ces bons vins de Lannoy*, T. 18–19; Gaspar, *Tota pulchra es* (*Quam pulchra es*-Zyklus VIII), T. 26; Jean Japart, *Trois filles estoient*, T. 20; de Orto, *D'ung aultre amer*, T. 30 (in zwei Stimmen); sowie die im Folgenden erwähnten.

46 Vgl. vor allem die Septimsprünge, die Wiederholungen ermöglichen, in *Vous l'arez*, T. 43–44, Bassus; und *Si j'ay perdu* (NJE 28.32), T. 42, Bassus. Bezeichnenderweise schwindet die Verbindung von Septimsprüngen und motivischer Repetition, wenn die Suche auf Werke ausgedehnt wird, deren Zuschreibung nicht gesichert ist. In jedem Fall enthält keines dieser Stücke so viele Septimsprünge wie die Une musque-Messe.

heit vorzunehmen: Derzeit verfügt das JRP nicht einmal über die Mehrzahl der Werke von Isaac, Loyset Compere, Alexander Agricola oder Obrecht, um nur die vier prominentesten Zeitgenossen Josquins zu nennen. Allerdings habe ich an anderer Stelle über einen Komponisten geschrieben, der eine außergewöhnliche Vorliebe für Septimsprünge der Art aufweist, wie wir sie hier finden: Gaspar van Weerbeke.[47] Wie bei den zuvor genannten Komponisten umfasst das JRP im Moment nur wenige Werke von Gaspar,[48] was die weitere Verfolgung dieser Hypothese zu diesem Zeitpunkt erschwert. Mit einem stetig wachsenden Korpus könnte es einmal möglich sein, weitere Belege für van Benthems Vorschlag zu sam meln, dass er der Komponist sein könnte, oder die Zweifel zu bestätigen, die die Herausgeber der Gaspar-Ausgabe geäußert haben.[49] Ein größerer Korpus wird es über Zuschreibungsfragen hinaus ermöglichen, weitere musikalische Phänomene zu untersuchen, die ihrerseits als überzeugende stilistische Merkmale identifiziert werden können.

In diesen Beispielen erweist sich das JRP als ein hilfreiches Tool, aber nicht als Wunderwaffe. Es ist wichtig zu beachten, dass diese Ressourcen falsch verwendet werden können, indem individuelle Beispiele nicht gründlich recherchiert, Daten falsch ausgelegt und Probleme des Textes, Genres und der Chronologie ignoriert werden. Um noch größere Fehler als die anfänglich beschriebenen zu vermeiden, sollten digitale Tools nie als Ersatz dafür dienen, Musik auf die »altmodische« Art durch Aufführungen, Hören, Partiturstudium und genaue Beschäftigung mit den Originalquellen und kritischen Ausgaben kennenzulernen. Im Hinblick auf ein Stück, das man nahezu auswendig kennt, gibt es dennoch immer neue Bereiche, die durch neue analytische Fragestellungen eröffnet werden können. Selbst wenn man hunderte Stücke sehr genau studiert hat, kann es hilfreich sein, ein Analysewerkzeug zu verwenden, das eine viel größere kompositorische Landschaft erschließt. Eine solche Möglichkeit bieten Ressourcen wie das JRP: Sie können Normen von Ausnahmen unterscheiden und Fragen beantworten, die sonst Monate aufwendiger Arbeit erfordern würden. Sie können sogar dazu beitragen,

47 Neun analoge Beispiele sind in Jesse Rodin, *Josquin's Rome: Hearing and Composing in the Sistine Chapel*, New York und Oxford 2012, S. 141–146, besonders in Tabelle 4.2 auf S. 142 zitiert.

48 Selbst unter diesen findet sich ein Nonensprung in entsprechenden Notenwerten, allerdings im Altus: https://josquin.stanford.edu/cgi-bin/jrp?a=notationWithEditWithText&f=Gas2017e&themax=-I%229%22, T. 58–59.

49 van Benthem, »Was ›Une mousse de Biscaye‹ Really Appreciated« (wie Anm. 38). Vgl. Eric F. Fiedler, »A New Mass by Gaspar van Weerbeke? Thoughts on Comparative Analysis«, in: *Studien zur Musikgeschichte: Eine Festschrift für Ludwig Finscher*, hrsg. von Annegrit Laubenthal und Kara Kusan-Windweh, Kassel 1995, S. 72–87. Andrea Lindmayr-Brandl und Paul Kolb diskutierten freundlicherweise ihre Zweifel an Gaspars Autorschaft mit mir (persönliche Kommunikation).

Fragen zu beantworten, von deren Existenz wir gar nicht wussten, indem sie auf ein musikalisches Charakteristikum oder eine Verbindung aufmerksam machen, die sonst verborgen geblieben wäre. Schließlich geht es nicht darum, Technologien um ihrer selbst willen zu verherrlichen, wie es zur Zeit Mode zu sein scheint, sondern sie in der Aufarbeitung der musikalischen Vergangenheit mit Bedacht einzusetzen.

APPENDIX

Tabelle 1

Guillaume Du Fay (as of spring 2018, the JRP curates 34,742 notes by Du Fay)

Intervall	Anzahl pro Tausend Noten	Anzahl der Sprünge
Sexte	1,78	62
Septime	0,17	6
Oktave	6,36	221
None	0,3	1
Dezime	0	0

Johannes Ockeghem (87,640 notes)

Intervall	Anzahl pro Tausend Noten	Anzahl der Sprünge
Sexte	0,74	65
Septime	0,05	4
Oktave	4,74	415
None	0	0
Dezime	0,1	1

Antoine Busnoys (34,233 notes)

Intervall	Anzahl pro Tausend Noten	Anzahl der Sprünge
Sexte	0,93	32
Septime	0,26	9
Oktave	5,2	178
None	0,03	1
Dezime	0,12	4

secure Josquin (153,551 notes)

Intervall	Anzahl pro Tausend Noten	Anzahl der Sprünge
Sexte	1,82	279
Septime	0,01	2
Oktave	7,07	1086
None	0,01	2
Dezime	0,17	26

Pierre de la Rue (229,629 notes)

Intervall	Anzahl pro Tausend Noten	Anzahl der Sprünge
Sexte	1,85	424
Septime	0,04	10
Oktave	4,39	1009
None	0,004	1
Dezime	0,03	8

Marbrianus de Orto (52,862 notes)

Intervall	Anzahl pro Tausend Noten	Anzahl der Sprünge
Sexte	1,66	88
Septime	0,15	4
Oktave	7,96	421
None	0,01	1
Dezime	0,04	2

Andrea Lindmayr-Brandl

The Catalogue of Early German Printed Music (*vdm.sbg.ac.at*) – Experiences and perspectives on the construction of a multi-faceted database as a research tool*

The invention of music printing in the early 1470s was a cultural achievement that changed the musical landscape of Central Europe. This new medium altered the sociology of music by making art music available to social classes that previously had only limited access to such music. Notated music became a commodity that could be disseminated through traditional mercantile channels far from the geographical origin of the repertoire. The desire to investigate the dynamics of these phenomena prompted the research project »Music printing in German-speaking Lands«, funded by the Austrian Research Council from 2012 until 2019.[1] In this project we treat all music published north of the Alps from the advent of music printing (c. 1470) until the middle of the sixteenth century. At the centre of our research interests stands both the technical challenge of printing notes and staff lines on paper, the development of repertoire and building of musical networks. Unlike studies that focus on a specific musical genre or printing centre, this project examines all kinds of printed sources containing musical notation. This broad perspective provides a comprehensive insight into the varieties of musical production during the late fifteenth and first half of the sixteenth centuries, and deepens our understanding of the influence and role of music printing in cultural history.[2]

One of the central pillars of the project is a database that records all know editions containing printed musical notation up to 1550. This database currently includes 1,187 editions and almost 8,000 copies.[3] Alluding to the »Verzeichnis deutscher Drucke des 16. Jahrhunderts« (VD16), a pivotal project for recording German books of the sixteenth century, we have called our database »Verzeichnis deutscher Musikfrühdrucke / Catalogue of early German printed

* I would like to thank Grantley McDonald for his linguistic support.

1 FWF Austrian Science Fund, Project P 24075-G23 and P 28353-G26. Collaborators: Elisabeth Giselbrecht, Grantley McDonald, Marianne Gillion, Moritz Kelber and Karina Zybina. For more details see our webpage: http://vdm.sbg.ac.at/development/music_prints.php?content=project_introduction&menu=0.

2 For more about the aims and challenges of the project, see Andrea Lindmayr-Brandl, Elisabeth Giselbrecht, and Grantley McDonald, »Introduction«, *Early Music Printing in German-Speaking Lands*, ed. idem (London & New York, 2018), pp. 1–17.

3 Date of data query for all statistics in this paper: 2 May 2018.

music« (*vdm*). The database *vdm* (http://vdm.sbg.ac.at/development/music_prints.php?content=database&menu=1) has been open access from the very beginning of the project and is still a work in progress.

The structure of the database *vdm*

The main problem in establishing such a database is the complex structure of early printed material. An edition of a *modern* book is the sum of all identical copies of a given title, so that the notions of ›book‹ and ›copy‹ are often treated as synonyms. For instance, if I say that my friend and I have read the same book, this is imprecise: in fact we read different copies of the same edition, sometimes even copies of different editions. Moreover, nobody would be interested in the notes I have written in my copy. Most contemporary readers are uninteresting subjects for contemporary research – at least for now – because they are not outstanding personalities and in any case too numerous. Furthermore, the reaction of present-day readers is perhaps too similar to ours to make them sufficiently interesting or illuminating.

On the contrary, the *early* book is much less uniform. In most cases, the copies of the same edition have individual bindings as well as inconsistencies of content, such as loss of pages, a different order of the gatherings, inscriptions that provide evidence of early owners, as well as differences on the printed page caused by a non-standardized production process. Each copy of an early edition is thus individual, with its own history. The interest of each copy is heightened by the small number that survive. As a consequence, our database does not merely list the known copies under each respective edition (both extant and known-but-lost), as in most bibliographies, but treats individual copies on a level on their own. This is reflected in the structure of the database, which distinguishes an edition level and a copy level. Both are closely related to each other. Further relations between editions and copies are represented: earlier and later editions are linked, as well as copies bound with copies of other editions, often arranged by early owners (see Figure 1).[4]

This concept results in a complex network of datas on different levels. I shall not go deeper into these technical issues, but wish to stress that when creating such a research tool, it is necessary to have a clear idea in advance of how the recorded data are going to be used, and to have a person at hand who is experienced in databases to realise the ideas appropriately.

4 For more on this problem, see Andrea Lindmayr-Brandl, »Early Music Prints and New Technology: Variants and Variant Editions,« *Fontes artis musicae* 64 (2017), pp. 244–60.

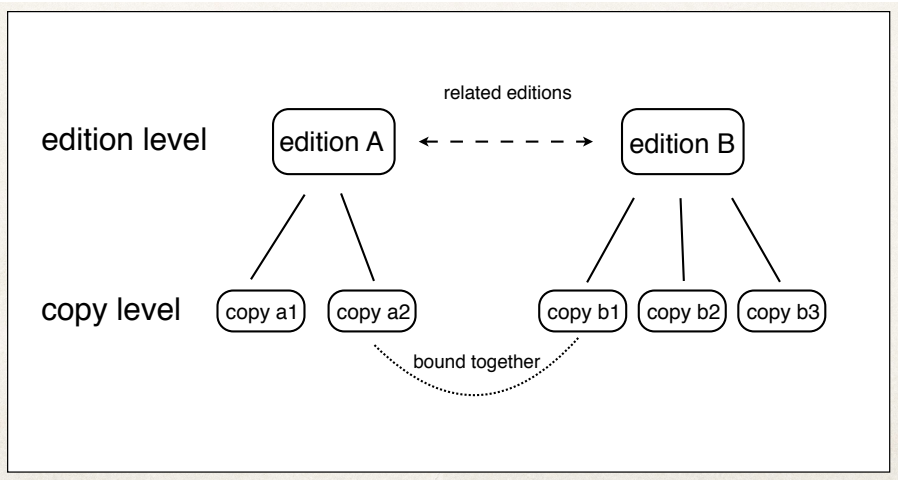


Figure 1. Structure of the database: edition level, copy level and relations.

Problems in recording printed objects

From the problems we encountered while establishing the database, three might be of broader interest.

The first problem is the diversity of the material. One of the qualities of the research project – the fact that we do not only study polyphonic music but all editions containing music notation – is also a challenge. We divided the editions into eight source types, each with different function, repertoire and material characteristics (see Figure 2): liturgical books of all confessions (A), polyphonic music books in several formats (B), tablature books in specific notation (C), theory and pedagogical books with music examples (D), humanist books with ode-setting or choruses as part of a drama (E), hymn books with sacred German songs (F), broadsheets and pamphlets, sometimes in an unusual layout (G), and ›other‹ books that do not fit into one of the categories, which might for example have only a snippet of musical notation on the title page (H). Each source type has to be appropriately represented in the database.

The variety of descriptors leads to a great number of data fields. Currently there are seventy fields only on the edition level and seventeen on the copy level. Several only apply to specific source types or very few editions. For instance, the fields »confessional identity« are relevant only for liturgical books and hymn books; the printing technique »empty staff lines« or »individual notes printed from type« apply mostly to the earlier editions; and »named composers« mainly for books containing polyphonic music. We record five different printing tech-

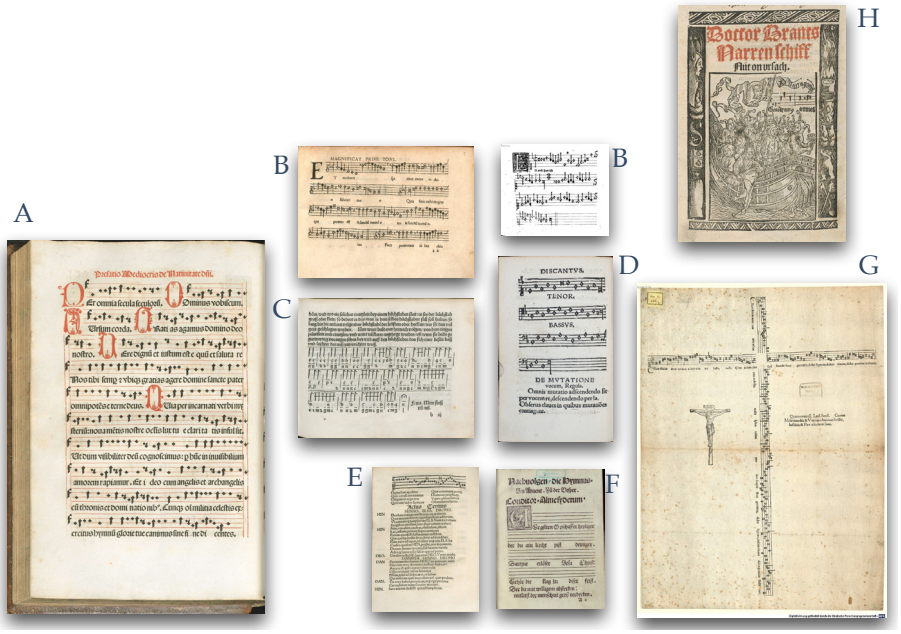


Figure 2. Source types.

niques (woodcut, single impression, multiple impression, individual notes printed from type, empty staff lines), seven notation types (Hufnagel, square and mensural notation, cantus fractus, tablature notation for viols, lutes and organs) and eighteen categories for the genre of music. To identify the items in already existing bibliographies we had recourse to twelve catalogues that apply for different source types and repertoires: five volumes of RISM (http://www.rism.info/publications.html) (A/1, B/1,6,8) including the Böker-Heil Tenorlied catalogue for polyphonic music and music theory, VD16 for printed books (https://opacplus.bib-bvb.de/TouchPoint_touchpoint/start.do?SearchProfile=Altbestand&SearchType=2), the »Gesamtkatalog der Wiegendrucke« (GW) for incunabla (https://www.gesamtkatalogderwiegendrucke.de/), the short title catalogues ISTC (https://data.cerl.org/istc/_search) and USTC (https://ustc.ac.uk/), the database of Renaissance Liturgical Imprints, RELICS (https://quod.lib.umich.edu/r/relics/), as well as Howard Mayer Brown's comprehensive catalogue for instrumental music and Schanze's catalogue of broadsheets with music.[5]

5 Howard Mayer Brown, Instrumental Music Printed Before 1600: A Bibliography (Cambridge, MA, 1979); Frieder Schanze, »Gestalt und Geschichte früher deutscher Lied-Einblattdrucke«,

A second problem is caused by the already mentioned complex concept of an early printed book. Since an edition is not a physical entity but a kind of Platonic Idea derived from the individual copies, we work with the concept of an ›ideal copy‹. Following the definition in the *Oxford Companion to the Book*, an ideal copy is »the most perfect state of the book as the printer or publisher finally intended to issue it […]. Descriptive bibliographers generalize from the evidence present in surviving copies to reconstruct the intended form of that specific […] edition at the moment of publication. Because such evidence may be inconclusive or incomplete, the ideal copy is often conjectural, and it is possible, especially when few copies survive, that no one copy matches the projected ideal copy.«[6]

Our description of an ›ideal copy‹ is based on an ›autopsy copy‹, another technical term used in book research. The autopsy copy of an edition entry in our database is the exemplar that was inspected by a member of the project team in person.[7] The scrutiny of the copy resembles a surgical autopsy, determining structural elements such as the gatherings, and painstakingly recording general and individual characteristics of the object. All data from a given edition are taken from this one copy – generally from the most complete copy that can be located – so that it is clear from where the data have come from. Conjectural data are designated as such, and the source of any additional information is indicated.

A third problem is the standardisation of search data. I will concentrate here on the main parameter of a print: the title. The title page (and with it a title) is a relatively recent element of the book. It developed with the early printed book and took several decades to be standardized in a certain way.[8] The first liturgical books had no title page. In these cases we take either the first words on the first printed page or a significant passage that characterizes the book. A missal for Salzburg, printed by Johann Winterburger in 1506 (vdm 678) might serve as an example. This – the fourth – edition of the missal has a title page, a full-page

NiveauNischeNimbus. Die Anfänge des Musikdrucks nördlich der Alpen, ed. Birgit Lodes (Tutzing, 2010), pp. 369–410.

6 Michael F. Suarez and H. R. Woudhuysen, eds., *The Oxford Companion to the Book*. 2 vols. (Oxford, 2010), p. 644.

7 We aim to inspect at least one copy of each edition in original. If this is not possible we have to draw on a digitised copy.

8 For more on this topic, see for instance Garold Cole, »The Historical Development of the Title Page,« *The Journal of Library History* 6 (1971), pp. 303–16; Margaret M. Smith, *The Title-Page. Its Early Development 1460–1510* (London & New Castle, 2000); Ursula Rautenberg, *Das Titelblatt – Die Entstehung eines typographischen Dispositivs im frühen Buchdruck*. Alles Buch. Studien der Erlanger Buchwissenschaft X (Erlangen-Nürnberg, 2004); Ursula Rautenberg, »Die Entstehung und Entwicklung des Buchtitelblatts in der Inkunabelzeit in Deutschland, den Niederlanden und Venedig – Quantitative und qualitative Studien,« *Archiv für Geschichte des Buchwesens* 62 (2008), pp. 1–105.

woodcut of the arma Christi, surmounted by SS Rupertus and Virgil, but lacks any words. It opens with a calendar, followed by several pages with instructions for the priest and a register. The main corpus of the book starts more than twenty pages later, where it reads (in translation): »Here begins the book of missals adapted for the church of Salzburg with all necessary details.« This beginning serves as a substitute for a title and is recorded in the database in the field »Diplomatic title page«. In this field we try to render the title page (or equivalent) as accurately as possible, indicating line breaks and reproducing abbreviations and ligatures. To do so, we use the font Brill, commissioned by the Leiden publishing house, which offers many of the special signs used by Early Modern printers (see Table 1.a). When the words given in this field do not stem from a title page, we indicate the folio number from where they are (e.g. fol. a1 recto).

Table 1: The entry of Titles in *vdm*

a. Titel entry of a missal without a title (vdm 678)

Diplomatic title page:

Incipit liber missalis fm || *rubrica ecclesie Saltzeburge* || *sis cu oibus requisitis. (a1r)*

Standardised title:

[Missale Salisburgense]

Alternative spelling:

missal, secundum, rubricam Saltzeburgensis

b. Titel entry of a set of partbook with voice designation only (vdm 13)

Diplomatic title page:

TENOR ||
DISCANT^{9} ||
ALTVS ||
BASSVS ||

Standardised title:

[Songs for 3-4 voices]

Alternative spelling:

Lieder Stimmen erstes Liederbuch first songbook

A different challenge are books with titles that give considerably more information than we are used to seeing on the title page of a modern book. An extreme case for such a situation is an ode collection by Erhard Oeglin, printed at Augsburg in 1507 (*Melopoiae sive harmoniae tetracenticae*, vdm 55). Here the nicely shaped title gives a very detailed description of the content and also contains poems flanking the text:

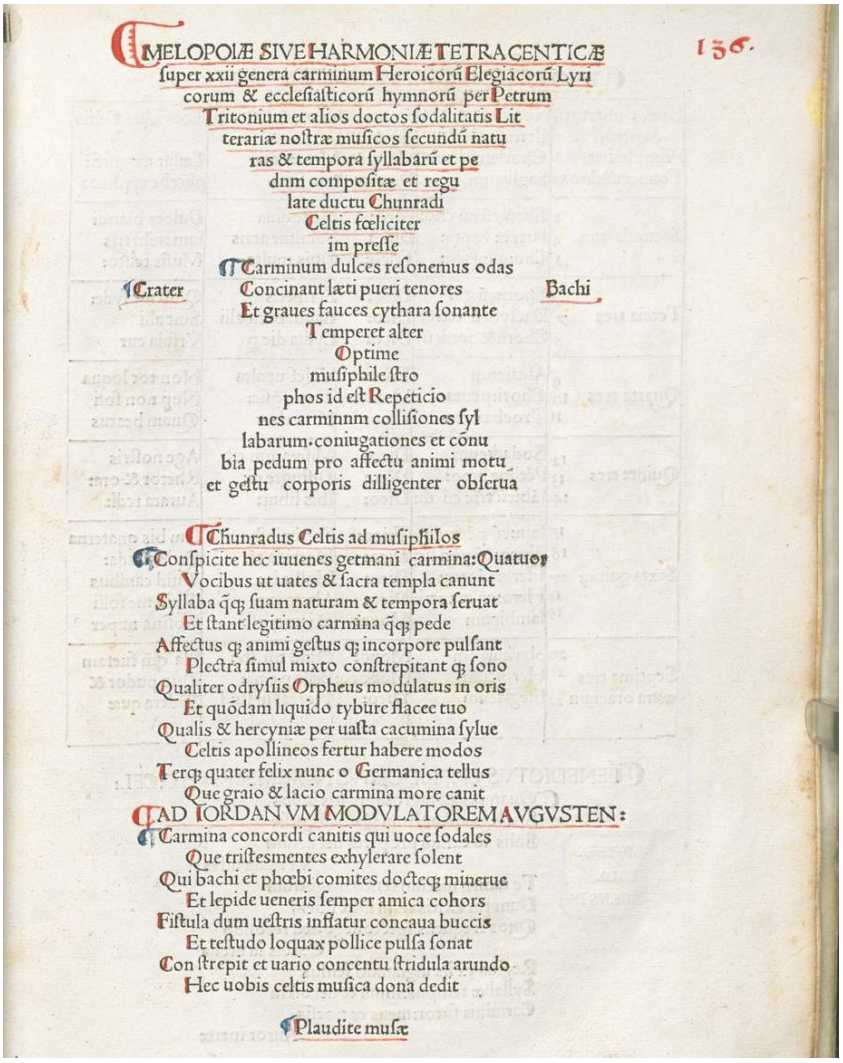

MELOPOIÆ SIVE HARMONIÆ TETRACENTICÆ
super xxii genera carminum Heroicorū Elegiacorū Lyri
corum & eccleſiaſticorū hymnorū per Petrum
Tritonium et alios doctos ſodalitatis Lit
terariæ noſtræ muſicos ſecundū natu
ras & tempora ſyllabarū et pe
dum compoſitæ et regu
late ductu Chunradi
Celtis fœliciter
im preſſe
Carminum dulces reſonemus odas
Crater Concinant læti pueri tenores Bachi
Et graues fauces cythara ſonante
Temperet alter
Optime
muſiphile ſtro
phos id eſt Repeticio
nes carminum colliſiones ſyl
labarum. coniugationes et cōnu
bia pedum pro affectu animi motu
et geſtu corporis dilligenter obſerua
Chunradus Celtis ad muſiphilos
Conſpicite hec iuuenes getmani carmina: Quatuor
Vocibus ut uates & ſacra templa canunt
Syllabaq; ſuam naturam & tempora ſeruat
Et ſtant legitimo carmina q̄q; pede
Affectus q; animi geſtus q; incorpore pulſant
Plectra ſimul mixto conſtrepitant q; ſono
Qualiter odryſiis Orpheus modulatus in oris
Et quōdam liquido tybure flacce tuo
Qualis & hercyniæ per uaſta cacumina ſylue
Celtis apollineos fertur habere modos
Terq; quater felix nunc o Germanica tellus
Que graio & lacio carmina more canit
AD IORDANVM MODVLATOREM AVGVSTEN:
Carmina concordi canitis qui uoce ſodales
Que triſtes mentes exhylerare ſolent
Qui bachi et phœbi comites docteq; minerue
Et lepide ueneris ſemper amica cohors
Fiſtula dum ueſtris inflatur concaua buccis
Et teſtudo loquax pollice pulſa ſonat
Con ſtrepit et uario concentu ſtridula arundo
Hec uobis celtis muſica dona dedit
Plaudite muſæ

Figure 3. Title of *Melopoiae sive harmoniae tetracenticae* (vdm 55). Bayerische Staatsbibliothek München, Rar. 291.

Problematic in other respects are polyphonic music books comprising partbooks whose titles constitute only a voice designation. This is the case at several early song books, one of them by Peter Schöffer the Younger, published in 1513 (vdm 13, see Table 1.b). It is obvious that the words TENOR, DISCANTUS, ALTUS, BASSUS do not constitute a title. Nevertheless, they have to be given as a transcription of the title page for each partbook. A working or descriptive title has to be invented.

An appropriate title for a book is a fundamental feature. A printed object needs a name we can use to refer to it, and which we can search in the database. To accommodate this need we introduced the field **»standardised title«. To cre**ate a standardised title, we trim long titles to the most salient words. If a book does not have a proper title, we create one and put it in square brackets. Such invented titles either denote the general typology of the edition (e.g. »Missale Salisburgense«) or describe its content (e.g. »Songs for 3–4 voices«). Moreover, we standardise the orthography to facilitate searching. Standardisation is necessary because orthography at this time was remarkably various and can constitute an obstacle to catalogue searches. We discovered how frustrating it can be to enter all possible variants into the search field of a database or OPAC without any idea how the object is recorded there. For example, in some OPACs, a search for the word »Liederbuch« will fail to turn up an edition whose title contains the word »Lieder-||buch«. To prevent such a situation we have added another field called **»alternative spellings« where we enter by hand variants of a single word (Salt**zeburgense/ Salzeburgense/ Salzburg) but also established names of the source (such as the so-called »Achtliederbuch«), words interrupted by line breaks or words containing abbreviations. This field is active in searches but invisible to the end user. The title search in the database *vdm* is related to all three fields: diplomatic title page, standardised title and alternative spellings.[9]

Search and search results

A detailed search mask permits a multi-faceted analysis of the recorded data and has already brought several new insights into the world of early music printing. The fields on the top are the obvious categories for printed music (see Figure 4): title, author/editor, printer/publisher, place of printing and year (or period) of printing. The next group goes more into detail and relates closely to music material studies: type of source, format, printing technique, musical genre, notation type, musical layout and confessional identity. These categories are closely related

9 See also the description of the database on our homepage: http://vdm.sbg.ac.at/development/music_prints.php?content=db_description&menu=1.

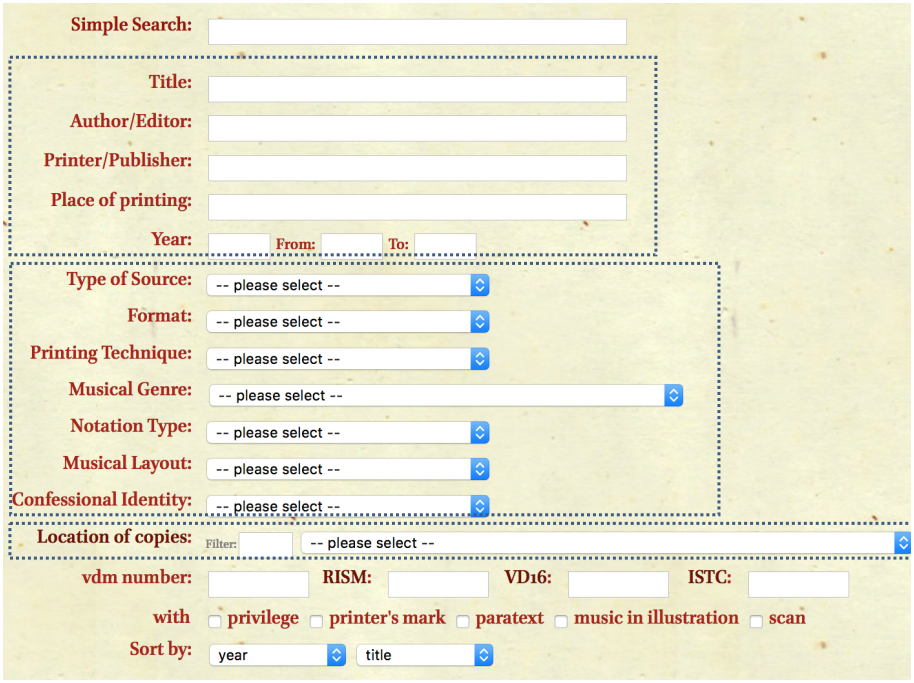


Figure 4. Search mask of the database *vdm*.

to the research questions that drive the project forward and have been its focus from the beginning.

One of my favourite search fields is the location of copies. With this search you can list all items that are preserved in a specific library. In practical work, such a tool has been a desideratum for a long time. Now it is possible to find out easily which early books with printed music can be inspected in a place without having to second-guess the local OPAC.

Users of the database can also search a source by its reference in other standard bibliographies (VD16, RISM, USTC, GW, ISTC and so on), or search for features of a given edition such as privileges, printer's marks, paratext or music in illustrations. The latter fields were developed during our work in the libraries when we recognized this as an interesting aspect of the printed material. Where a digitised copy is available online – currently over half of our titles – we also give a link and the possibility to select only these items.

A search in the database produces a list of editions matching the search criteria; from there it is easy to identify the extant copies. For many research questions such a result is satisfying, for instance if you are investigating printed missals from

a given diocese, if you want to study one edition in detail, or if you are interested in the output of a specific printer or city.

Moreover, the large number of entries allows us to interpret the search results statistically, employing techniques associated with the notion of »distant reading«.[10] With this approach, a group of numerous elements is viewed from a greater distance so that developments of specific research questions become visible. I will give some examples for this approach:

1. Overview of all editions (Figure 5)

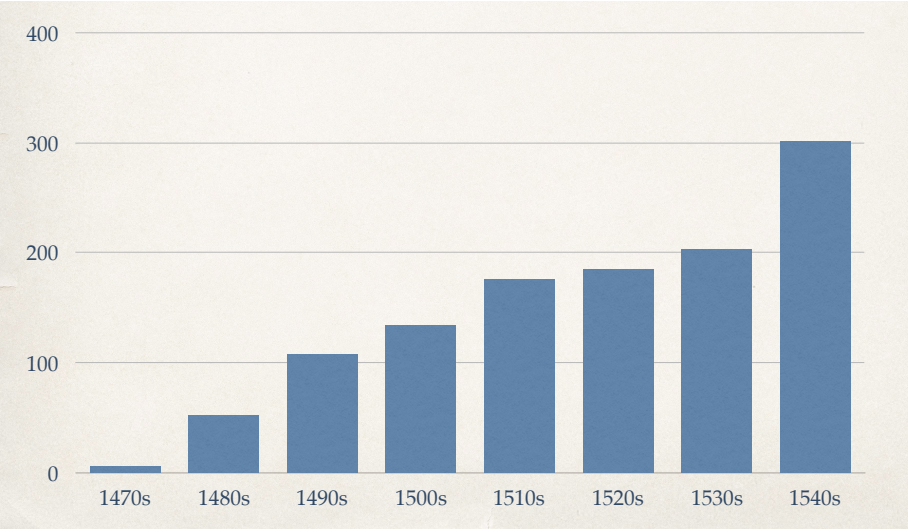


Figure 5. Overview of all prints (in decades).

The development of music printing can best be conceived in a bar chart that presents the outcome in units of decades. It is interesting to see that production increases continually in the first time periods until the 1510s. In the next decades it slows to an halt, then rises again remarkably in the 1540s, with a fifty per cent increase over the previous decade. The reason for this strange development is threefold. One parameter was the turmoil of the Reformation, when the music production was cut back because all printing presses were used primarily for religious texts and propaganda against the old church.[11] The other parameter was

10 Cf. Franco Moretti, *Distant Reading* (London, 2013).

11 Andrew Pettegree and Matthew Hall, »The Reformation and the Book: A Reconsideration«, *The Historical Journal* 47 (2004), pp. 785–808; Andrew Pettegree, *Reformation and the Culture of Persuasion* (Cambridge, 2007).

uncertainty about the kind of music the new church would accept, if any. Finally, a new technique of music printing introduced in the second half of the 1530s – single-impression fonts for mensural notation – made printing such music much easier and cheaper and turned the polyphonic music book into a mass product.

2. Output of 125 music printers (Figure 6)

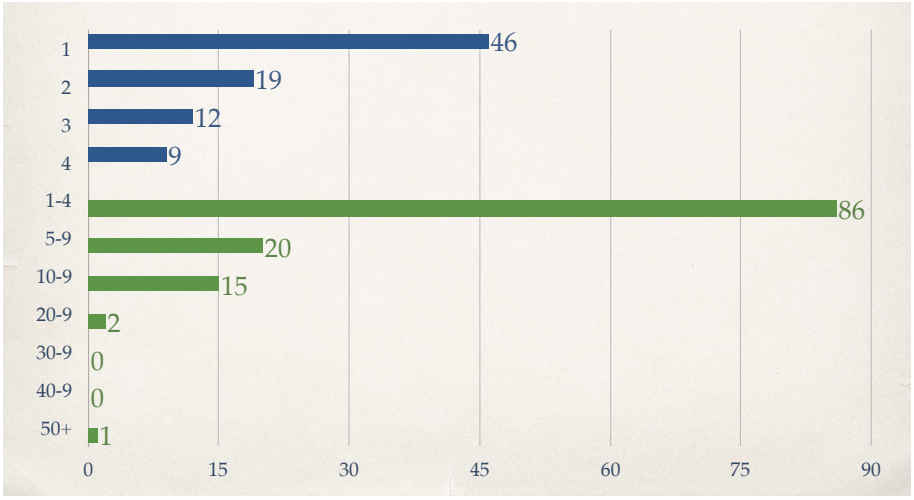


Figure 6. Output of 125 music printers.

Through this diagram it becomes clear that music printing was a niche product in the catalogue of early printers. Forty-six printers produced only a single book containing music; eighty-six produced between one and four such books; twenty produced between five and nine; fifteen printers produced between nine and nineteen. Only a single printer – Georg Rhau at Wittenberg – was responsible for more than fifty editions. But even this was less than ten per cent of his whole output.

3. Overview of source types (Figure 7)

One of the most stunning results of the project has been the discovery of how small a share of the total number of titles comprises polyphonic books. This pie chart indicates the percentage of each source type in the total production over the period of eighty years (1447–1550). The dominant source type is liturgical books, which represent about a third of all editions. Also theory books that include several editions of the same book are a relatively comprehensive group. With

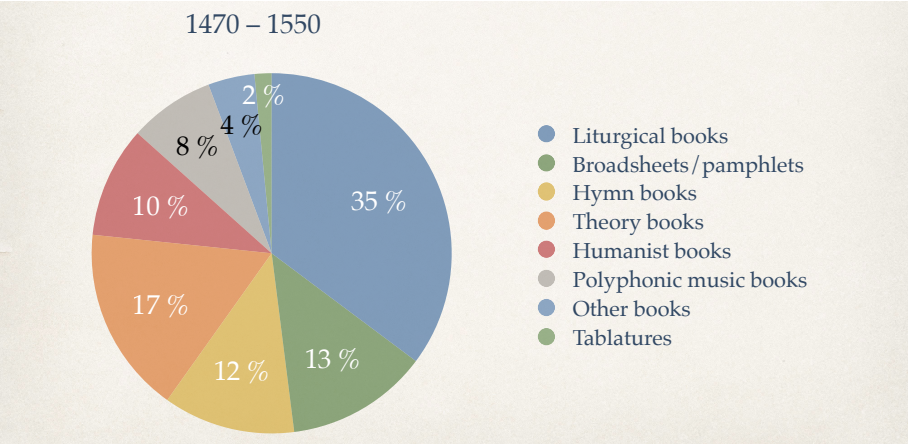


Figure 7. Overview of source types.

eight per cent, polyphonic music books are almost at the end of the scale. The reason and the consequences of this fact have been explored elsewhere.[12]

4. Overview of source types in decades (Film 1, see the attachment)

While a pie chart presents a stable relationship between the groups within a given time, an animated bar graph reveals that the accumulation of source types was not a consistent development but changed from decade to decade. Until the turn of the century (1470–1500) the number of liturgical books was overwhelming. In the first decade of the sixteenth century, theory books, humanist books and broadsheets (or pamphlets) begin to appear. Only a very few polyphonic music books appeared in the following decade. At this point liturgical books were still by far the most numerous printed music source. In the 1520s, during the early Reformation, evangelical hymn books emerged as a new source type; moreover, the number of broadsheets as a cheap and quick means for propaganda developed remarkably. In the next decade, the production of all source types proceeded in the same relation to each other, and in the years immediately before the middle of the century, polyphonic music books overtook liturgical books for the first time. While for polyphonic music books there seemed to be a promising market, the market for liturgical books was increasingly saturated.

12 Andrea Lindmayr-Brandl, »Polyphonic Music in Early German Print: A Changing Perspective in Music Historiography«, *Early Music Printing in German-Speaking Lands*, ed. Andrea Lindmayr-Brandl, Elisabeth Giselbrecht and Grantley McDonald (London & New York, 2018), pp. 245–59.

Visualisation of search results

Although the tools for a statistical analysis are helpful and well developed, one central research question cannot be addressed with this kind of data inquiry: the dissemination of editions in time and space. For these purposes we have developed a mapping tool that is directly related to our database and enables us to visualize and thus understand developments within larger amounts of data, filtered by certain criteria of research interest and tracked in time. This tool is found on our homepage (http://vdm.sbg.ac.at/development/music_prints.php?content=mapping&menu=2). It offers five different maps, based on more or less complex search strategies and representational techniques (see Figure 8).

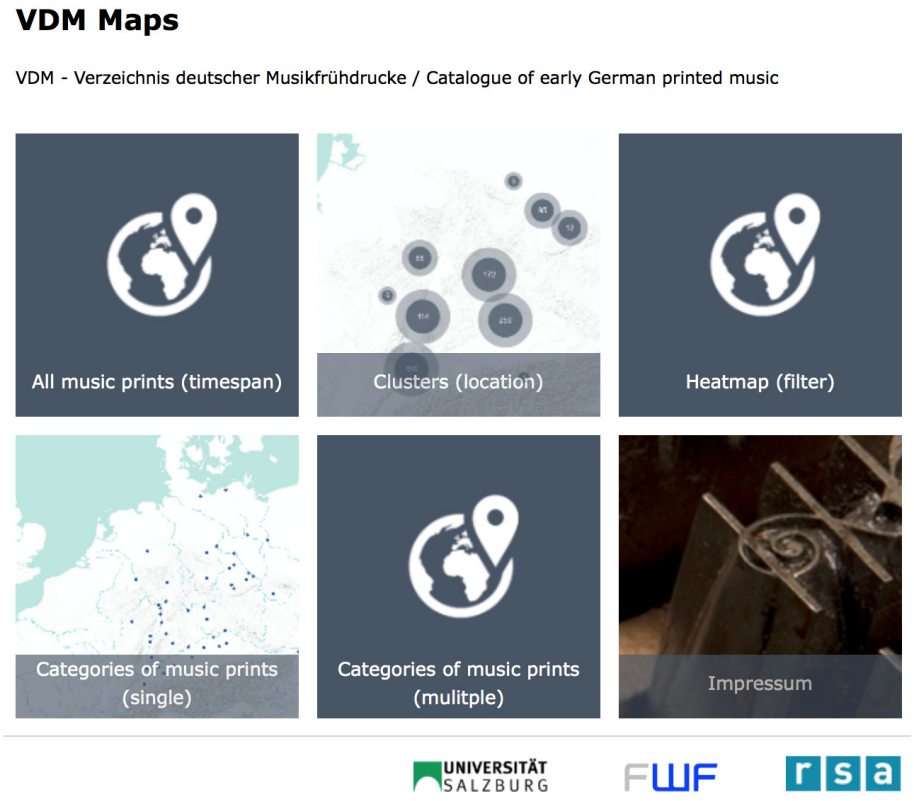


Figure 8. Mapping tool.

The most simple one shows the development of production of all kind of musical editions over time (Film 2, see the attachment). Until 1475 music was printed in only three places: at Constance (a Gradual with about 300 pages of music, the first

printed musical edition, vdm 1107), Strasbourg and Cologne (a first and a second edition of a commentary on the Magnificat by Jean Gerson, with only one music example in six single black breves, vdm 1468 and 1469). By the turn of the century, the map looked quite different: several cities have popped up, with a concentration on the area between the Upper Rhine and the Upper Danube, forming a kind of triangle. Cologne and Vienna are outliers. The three cities of Magdeburg, Leipzig and Freiberg form a small centre in the north-east on their own.[13] Twenty-four years later, some of the cities in the triangle had established themselves as centres for music printing: Basel, Strasbourg, Nuremberg and Augsburg. In the area around Leipzig, several new printing cities, such as Wittenberg, Erfurt, Zwickau or Dresden, started to produce musical editions.[14] In the middle of the century, the output of the more productive cities became even greater. Nuremberg, coloured in dark red, stands out, but Augsburg, Strasbourg and Leipzig also developed their printed production remarkably. A specific case is Wittenberg. As far as we can establish, music was first printed there in 1511. In 1525, only four musical editions were published there. However, as Wittenberg established itself as the centre of the Reformation movement and hub for the printing of Lutheran theological and polemical works, the production of printed music for the Lutheran church also increased enormously in the next twenty-four years and rose to a total of 134 titles. With this high output Wittenberg could compete with Leipzig and the other music printing centres in the south-western area of Germany.

Although this relatively simple map already provides insights into the history of early music printing, research questions are often more detailed. In the other four maps of our tool you can specify your query and visualize the development of a specific source type, a printing technique or a notation type, or a combination of several parameters. Figure 9 illustrates such a selective search. It is based on a heat map with a query for polyphonic music books. The maps tool allows one to click on a city, and thus to receive basic information about each edition produced there. With another click on »Weitere Informationen/ Further information« you open the *vdm* entry of the relevant edition.

It is also possible – and sometimes more suggestive – to work with the cluster map. In Figure 10, the printed books of polyphony are displayed in areas. Depending on the scale of the map you chose, different areas of concentration are shown. In this case the numbers and circles are almost identical with the output

13 Freiberg, however, does not really count because we have only one edition from there. The printer of this edition, Konrad Kachelofen, was based in Leipzig and escaped the plague in 1495, transferring his workshop temporarily to Freiberg. See Christoph Reske, *Die Buchdrucker des 16. und 17. Jahrhunderts im deutschen Sprachgebiet* (Wiesbaden, 2007), p. 515.

14 Music was also printed in several other cities outside the detail of the map shown here.

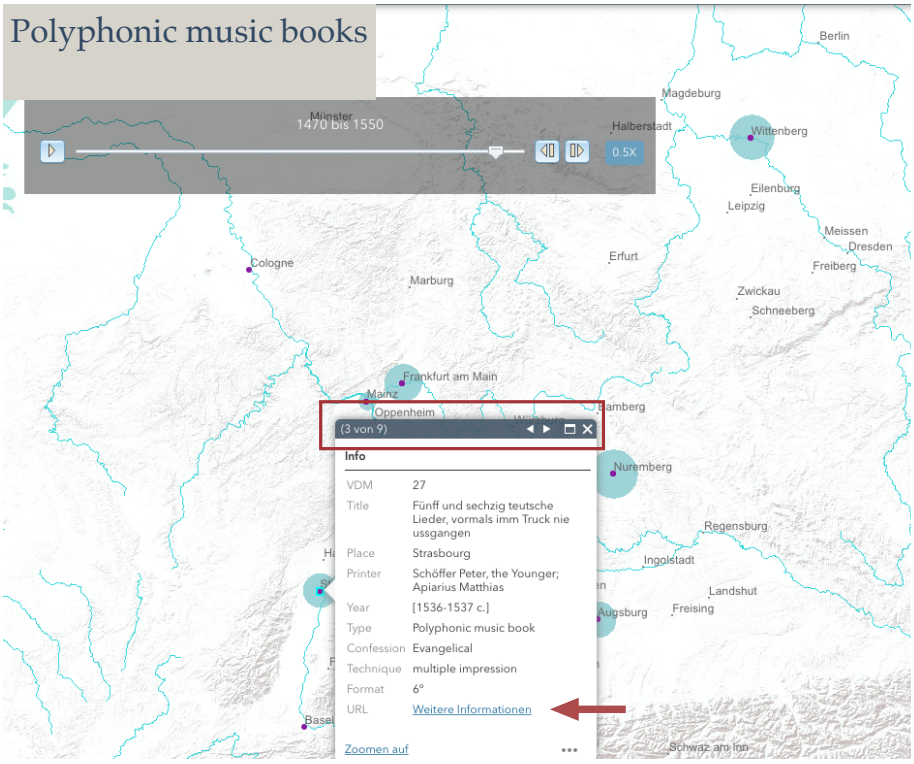


Figure 9. Heatmap app of music print locations

of one city. To the middle of the century, 23 books of polyphony were printed in Wittenberg, 1 in Cologne, 16 in Frankfurt am Main, 9 in Strasbourg and 1 in Basel. Only the number 47 relates to two cities that are geographically close: Nuremberg (with 37 editions) and Augsburg (with 10 editions). Detailed searches are also possible by selecting combinations of variables. One might ask how the technique of single impression used in polyphonic music books developed, or how the production of hymn books disseminated in the first decades of its introduction. In general, this tool is not only convenient in visualizing the printed production in German-speaking lands in space and time. It is also a playful instrument to generate ideas for new research questions with astonishing insights.

Figure 10. Cluster music prints per location and set filters.

Future developments and conclusion

At the current state of the project there is still a potential for further development of the database. In the near future we want to offer more search options in introducing a second search with free field selection and a combination with the Boolean operators AND/ OR/ AND NOT. There will also be more search parameters available, such as »named composer«, »language«, »provenance of copies«, etc. The web design will be improved and a new layout of the search results is planned. Conscious that an image of the title page of a book succinctly conveys an idea of the object, we will add images alongside the information provided in words. A title page will help to identify and memorize an edition, and a page with

music notation will illustrate the detailed technical data recorded in the database. Realizing this part of the plan is not a question of technique but one of copyright and cost. We have already begun negotiations with several large collections for copyright clearance of images, and aim to enlist further libraries in the near future.

Finally I want to emphasize that the database *vdm* is first of all a research tool for early music printing, and not a professional bibliography that stands on its own. Thus, it is not perfect in every detail, but it is much richer than most of the bibliographies I know. *Vdm* is a well-organized collection of material, still a work in progress, with an open online access from the very beginning. It is ready to be used by all who are interested in this area. As such, the database should help to pose interesting research questions and in many cases can also provide ready answers that will lead to further questions.

(Summer 2018)

Camilla Cavicchi

Digital humanities projects by *Ricercar*: from research tools to musical spatial installations

The need to valorise our musical heritage is keenly felt by the great museums, which preserve for posterity collections of instruments and musical sources, for instance the *Cité de la musique* in Paris or the *Musée des instruments de musique* in Brussels. For decades such institutions have been using technology to give voice to musical objects that would otherwise remain silent, and to educate the uninitiated public. The *Cité de la musique*, for example, uses several multimedia aids for this purpose, from audio-guides, which explain the instruments to the public and give them the opportunity to hear their music, to sensory games which enable them to ›feel‹ how the instruments work. In addition, the *Cité de la musique* makes use of documentaries featuring in-depth interviews with musicians, instrument makers and performers, who shed light on various aspects of the history of music.

By giving their visitors opportunity to hear, as well as see, the instruments, images and documents they house, museums can do much to raise awareness and engage the general public by providing them with emotional, not just visual, encounters with our shared musical heritage. This explains why such communication tools are becoming ever more common in museums, effectively bringing musical objects back to life. An example *par excellence* is the Victoria & Albert Museum, whose Medieval and Renaissance galleries were set up with the following aims: (i) to enable visitors »to imagine the Renaissance world«; (ii) to complete thematic displays by adding music; and (iii) to allow visitors to hear the sound of the instruments that are exhibited[1]. The curators of this project, Stuart Frost and Giulia Nuti, achieved these goals by selecting from the available historically informed recordings, and in certain cases even commissioned recordings, in collaboration with the Royal College of Music. They set out to follow three thematic lines, namely musical notation, musical instruments and figurative sources on musical themes. They have provided musical ›hotspots‹, where visitors can hear a brief explanation and musical excerpt through headphones, and explore musical sources via a touch-screen. By these means the museum encourages interaction and audience participation to enhance its educational impact.

1 Stuart Frost and Giulia Nuti, »Another Dimension: Integrating Music with the Medieval and Renaissance Galleries,« *V&A Online Journal* 4 (2012). http://www.vam.ac.uk/content/journals/research-journal/issue-no.-4-summer-2012/another-dimension-integrating-music-with-the-medieval-and-renaissance-galleries.

Although it is undoubtedly important to integrate music into the visitors' experience of such museums, raising their awareness of music, performance and history in general,[2] such exhibits have been installed without the benefit of musicological research. Unlike the museums, the musicological research programme *Ricercar* has been designing digital spatial projects based on specific research hypotheses. Launched in 1992 by Jean-Michel Vaccaro, and subsequently inherited by Philippe Vendrix, the *Ricercar* team has been working on digital humanities projects since 1994[3]. Over the past 25 years, the *Ricercar* research group has developed many research tools for students, musicologists, musicians, and researchers with a general interest in music. In particular, the Ricercar team has produced three distinct types of digital projects:

1. Databases, such as the *Catalogue de la chanson française* by Annie Cœurdevey (http://ricercar-old.cesr.univ-tours.fr/3-programmes/basechanson/index.htm) and the *Prosopography of Renaissance singers* by David Fiala (http://92.154.49.37/CESR_CHANTRES/).

2. Online repertoires, including *The Anonymous masses*, by Agostino Magro (http://ricercar-old.cesr.univ-tours.fr/3-programmes/EMN/MessesAnonymes/); the regional repertories of Picardy (http://92.154.49.37/CESR_PICARDIE/) and Croatia (http://92.154.49.37/CESR_CROATIE/); the instrumental music of the *Corpus of Lutistes* (http://ricercar-old.cesr.univ-tours.fr/3-programmes/EMN/luth/); the *Du Chemin chansons nouvelles* project, by Richard Freedman (http://ricercar-old.cesr.univ-tours.fr/3-programmes/EMN/Duchemin/); and *Gesualdo Online*, by Philippe Vendrix (https://ricercar.gesualdo-online.cesr.univ-tours.fr/), in which the use of MEI standards makes this repertoire suitable for some new tools for music analytical enquiries.

3. Digital research projects that respond to a specific research query. For example, the question »How can we re-construct the voice of a lost partbook?« gave rise to the *Atelier Virtuel de Restitution Polyphonique*, with five workshops in Tours, and then to Richard Freedman's project *Lost Voices* (http://digitalduchemin.org/about/). The *Citations: The Renaissance Imitation Mass* project (https://ricercar.crim.cesr.univ-tours.fr/) was set up to

2 On this subject the article by Nikos Bubaris, »Sound in Museums – Museums in Sound,« *Museum Management and Curatorship* 29 (2014), pp. 391–402, is very interesting.

3 For a detailed presentation of the programme, see the website, still under construction: http://92.154.49.37/CESR/

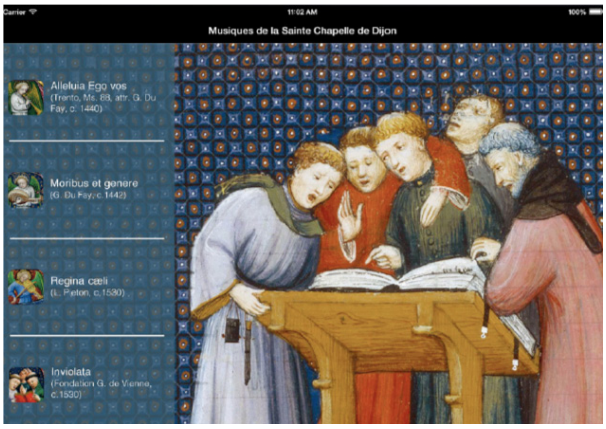
find an answer to the question »How can we analyse imitation in sixteenth-century masses?«. Likewise, the online *Le chant sur le Livre à la Renaissance* by Philippe Canguilhem (http://josquin.cesr.univ-tours.fr/lusitano/contrepoint/chant-livre.html) sought to determine how we can learn from a counterpoint treatise in a more interactive and effective way.

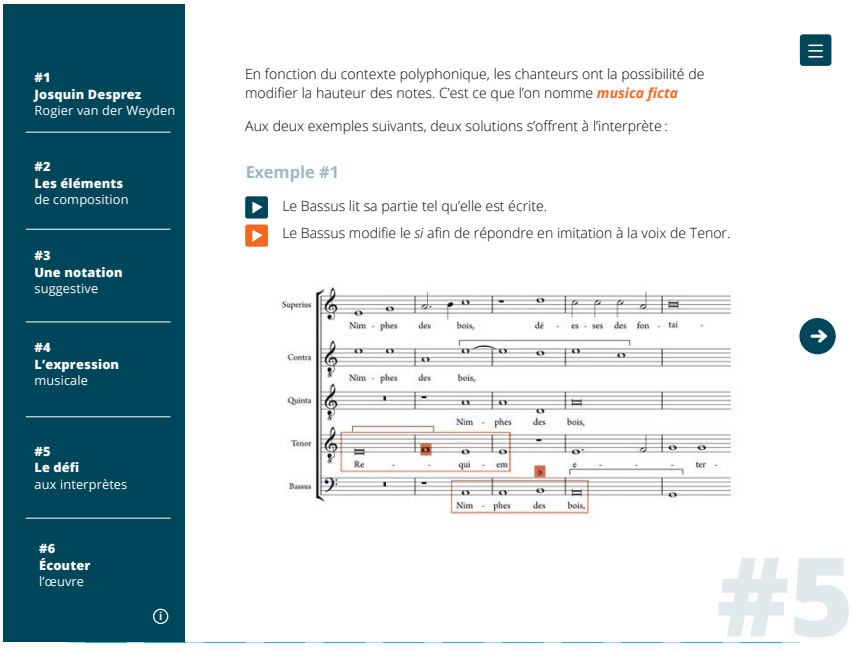
In certain cases, the questions that stemmed from such digital projects also led to printed publications, as was the case for books on Picardy and Croatia, and the forthcoming book on tablatures[4]. In addition, the development of research projects designed to respond to specific questions regarding musical practice in spaces that have now been lost has spawned other innovative projects involving multimedia techniques such as 3D rendering and 3D matte painting. Since 2012, the *Ricercar* team has been working on digital projects on cultural heritage and music, designed to disseminate the results of musicological research to a wider (lay) audience. The ultimate aim is to make musicology more relevant in today's society.

Our first endeavour focused on the restitution of musical experiences in lost Renaissance spaces – those destroyed during the French Revolution. This we achieved by creating 3D renderings: first of the lost Sainte-Chapelle in Dijon, in 2014, and then of the lost Saint-Martin Collegiate in Tours, for public exhibition in 2020. This multidisciplinary research programme, *Musique et Musiciens des Saintes-Chapelles*, was funded by the Agence Nationale de la Recherche Scientifique (2011–2014) and coordinated by David Fiala and Vasco Zara. It gave musicologists, archaeologists, historians and virtual- and augmented-reality engineers the chance to work together on a 3D architectural rendering of the interior and exterior of the Sainte-Chapelle of Dijon (destroyed in 1802) based on ancient plans, elevations, images and other documents. This research project produced a rendering, available as a short movie, created by the *Institut Image* (*Arts et Métiers ParisTech*, Cluny). This enables users to visit the edifice virtually, and experience the sounds that were played there in the sixteenth century. Indeed, the movie features music for the votive ceremony that, from 1526 onwards, was annually celebrated on the day of the Annunciation (25th March), as well as a detailed description of the various elements and stages of the ceremony, as decreed in the founding charter (laid down on the 6th June 1526 by Girard de Vienne, Lord of Ruffey and Knight of the Order of the Golden Fleece). The user can experience all the sights and sounds of a rehearsal for the same; under the direction of

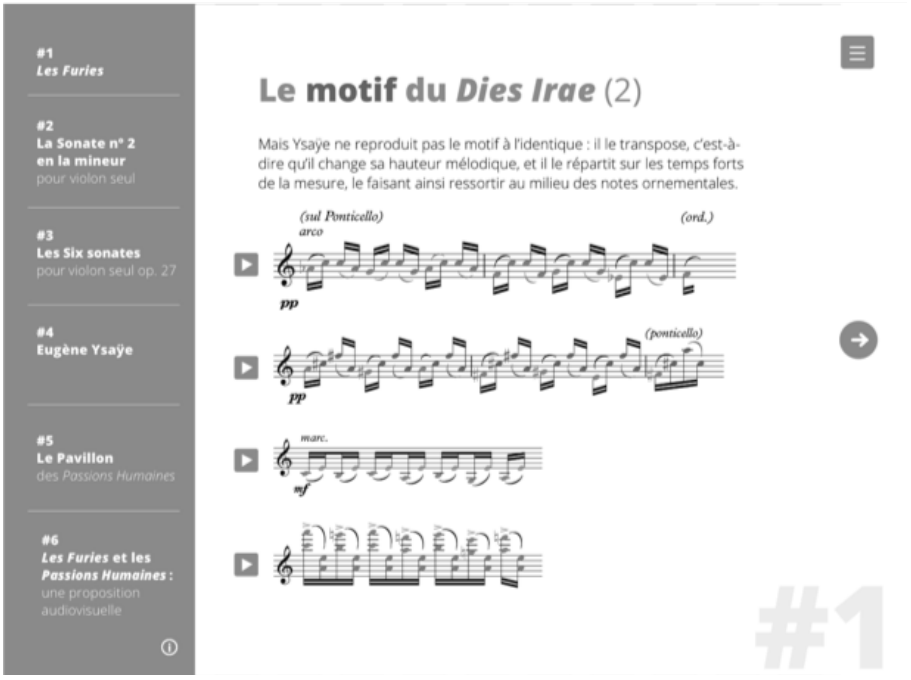
4 Camilla Cavicchi, Marie-Alexis Colin & Philippe Vendrix (eds.), *La Musique en Picardie du XIVe au XVIIe siècle* (Turnhout, 2012); Ennio Stipcevic, *Renaissance Music and Culture in Croatia* (Turnhout, 2016); David Dolata, John Griffith & Philippe Vendrix, *Encyclopedia of Music Tablatures* (Turnhout, in preparation for 2020).

the choirmaster, the singers, grouped around the lectern in the choir, interpret *Alleluia Ego Vos* from the proper of the *Mass of St. Andrew* attributed to Guillaume Du Fay (c. 1440), and Loyset Piéton's *Regina Caeli* (c. 1530). This movie was presented in an immersive projection room, installed within Dijon's Museum of Fine Arts as part of the exhibition *La Sainte-Chapelle de Dijon et les résidences des Ducs de Bourgogne. Architecture, Histoire et Musique* (17th May–13th Oct. 2014).[5]





5 https://www.cesr.cnrs.fr/actualites/manifestations/exposition-la-sainte-chapelle-de-dijon.



Figures 1–3. Application for iPads entitled *Divio Dives: Music at the Sainte-Chapelle of Dijon*

Accompanying the 3D rendering was an educational application for iPads entitled *Divio Dives: Music at the Sainte-Chapelle of Dijon*. Freely downloadable from the App Store in both French and English (Fig. 1–3), this application provided information on the historical context and elements of musical analysis of each piece of music, and allows users to follow them on the score, measure by measure, while they are played. The voice options at the bottom of the screen (*Superius / Altus / Tenor / Bassus*) also allow users to listen to one or several voices in isolation (by muting the others) – an interactive tool that was extremely well received by the visitors.

The second *Ricercar* project involving 3D rendering of lost musical spaces was *ReVisMartin* (https://ricercar.cesr.univ-tours.fr/ReViSMartin/), a project funded by the Région Centre-Val de Loire. For the 1700th anniversary of Saint Martin's birth, the Centre for Renaissance Studies in Tours proposed a scientific project to reproduce the music and buildings of the Saint-Martin Collegiate. This 3D rendering is accompanied by a commissioned interpretation of a musical master-

piece composed by Johannes Okeghem[6] – principal musician and the Treasurer of the collegiate. Played by the Binchois Ensemble, conducted by Dominique Vellard, this was recorded with separated voices to allow an elaborate plan for the diffusion of the sound. The music is accompanied by a short video, lasting about 7 minutes, featuring animated characters of Okeghem and his fellow singers. This enables the public to appreciate the polyphonic music and its diffusion in the space of the lost collegiate. In addition, an interactive application has been designed to help the visitor discover the virtual space and the acoustics of the collegiate. Other digital tools, such as touch screens, complete the experience by providing further information on the music and the building. This project is listed as part of the strategies for the Innovation of the Région Centre-Val de Loire.

A totally different experience has been created through the project *Musi2R* –an acronym of *Musique dans les Résidences Royales* (https://intelligencedespatrimoines.fr/chambord-chateaux/musi2r/). This project was also funded by the Région Centre-Val de Loire, and was produced under the direction of the Centre d'Études Supérieures de la Renaissance in Tours and the Centre de Musique Baroque de Versailles (coordinator Vasco Zara, scientific board chair Thomas Leconte).[7] This innovative project took into account research into the performance and acoustic devices designed for musical exhibitions in the houses of the kings of France, from the reign of Henri III to that of Louis XIV – a historical period in which the French court was itinerant and moved between several royal castles and palaces. For the purposes of this project, beginning in 2017 the music of the court was performed and recorded in the spaces for which it was conceived – the castles of Blois, Chambord, Saint-Germain-en-Laye and Fontainebleau – in order to help us better understand the relationships between sound, acoustics and architecture. At Blois castle, the *Doulce Memoire* ensemble, conducted by Denis Raisin Dadre, interpreted the music of the *académies humanistes*[8], while in Fontainebleu castle, the ensemble *La Rêveuse*, conducted by Florence Bolton and Benjamin Perrot, played several pieces of the mass for the kings when the court moved to Versailles (ca 1697)[9]. In Chambord castle, the ensemble *Jacques Moderne*, directed

6 On the correct spelling of Okeghem see: David Fiala, »La très véritable signature de J. de Okeghem et ses implications philologiques,« *Revue française de Musicologie* 105/1 (2019), pp. 145–58.

7 Vasco Zara, »Music in the Royals Residences,« *Sound Heritage. Making Music Matter in Historic Houses*, eds. Jeanice Brooks, Matthew Stephens & Wiebke Thormählen [in preparation for 2020].

8 They played and recorded the following pieces of music: Fabrice-Marin Caiétain, *Airs mis en musique à quatre parties* […] *sur les poësies de P. de Ronsard & autres excelens poëtes de nostre tems* (Paris, Adrian Le Roy & Robert Ballard, 1576); Claude Le Jeune, *Le Printemps* […], *à deux, 3. 4. 5. 6. 7. et 8. parties* (Paris, Veuve Robert Ballard et Pierre Ballard, 1603).

9 *Motets pour la messe de Louis XIV, pour le jour du départ pour les voyages entre les châteaux de Versailles et Fontainebleau*, Versailles, Bibliothèque municipale, Ms. Mus.18: Du Buisson, *Confitebor tibi Domine*; François Couperin, *Laudate pueri Dominum*.

by Joël Suhubiette, played the music of Louis XIV's royal chapel[10], and, in Saint-Germain-en-Laye castle, the ensemble *Correspondances*, conducted by Sébastien Daucé, interpreted some motets by Henry Du Mont[11].

These experiences enabled researchers to analyse the specific acoustics of each of these places, and in general to discover that their architects took great pains to ensure that the acoustics would be perfect for listening to music. In fact, unlike today's buildings, in the spaces specifically designed for musicians and musical performance, the sound quality often leaves much to be desired, while in the places where the king and courtier sat the acoustics are flawless. Four papers documenting these experiences are being written, and will be made available on the website of the project itself and those of the respective castles. The recordings themselves will be incorporated into computer applications that visitors will also be able to access, and musical installations that will allow the public to experience the music in the spaces in which it was first played (for a sneak peek of this highly original listening experience, please see the online teaser in https://intelligencedespatrimoines.fr/chambord-chateaux/musi2r/).

In a similar vein, we also developed an immersive installation, called the *Cubiculum musicae* (https://cubiculum-musicae.univ-tours.fr/presentation/?page_id=22). The term *cubiculum musicae* was originally coined by Paolo Cortese, the apostolic secretary to Pope Julius II, in his 1510 *De cardinalatu libri tres*, to describe a room for listening to music.[12] During the 15th century, the term *camera della musica* was also used to describe specific rooms in aristocratic abodes that housed precious collections of musical instruments, as well as pertinent books and portraits of musicians. Five hundred years later, in 2010, the *cubiculum musicae* concept was reinvented by Philippe Vendrix, with whom I was co-authoring an article about music collections in the Renaissance[13]. His inspired idea was to build a mobile and interactive space in which Renaissance music could be listened to in optimal acoustic conditions – a means of providing an immersive Renaissance experience to a wider public. Through our endeavours, the *cubiculum musicae* was totally transformed: from a private repository for the elite to a space of sensorial

10 *Grand motets* and *petits motets* for the mass of Louis XIV by Pierre Robert (ca 1622–1699), who was »sous-maître« of the Royal Chapel Music between 1663 and 1683: Pierre Robert, *In exitu Israel (Motets pour la Chapelle du roy)* (Paris, Christophe Ballard, 1684) and *Splendor aeterne gloriae*, in id., *Motets manuscrits*, ed. Thomas Leconte (Versailles, 2016).

11 Henry Du Mont, *Motets pour la Chapelle du Roy* (Paris, Christophe Ballard, 1686).

12 Nino Pirrotta, *Musica tra Medioevo e Rinascimento* (Torino, 1984), pp. 213–249, in particular p. 244.

13 Camilla Cavicchi & Philippe Vendrix, »L'érudit et l'amateur: collectionner la musique à la Renaissance,« *Collectionner la musique. Histoire d'une passion*, eds. Denis Herlin, Catherine Massip, Jean Duron & Dinko Fabris (Turnhout, 2010), pp. 24–54.

experience and musical immersion that would explain and promote the musical heritage of the Renaissance to all.

Developed in collaboration with *Intelligence des Patrimoines* (https://intelligencedespatrimoines.fr/) – a new research program established by Philippe Vendrix in 2013 to promote interdisciplinary research and innovation in the study and development of natural, cultural, tangible and intangible heritage – the *Cubiculum musicae* is a revolutionary exhibition space that can be custom-designed for specific events. The Cubiculum musicae is a mobile unit in which selected pieces of music are played and explained to the public with visual aids, technological tools, interactive software and web applications. Inside, the visitors find themselves in a dark, acoustically isolated room, which features a central screen and tailored sound diffusion all around the walls to optimise their experience of the music – in our case from the Renaissance. The isolation of the space from outside noise is fundamental, giving the public the opportunity to focus their attention on the music, and to transform the *Cubiculum* experience into a sensory learning experience.

In 2013, the first prototype of the *Cubiculum* was presented in Paris in the CNRS Innovation salon (Innovatives SHS, Paris, Espace Charenton, May 2013); it was designed to showcase Josquin Desprez' *Nymphes des bois*. Buoyed by the success of this presentation, in 2014 two new *Cubicula* were built: one commissioned by Belspo (Belgian Science Policy) in Belgium, and the other by the University of Tours. For Belspo, *Ricercar* produced three programmes, in which the music of a Belgian composer was paired with the artistic output of a Belgian painter or sculptor: *Nymphes des bois* by Josquin Desprez with the *Deposition from the Cross* by Rogier van der Weyden (see the web-application *Josquin/van der Weyden* https://cubiculum-musicae.univ-tours.fr/presentation/?p=143); Eugène Ysaÿe's *Les furies* with the bas relief *Human passions* by Jeff Lambeaux (see the application *Ysaÿe/Horta-Lambeaux* https://cubiculum-musicae.univ-tours.fr/presentation/?p=247), and the song *El grillo è buon cantore* by Josquin Desprez with a series of paintings of crickets (see the application *Josquin/Grillon* https://cubiculum-musicae.univ-tours.fr/presentation/?p=272). There are video sequences based on each section of the music (currently available in Section 5 of the web application), and the images therein have a descriptive or interactive purpose.

Like our previous projects, the *Cubiculum* is a multidisciplinary achievement. Images in particular play a fundamental role, enhancing the musical experience and promoting the discovery of local heritage. As well as this educational function, images create a connection between the music and the cultural and historical context in which it was composed. The *Cubiculum* experience shows how musical iconography can be a vital part of programmes designed to promote and

raise awareness of scientific content. Two other *cubicula*, which have already been exhibited – the *Lassus/Brueghel Cubiculum*, produced for »Mons 2015 European Capital of Culture« and the *Ockeghem/Saint-Martin Cubiculum*, for the national exhibition on Saint Martin at the Musée des Beaux-Arts in Tours – give a better idea of the potential of this kind of installation.

In both cases, the *cubiculum* formed a part of a temporary exhibition. In Mons, the brief was to design the installation around a Renaissance musician from the local area; we chose Orlando di Lasso, who was born in Mons in 1532. Once we had chosen our subject, we then looked for a piece of his music that would be accessible to the general public. We selected the motet for six voices *Musica Dei donum optimi* – a song praising the power of music, recorded in separate voices by the ensemble Odhecaton, which that year was recording the CD *Roland de Lassus Biographie musicale vol. IV: La viellesse*.[14] This motet was paired with the painting *Allegory of Hearing* by Pieter Brueghel and Peter Paul Rubens, as this artwork illustrates many themes related to those covered in Lasso's motet. To make things more educational for the viewer, the painting by Brueghel was de-constructed, and a concrete restitution of the musical imaginary of the time of Lasso in connection with his motet was proposed, as follows:

The words of the motet	**The meaning**	**The images associated with the text**
Music, gift of God the greatest, draws men, draws gods	The power of music to charm men and gods	Focuses on deities and humans playing music
Music calms turbulent souls, and raises sad spirits	The therapeutic power of the music	Focuses on the music itself
Music moves even the trees themselves, and wild beasts	Music moves even nature	Focuses on trees and animals

The Lassus *Cubiculum* experience lasts just 3 minutes, and at the end, the visitors can access the content on an Android App available in 3 languages (English, French and Dutch, see these Applications at https://cubiculum-musicae.univ-tours.fr/presentation/?p=276). Through this App the public can access a detailed biography of the composer (https://cubiculum-musicae.univ-tours.fr/lassus/en/#/chapter-2), accompanied by the images of his time; a section on the music which explains the musical source and the composition processes (https://cubiculum-musicae.univ-tours.fr/lassus/en/#/chapter-1); and an iconographical analysis of the Brueghel-Rubens painting (https://cubiculum-musicae.univ-tours.fr/lassus/en/#/chapter-3) – an opportunity to discover its meaning and learn

14 *Musique en Wallonie 1474* (https://www.musiwall.uliege.be/?page=fiche&id_article=238).

about the musical instruments represented. The video used for the installation is now available in the web App at https://cubiculum-musicae.univ-tours.fr/lassus/fr/#/chapter-4. This *Cubiculum* was funded by the Fondation Mons 2015, and produced in collaboration with Marie-Alexis Colin of the Université libre de Bruxelles, in collaboration with the FNRS.

The second *Cubiculum* I would like to focus on was commissioned in 2016, in conjunction with the national exhibition on Saint Martin at the *Musée des Beaux-Arts* in Tours. It was located in the museum courtyard and was accessible to visitors during the exhibition. The idea behind this installation was to tell a story about music and Saint Martin of Tours during the Renaissance, highlighting the richness of the local musical culture. For this project, we chose Johannes Okeghem, the main composer active at the Saint Martin Collegiate during the Renaissance. We then selected a piece of his music: the beautiful *kyrie* from the mass *De plus en plus*, which lasts just 3 minutes. The choice of a short piece was a key element of the installation, as we wanted to appeal to a public unused to listening to Renaissance music. The *Cubiculum* was also used as a vehicle for divulging and disseminating new scientific discoveries, namely a previously undiscovered document about the reception of Okeghem's famous motet for 36 voices, and the discovery by my colleague, Agostino Magro, that the theme of the mass *De plus en plus* has connections with the antiphon *Dixerunt discipuli* for Saint Martin's liturgy. Although visitors to the Lassus Cubiculum experienced the music without explanation, for the *Ockeghem Cubiculum* I wrote a short documentary explaining our discoveries to be played before the music. To tell this story through images, I sought out local paintings produced by artists from Tours[15].

Thus the *Ockeghem Cubiculum* video had three sections: first, the introduction; second, the documentary with voice-over; and third, local artists' images of Saint Martin of Tours sharing his cloak to accompany the listening of the *kyrie* (which is played in full). As for the introduction, the movie depicts the public in 1460, outside the walls of Tours, listening to very soft music as they gazed upon

15 Jean Fouquet's miniatures of Tours, dated 1455–1460, from Paris, Bibliothèque national de France, ms. français 6465, fol. 169^{v} and fol. 223; Jean Fouquet, *Martin sharing his cape*, miniature from *Heures d'Étienne Chevalier*, 1452–1461, Paris, Musée du Louvre, Département des imprimés et des dessins, RF1679-recto; Maître du missel de Yale (Bourges ou Tours), *Martin sharing his cape*, miniature from *Heures de Louis de Laval*, vers 1470, Paris, Bibliothèque nationale de France, ms. latin 920, fol. 300^{v}; *La Vie et miracles de monseigneur sainct Martin*, engraving, Tours, Mathieu Lateron, 1496, Paris, Bibliothèque nationale de France, Velins 1189, fol. A1; Jean Bourdichon, *Martin sharing his cape*, miniature from the *Grandes Heures d'Anne de Bretagne*. *Horae ad usum romanum*, 1500–1508, Paris, Bibliothèque nationale de France, ms. Latin 9474, fol. 189^{v}; *Charity of Saint Martin*, sculpture, Val de Loire, ca. 1531, inv. 53, Lisbon, Calouste Gulbenkian Foundation, Museum Gulbenkian; Anonymous miniaturist from Tours, *Dove of the Holy Spirit*, Book of prayers, ca. 1511–1513, New York, Pierpont Morgan Library, ms. M. 292, fol. 14^{v}.

the Saint Martin Collegiate in the background, from afar. Then the camera zooms onto the collegiate and the music becomes louder; as we enter the collegiate we can see the attributed Okeghem portrait while he is singing in the famous ms. Bnf fr. 1537[16].

I thought it would be a good idea to use a specific movie animation technique, called 3D matte painting, to make the images more evocative and immersive. Indeed, this animation gives a deeper perspective on the Renaissance miniatures, without distracting the public from the explanation or the music. The intent was not to give perspective to flat images, but to explain a content which is illustrated by the images in action. Indeed, the 3D matte painting technique gives a diachronic dimension to still images, and helps in pairing images with the voice-over narration and music.

After the musical immersion, on the panels outside the *Cubiculum* the public was able to explore more content on the life of Okeghem in Tours (for example, the building where he lived, and the documents from the local archives), and his *kyrie*, as well as the newly discovered letter regarding his motet for 36 voices. Using a QR code, the visitors could read all about the virtual exhibition, which is still accessible online (https://cubiculum-musicae.univ-tours.fr/presentation/?page_id=852).

Such installations are compact, and perfect for sites with a high footfall, such as museums and exhibitions; they therefore offer the opportunity to present the outcomes of musicological research to a much wider audience than that reached by specialist journals. Thanks to the combination of high-tech sound and innovative audiovisual effects, visitors are drawn in to musical experience, which appeals to both adults and children, as well as experts such as musicians, musicologists and scholars of other disciplines. In these spaces, listening to a piece of music becomes a moving and unifying experience, transcending ethnic boundaries and generational tastes, thanks to the use of the 3D matte painting animation.

Other *Cubiculum musicae* have also been produced in the last years. A project for the Royal Abbey of Fontevraud, a UNESCO site in France, was produced in July 2018, and funded by the Région Pays de la Loire. For this extraordinary place we developed a programme enabling visitors to discover the musical traditions of the abbey in the seventeenth century. Thanks to a short 12-minute documentary, the public can learn about the fame of the nuns of the Abbey as excellent singers, their sources and repertoires, the *Cérémonial de l'Ordre de Fontevrauld* (Paris, J. de Heuqueville, 1628), and the performance of the lyric tragedy Esther by Jean Racine with music by Jean-Baptiste Moreau, when Marie-Madeleine Ga-

16 Étienne Collaut, *Ockeghem at the lantern*, miniature from *Chants royaux sur la Conception couronnés au Puy de Rouen*, vers 1530, Paris, Bibliothèque national de France, ms. français 1537, fol. 58v.

brielle de Rochechouart was at the head of the Abbey. As the Abbey has many available spaces, we decided to exploit two of these, instead of the mobile unit, to create a ›dematerialised‹ *Cubiculum*. In one room the documentary film was shown, while the other was used to display the musical sources and documents related to our new scientific discoveries regarding the musical life of the Abbey in the 18th century.

Currently, we are working on a new *Cubiculum* dedicated to Leonardo da Vinci and the musical instruments he invented, as the Région Centre-Val de Loire will be celebrating the 500-year anniversary of his death (which occurred in 1519 at his home in Amboise) this year (https://cubiculum-musicae.univ-tours.fr/presentation/). From September 2019, the *Musée des Beaux -Arts* at Tours

Figure 4. *Cubiculum* Fontevraud: entrance

Figure 5. *Cubiculum* Fontevraud: document display room

Figure 6. *Cubiculum* Fontevraud: musical immersion space

will play host to a dematerialised *Cubiculum* designed to highlight Da Vinci's role as a musician. One exhibition space in the museum will be entirely given over to an immersive musical experience, thanks to a hi-fi music system and high definition projector and cinema screen. The video will be structured in a manner similar to that of the *Ockeghem Cubiculum*; the first part will explain Da Vinci's interest in music, the music he played, and the sketches that he drew of various instruments of his own devising, and the second will allow visitors to listen to the *strambotto Zephyro spira e il bel tempo rimena* by Bartolomeo Tromboncino,[17] before a projected image of Da Vinci's portrait of the singer Cecilia Gallerani. The room next door will provide them the opportunity to explore the video's content in depth thanks to an exhibition on Leonardo's manuscripts (the Giunti edition beautiful facsimiles) showing and explaining his projects and sketches of musical instruments.

It is our belief that, as well as allowing the general public to discover the history of (Renaissance) music, and raising the profile of musicological research, the *Cubiculum musicae* plays a broader ethical role. The environment in which we operate in Europe is conditioned by two dominant but paradoxical tendencies: on the one hand, globalisation is acting to divorce traditions from their original context, allowing them to spread to the far corners of the world, but on the other hand, more importance is being placed on our individual cultural heritage; attempts are being made to conserve traditions in the place in which they originated, and to highlight the importance of diversity and the specificities of each tradition[18]. Music is a particular case in point; it is a major medium for globalisation processes, but curiously enough it has received less attention from promoters of cultural heritage, despite its significant role in the transmission of local traditions. In this era in which globalisation and reactionary politics tend to relegate culture to a marginal role, the *Cubiculum* offers an example of how musicology can forge links with society. In other words, such projects have a twofold function. Not only do they comprise an innovative form of scientific reporting, conducive to widespread dissemination of the results of research, they also enable us to explain to our society what musicological research entails, and why this field of research is useful for increasing our awareness of how lost traditions shaped our culture.

Although these projects have a predominantly musicological focus, a multidisciplinary approach is essential in order to achieve their outcomes. Indeed, specific methodologies, knowledge and skillsets were required in order to reconstruct lost architecture, to determine how the buildings would most likely have been fur-

17 *Frottole dal Primo Libro di Franciscus Bossinensis*, Roberta Invernizzi/Accademia Strumentale Italiana conducted by Alberto Rasi, *Stradivarius* STR33516.

18 See the intangible cultural heritage list on the Unesco website https://ich.unesco.org/en/lists.

nished, and how the performers would have been dressed, as well as how the music would have been practiced and performed. In other cases works of art that are all but lost to public view are displayed, and presented in an immersive experience that provides visitors to the exhibits a chance to ›live‹ the musical culture of the era. Fortunately, national and regional bodies continue to recognise the validity of what the Ricercar team aims to accomplish. Indeed, projects such as these can explain and valorise the variety and richness of our shared musical heritage, and highlight the importance of diversity, bringing the beauty of (Renaissance) music to a non-specialist audience.

Laurent Pugin

Aruspix and the Marenzio Online Digital Edition: Some Lessons and the Evolution of the Project Plan

1. Introduction

Critical edition projects are complex and notoriously long endeavours, and music is no exception. The publication of a critical edition of the complete work of a composer typically takes decades and represents a significant amount of scholarly work. Very often, the project needs to be adjusted in the light of new findings in the field. New sources may be discovered, authorship of pieces or manuscripts may be confirmed or oppositely invalidated. In some cases, this can yield the necessity to revise or extend significantly the editorial criteria for the project. Over time, editorial and music performance practices can change, which is often but not exclusively the case with Early music. For example, reducing note durations for mensural notation, which used to be the standard practice a few decades ago, is nowadays not the rule anymore. As a result, editorial projects often have to balance the tension between a desired uniformity in its outcome and the expectation to comply with state-of-the-art and most recent developments in the field of musicology and editorial practices.

In most countries, there are no dedicated funding schemes for critical music editions which makes it very difficult to finance them. The notable exception is Germany, where many leading music edition projects benefit from long-term funding, mostly through the *Akademie der Wissenschaften und der Literatur* in Mainz. The *Akademie* funds several complete edition projects.[1] For countries that do not benefit from this unique type of funding, critical edition projects are usually supported directly through the involvement of university collaborators or through dedicated research projects. However, raising support for editorial projects through research funding schemes is usually quite difficult. Preparing critical editions is not *per se* research, or at least is often not considered as such. Furthermore, the typical duration of a research project (three or five years) remains a relatively short timeframe for the realisation of a proper editorial venture compared to the usual needs of a complete work edition project.

1 There are currently 16 long-term musicology projects related to music editions and music documentation supported by the *Akademie* for a total of 86 collaborators.

The development of digital technology adds another layer of complexity that comes with an even more rapid evolution pace. Technology evolves extremely quickly, and new possibilities are constantly emerging. In the last decade, the field of digital critical edition has established itself, first as a research field and now as a new direction for scholarly editing and publishing.[2] Digital editions offer alternative ways to manage the evolution of the editorial project and present several advantages over traditional printed editions. One of the most important is the possibility to revise those parts of the editions that have already been published and to react to the possible findings and needs for changes mentioned above. This can, to some extent, include the revision of the editorial criteria, even though doing so could yield significant revision work that obviously ought to be avoided as much as possible.

As always, innovation and technological developments come with new challenges and new questions. Although revising and adjusting already published content throughout the editorial project is to be considered a great advantage of digital editions, the direct drawback is that this requires the appropriate infrastructure and workflows for making these adjustments. This is not necessarily straightforward, simply because editors who have finished and published a volume are not always available or ready to make the desired revisions. Updating content requires appropriate schemes to be put in place for users to be able to properly cite and access the edition for each specific publication stage.

These broad considerations concern only some of the transformations that digital technology can bring to the progress of an editorial project but does not touch upon all the possibilities and challenges brought by digital editions regarding user interfaces, navigations or any other aspects. Furthermore, the development of digital technologies can also have some more in-depth consequences in the evolution of an editorial project. These are the topic of this paper which provides an example of the significant changes the Marenzio Online Digital Edition (MODE) project went through over time, adjusting itself to the very fast developments the field of digital music editions went through over the past fifteen years.

2 Johannes Kepper and Laurent Pugin, »Was ist eine Digitale Edition? Versuch einer Positionsbestimmung zum Stand der Musikphilologie im Jahr 2017,« *Musiktheorie, Digitalität in der Musikwissenschaft* vol. 32 no. 4 (2017), pp. 347–63.

2. History of the project

The Marenzio edition project started in 2005 under the direction of Mauro Calcagno, when music digital editions were still in their infancy.[3] This editorial project was launched with two international conferences held in 2005 and 2006 at the Accademia Nazionale di Santa Cecilia in Rome and at Harvard University respectively. The main goal of the two conferences was to assess the current state of research on the composer and to lay the groundwork for the new edition. The conferences generated two separate publications, which include five articles devoted specifically to the Marenzio edition.[4] During the conference in Rome, preliminary discussions took place for integrating digital technology within the editorial process with the use of Aruspix, a tool developed at the University of Geneva under the supervision of Etienne Darbellay. The main idea of Aruspix was to offer a suite of tools for comparing printed music sources of the sixteenth and seventeenth century, similar to what had been developed for text with, for example, the collecting and exhibiting software Collex and the textual collation tool Juxta used in the NINES (Nineteenth-Century Scholarship Online) project.[5]

With this approach, the project very quickly took a direction that went beyond the benefit of making a corpus of music more readily available. Indeed, the idea of the project became to offer a unique link between the world of the Renaissance printing press and that of today's digital technologies. The technology of printing by movable type, which in the literary domain transformed European culture and was used to publish all of Marenzio's works, was the most common way of printing music in the sixteenth century. Despite the fact that it was cheaper and that it generated a profitable market, particularly in Venice (where most of

3 At that time, digital technology related to music notation publishing was mostly embedded in music notation software applications that were designed to produce printed editions, such as the Wolfgang music notation software application. The only notable exception was the Computerized Mensural Music Editing (CMME) project focusing on Renaissance music, with a Java-based application plugin that would run in web-browsers once installed by the user. See CMME, https://cmme.org. (All URLs in this paper were accessed in October 2019.)

4 They are, in *Luca Marenzio e il madrigale romano*, ed. Franco Piperno (Rome: Accademia Nazionale di Santa Cecilia, 2008): Mila De Santis, »Problemi di edizioni di testi poetici intonati nel Cinquecento (con alcuni esempi marenziani),« and Maria Caraci Vela, »Per una moderna edizione critica della musica marenziana« ; and in *Perspectives on Luca Marenzio's Secular and Devotional Music*, eds. Mauro Calcagno and Paolo Cecchi (Turnhout: Brepols, 2011): Etienne Darbellay, »Do We Need a New Edition of Marenzio's Music?,« Christine Jeanneret, »›Dare in luce et con diligenza correggere‹: A Study of Marenzio's Editions and Re-editions,« and Laurent Pugin, »Music Printers at Work: Comparing Editions of Marenzio's *Primo libro di madrigali a quattro*.« The latter volume was published as part of a series under the auspices of the Centre d'Études Supérieures de la Renaissance in Tours, directed by Philippe Vendrix.

5 NINES, http://www.nines.org.

Marenzio's works were published), this technology presented several limitations that became especially prominent during Marenzio's time: the text setting, for example, was often misaligned with the music, precluding a clear reading. Because of Marenzio's popularity and the numerous editions and reprints of his works, the objective of the project was to present the best-case scenario in which to study the dynamics of the music printing market in the late Renaissance. As the digital tool suite of Aruspix was developed in conjunction with the Marenzio edition, it would facilitate an investigation of these dynamics with unprecedented depth, while producing a modern edition usable by scholars as well as professional and amateur musicians.

The Marenzio edition project has not been supported by a long-term funding scheme. However, it has been continuously supported by the institutions of the scholars involved in it. In the first place, the project received support from the various university libraries.[6] The project received dedicated funding for the editorial work through the Swiss national science foundation, a fellowship award to Christine Jeanneret from 2009 to 2011,[7] and most importantly through a three-year grant (2011-2014) from the National Endowment for the Humanities (NEH) in the U.S.A. as part of the »Scholarly Editions and Translations« program awarded to Mauro Calcagno (PI) and Giuseppe Gerbino (Co-PI).[8] The project also received regular funding from institutions for workshop and additional editorial work.[9]

3. Evolution of the project

At the time of the NEH project in 2011, the Marenzio edition had already evolved from the original idea to producing a traditional paper-based edition to creating a digital edition. The project became the MODE project even though not all technology challenges had been solved at this time. During these years, the project

6 It includes the Isham Memorial Library of the Eda Kuhn Loeb Music Library at Harvard University, the Stony Brook University Libraries, the Gabe M. Wiener Music & Arts Library at Columbia University, and the Kislak Center as well as the Schoenberg Institute for Manuscript Studies at the University of Pennsylvania.

7 Marenzio Project: for a Critical Edition of Luca Marenzio's Profane Music, http://p3.snf.ch/project-121444.

8 Online Edition of the Secular Music of Luca Marenzio, https://securegrants.neh.gov/publicquery/main.aspx?f=1&gn=RQ-50553-11.

9 It includes the Center for Digital Research and Scholarship at Columbia University (CDRS), which has provided technical assistance both for digital storage and for the building and maintenance of the website, the Faculty in the Arts, Humanities, and lettered Social Sciences (FAHSS) initiative at Stony Brook University, and the Price Lab for Digital Humanities at the University of Pennsylvania.

had to go through some quite significant adjustments, influenced by other projects in the field and by the development of new technologies. We can list at least three significant developments that, at the beginning of the project, did not exist or that were not yet very developed and which would have a direct impact on the way the MODE project evolved and adjusted its objectives.

3.1 The development of the Music Encoding Initiative (MEI)

The fundamental question for a digital edition is how to encode the data. The encoding scheme has some direct implications for current and also future interoperability of the project. It determines the ways in which the data will be usable by tools and how it can be shared with other projects. It is also directly related to its long-term sustainability and other long-term archiving questions. For music edition projects, having a common scheme makes it possible to share data between them but also to share tools.

At the beginning of the project, MEI was still at a very early developmental stage. In 2007, however, thanks to the involvement of scholars from the University of Detmold / Paderborn, the project grew significantly and rapidly. MEI clearly was the best candidate for MODE.[10] First of all, MEI includes a very rich metadata header that makes it possible to include very detailed metadata in a highly structured manner. MEI also has all the benefits of any XML format by default. Standard tools for manipulating XML can be used, and it is both machine-readable and at the same time, to some extent, human-readable. One strength of MEI that made it particularly interesting for both the Aruspix project and the MODE project is its flexibility for modelling various types of music notation, including mensural notation. It offers a dedicated module specifically designed for accommodating the special needs of mensural notation. This means, for example, that a minim will be encoded as such and not using its Common Western Music Notation (CWMN) equivalent, a whole note. Such distinctions are important and are one of MEI's advantages.[11]

MEI also provides an encoding organisation by parts (as opposed to a score organisation), which makes it perfectly suitable for encoding part-books. In a

10 See MEI, http://music-encoding.org.

11 On that base, it is possible to develop tools that are aware of the underlying notational system and that can process mensural note durations appropriately, i.e. to have algorithms that understand the context given the 16 mensural species provided by the four levels of division in mensural notation: *modus major*, *modus minor*, *tempus* and *prolatio*. It means algorithms that are ternary-based (and not binary-based as in CWMN) can be developed. They themselves apply imperfection or alteration rules when the level is imperfected or altered without incorporating in the encoding of the note itself the number of sub-units it represents. In other words, calculating the actual duration of a particular note can be left to the algorithm and does not have to be hard-coded.

part organisation, each part is encoded in a distinct XML sub-tree. With this, it is possible to have all the parts in a single file even if the score has not yet been assembled. For an editorial project such as MODE, however, the question of how to move from a part encoding resulting from an Optical Music Recognition (OMR) process to a complete score encoding raises some important questions. What link to the original source do we want to keep (or can we keep) once we have switched to a score representation? Can we create a diplomatic score transcription of the part-books?

Even if we aim at building a diplomatic score transcription, encoding the score creates a distance from the sources in part-books, since the organising format is no longer the same. As an example, keeping ligatures in a score is cumbersome, and scholars traditionally use artifices such as brackets to mark them in the score.

On a broader scope, these questions illustrate the multiple encoding viewpoints with which this type of music source can be approached, and, above all, how the viewpoint can be expected to change throughout the editorial process. Figure 30 illustrates the various steps in such a process, from the raw OMR output to a CWMN score usable by common sheet music viewers or music analysis frameworks. Each step in this process requires a change of perspective on the music source.

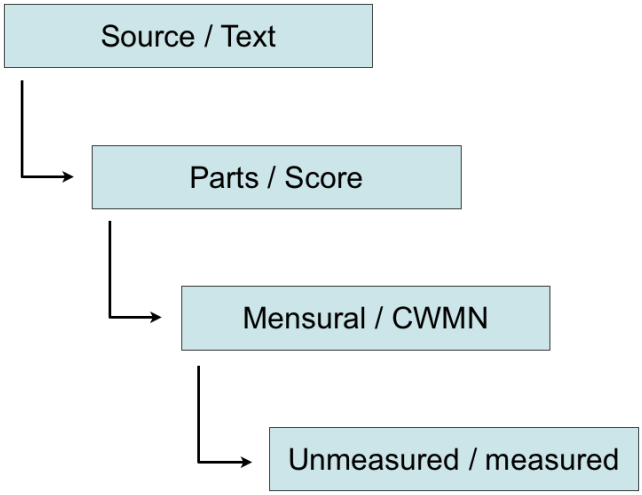


Figure 1. The various steps in a digital edition workflow for early music part-books. Each step requires the encoding viewpoint to be shifted.

Each step of the process presents a duality of possible viewpoints on the data. First of all, the raw output of the data as generated by an OMR process needs to be transformed from a purely source-focused representation (e.g., a note is represented by its staff-line position) to a text-focused one (a note is represented by its pitch). The next step in the process requires the shift from a part-based representation to a score-based one, with all the voices aligned. This requires the aforementioned question of the durations to be resolved. At this stage, a possible viewpoint change lies in moving from a mensural representation with note durations represented by a ternary-based system to a CWMN representation with durations represented in a binary-based system. Finally, the encoding can be transformed from an unmeasured to a measured representation.

A possible approach to tackling this problem has been proposed in experiments for introducing a layout module in MEI. The general idea of the layout module is to separate more effectively the presentation and the content.[12] With the layout module, there is a single XML sub-tree for the content (the usual MEI sub-tree with the actual music encoding) and in addition distinct sub-trees for each of its presentations. The elements in the presentation (or layout) sub-tree always point to the content. Concerning the part-books, each individual part is only one presentation of the content, while the full score is another. With this experimental layout module, MEI is being used in Aruspix with promising results. However, while this approach clearly shows advantages by avoiding data redundancy, future work on this will be necessary to determine if this is a valid option for the MODE project and for similar editorial projects.

Working on content and presentation separation is one example of how collective research efforts have contributed to modifying and improving the MEI schema. It often requires extensive community discussions, which are at the core of the MEI development and make it strong and unique. However, this comes with the cost of the time for these discussions to be conducted and the consensus to be found. Nonetheless, the development of MEI made it possible for the MODE project to become part of a broader community and to establish itself as one of its players.

12 Laurent Pugin, Johannes Kepper, Perry Roland, Maya Hartwig and Andrew Hankinson, »Separating presentation and content in MEI,« in *Proceedings of the 13th International Society on Music Information Retrieval Conference (ISMIR 2012)*, Porto, Portugal (2012), pp. 505–510.

3.2 The development of Verovio

In 2013, the Swiss RISM Office launched the development of an open-source software library for rendering music incipits named Verovio.[13] The main idea behind the development of Verovio was to implement a tool that could render MEI natively, i.e. without converting MEI either explicitly or internally in the software application used for rendering to another format. With Verovio, the MEI code is parsed and rendered as notation with a single tool and in one step. Verovio has been developed as a software library and not as a full software application. This means that it is not a desktop music notation application but instead a software component that can be integrated into a wide range of application environments.

The decision was made to develop Verovio from scratch in order to be able to operate on a memory representation of MEI. Verovio directly implements the MEI structure internally with the exception of a top-level page-based organisation that is required for the organisation of the rendering. The reason for choosing to implement a library from scratch rather than modifying an existing library such as GuidoLib[14] is that in the long run it will make it significantly easier to render complex MEI features. Previous experience has indeed shown that modifying an existing solution can be very quick to develop at the beginning but that the development curve eventually reaches a plateau.

Another idea behind the development of Verovio was to have a tool that would produce SVG in order for it to be easy to use in web environments. With the same goal in mind, it was designed to be light, fast, and with no external dependencies, making it very flexible and easy to use or integrate into a wide range of environments. This opens up a whole range of different possible uses. A JavaScript version of Verovio is particularly promising because it provides a fast in-browser music MEI typesetting engine that can easily be integrated into web-based applications. This setup makes it possible to design ground-breaking web applications where the MEI encoding is rendered on the fly. In such designs we can rethink the interface and avoid mimicking page output. We can instead adjust the layout dynamically to the screen of the device employed by the user.

13 Verovio is named after the Dutch music engraver, Simone Verovio, who was active in Rome in the late sixteenth century. He was one of the very first to use engraving on copper plates for printing music, a technique that was revealed to be the most suited to music about one century later. See Laurent Pugin, Rodolfo Zitellini and Perry Roland, »Verovio: A library for engraving MEI music notation into SVG,« in *Proceedings of the 15th International Society for Music Information Retrieval Conference (ISMIR 2014)*, Taipei, Taiwan (2014), pp. 107–12. See also Verovio, https://www.verovio.org.

14 Christophe Daudin, Dominique Fober, Stéphane Letz and Yann Orlarey, »The Guido Engine: A toolbox for music scores rendering,« in *Proceedings of Linux Audio Conference*, Parma, Italy (2009), pp. 105–111.

The layout can be calculated to fill the size of the screen or interactively changed according to a zoom level adjusted by the user.

When the project started, some music digital edition projects were using CD-ROM or USB-keys as publication media, storing desktop software applications that users had to install on their computers. It quickly became clear that these solutions would be difficult to maintain and that a web-based solution would be more desirable. For MODE, the development of Verovio filled a crucial gap and made a web-based edition possible. It was the missing piece for putting in place a truly dynamic online music edition that would not require to distribute a software application which users would need to install locally. This was even more of a break-through considering that Verovio also allows for variants encoded in MEI to be rendered natively and without having to be converted to another format.

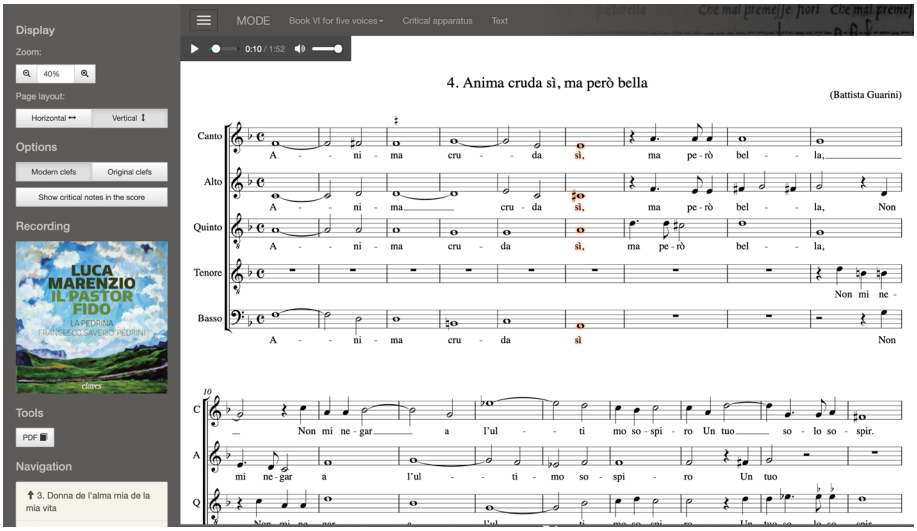


Figure 2. A screenshot of a madrigal as displayed in the MODE project. The music is rendered dynamically with Verovio. For this particular madrigal, the music notation is linked to a recording of the piece that can be played directly in the interface.

3.3 The development of Git and related tools

Hosting a digital edition project is not an easy task to organise. Research grants usually do not provide resources for hosting beyond the duration of the project itself. This often means that hosting is organised at an institution where a project member works. However, it is not rare for scholars to move away from an

institution, and hosting becomes again a problem to be solved. Sometimes, other changes can occur at institutions, and some hosting solutions become no longer be possible.

The MODE project had to re-organise its hosting several times. Because of the large quantity of images and files the project had to deal with, it was necessary to have an appropriate data hosting solution. This was provided by the University of Geneva and then by the Distributed Digital Music Archives & Libraries Lab (DDMAL) at McGill University.[15] Eventually, all of the hosting was moved to the Center for Digital Research and Scholarship (CDRS) at Columbia University.[16] Hosting of the images there was provided via Alfresco, an enterprise-level system for managing large collections of data. This allowed for all the digitised microfilms the MODE project had to deal with to be stored in one place and to be easily accessible by all members of the project. However, in 2015, the CDRS ended the support of the Alfresco system and all the data was moved to GoogleDrive.

The hosting of the project website also went through multiple institutions. At the beginning of the project, the needs were limited to a simple website. However, with the shift to produce a digital edition and the progress of the project, a more elaborated solution had to be put in place in order to publish the digital edition itself. As of 2006, Harvard University hosted the project webpages, which were then moved to the DDMAL at McGill University and then to the CDRS at Columbia University in 2014. The solution adopted at the CDRS for hosting both the website and the digital edition was the WordPress content management system (CMS).[17] The WordPress CMS was used for the publication of the output of the NEH project with a pre-release. At this stage, the music was still being published as PDF files generated from the Sibelius files and not through Verovio. In 2016, however, the CDRS ended the support of the WordPress CMS and another solution had to be found. It was decided with the staff at the University of Columbia to move the entire content of the edition to a Git repository.

Git is an open-source software for managing versions of documents.[18] It distinguishes itself from other widely used similar tools such as the Apache Subversion[19] by being decentralised. This means that it does not rely on a centralised server for managing external contributions but instead simply allows for fully independent repositories to communicate with each other. This makes Git repositories much simpler to archive or to move, since each repository includes its entire

15 DDMAL, https://ddmal.music.mcgill.ca.
16 CDRS, http://cdrs.columbia.edu.
17 WordPress, https://wordpress.com.
18 Git, https://git-scm.com.
19 Apache Subversion, https://subversion.apache.org.

history and can interact with others in a completely independent and flexible way.

The documents typically managed in Git repositories are computer source code files. The use of Git, however, is not limited to computer source code files. Git is in fact perfectly suitable for text data in general, and this of course includes humanities data. The same applies to many functionalities offered by software that was built on Git. Some of these functionalities are directly optimised for managing computer source code, such as specific computer languages syntax highlighting. Many of them, however, are not that specific and can also be applied and be useful to other types of files. For example, the ability to track changes and to visualise all the revisions made to a file is very useful in many cases outside computer programming workflows. This also applies when it is necessary to merge changes made to a same file simultaneously by different contributors. In other words, digital music edition projects, and digital humanities projects in general, can benefit here from a side effect and make direct use of tools that were not meant to be used in this context.

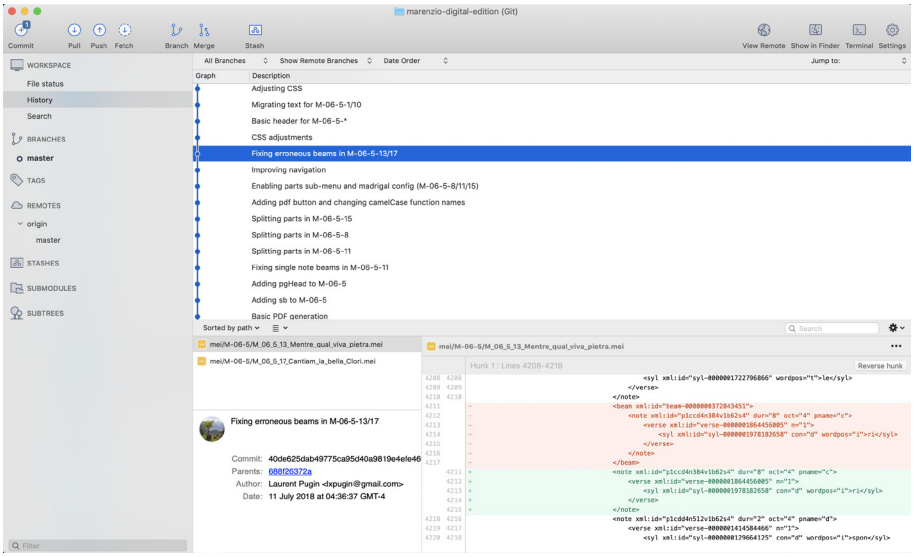


Figure 3. A Git repository browsed through a dedicated software application. Changes and revisions are all listed and differences between versions can be browsed. Additions and deletions are listed and highlighted.

For Git, this goes one step further. The development of Git is closely related to that of GitHub, a service for hosting Git repository.[20] The service is used by thousands of companies for managing their codebase, including major technology companies. For open-source projects, this service is free, with the implicit requirement that the source code (e.g., the files) are made accessible to everyone.[21] For projects such as MODE which have open-data and open-source development policies it means that data hosting is available free of charge through the indirect support of private companies that use the service through paid plans.

In the case of the MODE project, GitHub appeared to be even more appropriate, since the service includes a web-publishing framework that perfectly fills the needs of the project. This web-publishing platform, named Jekyll, acts as a static content management system (CMS) fully embedded in the Git repository.[22] The MODE project uses it to publish both its website and the complete digital edition – currently at a beta stage. With this approach, one single Git repository contains the complete MODE project, i.e. all the MEI source files of the edition content and also the complete tool ecosystem used to publish the edition. It makes the whole infrastructure very flexible, also for moving the hosting to another provider should this be necessary in the future. The repository also includes the entire history of all the revisions made to all the files. This allows for a previous stage of any files to be consulted or restored easily at any time.

4. Use of Aruspix for the editorial work

One of the main components of the NEH project was to use Aruspix for the preparation of the editions and more precisely to compare the original sources in order to elaborate the critical apparatus. However, the core of the NEH project was to support the editorial work and it did not support any software developments as these were explicitly precluded by the »Scholarly Editions and Translations« program. It did support, however, some training workshops, which were very important for the users to learn how to use Aruspix.

The use of Aruspix was two-fold. Firstly, it was used for comparing different copies of an edition. In Aruspix, copies of the same edition are compared through image superimposition. Images are automatically aligned using image processing

20 GitHub, https://github.com. GitHub is the largest provider for Git repositories but not the only one. It was founded in 2008 and currently hosts 80 million repositories. In 2018, GitHub was acquired by Microsoft for $7.5 billion USD. See https://en.wikipedia.org/wiki/GitHub.

21 There is no requirement on the license under which the files have to be made available except for the fact that it needs to be compliant with open-source or open-data practices.

22 Jekyll, https://jekyllrb.com.

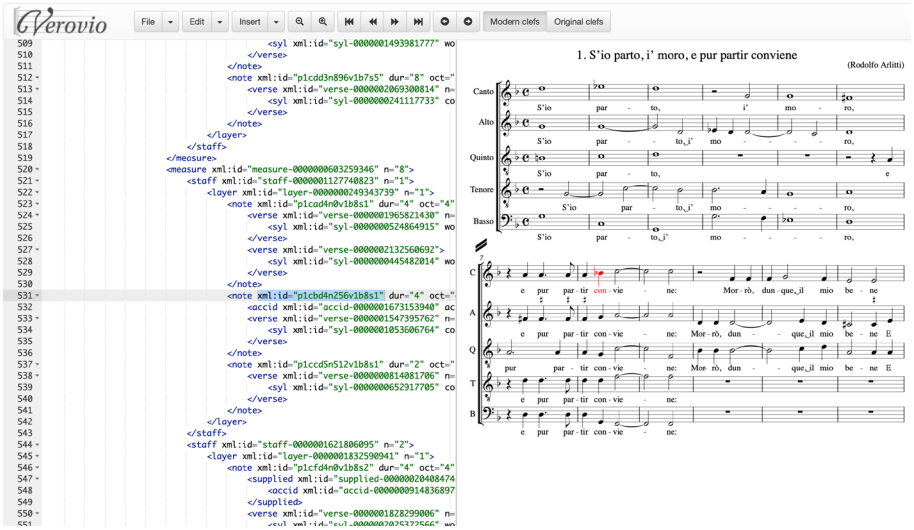


Figure 4. An example of the use of GitHub within its editorial workflow. It enabled the development and deployment of a specific online tool for editors of the MODE project to correct MEI files displayed interactively through Verovio.

algorithms specifically developed for this task. The superimposed images highlight differences between two images (e.g., two copies) in colour, making it easy for the editor to spot differences. This feature is very useful to detect stop-press corrections or other modifications that might have occurred during the printing process. For the Marenzio project, it was decided that this comparison would be performed only for the first edition (*editio princeps*) of each madrigal or canzonetta book, since this is the »copy-text« with which the successive reprints would be compared.[23] This feature of Aruspix was used to gather information about the printing process and to improve the edition of the music and the text by detecting mistakes. Clearly, the editor's critical eye is always involved in checking any outcome.

Secondly, Aruspix was used to compare the first edition with successive reprints. For this step, image superimposition is not a possible approach because the layout of the reprints is different. It can be quite similar in some cases, especially when a reprint was re-typeset in a mechanical manner using the *edition princeps*

23 In some publications related to the project, the term »re-edition« is synonymously used for »reprint«. With moveable types, a reprint does require the content to be re-typeset, which in many cases involves corrections or modifications. For this reason, we can argue that both terms are equally appropriate.

as a model but never perfectly identical and image superimposition cannot work. For a digital comparison to be possible, the content of the prints that need to be compared first has to be recognised. Only then can the recognised content be digitally collated. Aruspix includes workspaces to perform both these tasks, namely an OMR workspace for transcribing the sources and a digital collation workspace for comparing the digitally transcribed sources. As for the image superimposition comparison technique, a visual check by the editor is needed throughout this phase too. The results are then used by the editor to write the critical apparatus.

The result of the comparison of all remaining copies of the *edition princeps* and the comparison of one copy of all known reprints with the *edition princeps* was gathered by the editors in the critical apparatus. It includes critical notes for the music which describe the discrepancies highlighted by the comparison through Aruspix and critical notes for text differences. In addition to listing all the differences in the various sources, the goal of this extensive source comparison approach was also to gather a better understanding of the editorial and printing process, not necessarily for Marenzio's work specifically but for music at that time in general. One take on this is that looking at differences and small anomalies can sometimes be the best way to learn about how normal workflows or normal tasks where organised.[24]

What lessons can we learn from the use or Aruspix in the Marenzio project? How did all this work? First of all, the comparison presented above underlined how important it is to have easy-to-use tools. Indeed, one of the strengths of the Aruspix software application is to have a user-friendly interface for running the processes and correcting the data. The user interface of Aruspix implements common software application user interface design patterns, which makes it easy-to-use for editors. A significant amount of development time was put into this in the development of Aruspix, and it paid off when using it on this large-scale and practical project. Developing user-friendly and well-documented software application user interfaces is a well-known challenge for tools developed as part of research projects, such as Aruspix. Developing this is often difficult to include in a research project, mostly because it usually does not belong to the core goal of the research. It is sometimes simply not seen as a research component. The fact that Aruspix could be used successfully in the MODE project shows a real accomplishment in this regard.

24 This is not dissimilar to approaches in pathology studies in psychology. A pioneer for this practice was Théodule Ribot in the nineteenth century with his monography *Les Maladies de la Mémoire* published in 1881. Ribot's goal was to unlock the secret of the structure and functioning of normal memory through the study of its pathology. The pathological, by the excesses or the lacks that it presents, makes it possible to understand the normal functioning of the organism.

Nonetheless, the Aruspix software application remains not straightforward to use without dedicated training. The tasks to be accomplished with it remain uncommon and specialised (e.g., building a digital collation of OMR output is not a common task that users are used to go through). The training workshops planned and held during the NEH grant were absolutely essential for editors to familiarise themselves with the software and with the workflows. They were also important for setting up rules and schemes on how to organise and name the hundreds of files that the process uses (input image files) and generates (recognition files, training data files, collation files, etc.).[25]

Another lesson learned from the project is that it is necessary to expect to have sources that will not be processable. This can be due to a too severe degradation of the document itself, since Early music sources often present deep bleed-through, i.e. when over time the content of the other side of a page becomes visible through the paper.[26] In some cases, the degradation is so far progressed that Aruspix is not able to recognise the content despite the extensive research that has been made to tackle this issue.[27] In other cases, the process can fail when the quality of the scanning does not meet the desired standard. This can occur with images scanned from degraded microfilms or when the scanning settings were not appropriate, meaning a very low resolution, a black and white (e.g., non-greyscale) colour scheme, or even both. The most problematic cases, however, are the images of sources not digitised with a proper scanning infrastructure but instead simply with a digital camera. When the images are taken without a tripod and the shooting angle is not perpendicular, the page in the image will be distorted perspectively. A small degree of distortion is tolerable in the process, but a too strong distortion will cause the staff detection algorithm in Aruspix to fail. Images taken without a proper scanning infrastructure often present problems related to the lighting. It can be non-uniform or simply too low, resulting in images lacking contrast. In other cases, not using a tripod can cause the image to be blurred because the person moved when taking the picture. These are cases we encountered in the images we received from some libraries in the MODE project.

25 The fact that Aruspix is a desktop application required it to be installed on all the editor's computers, which was not always easy to achieve. However, this never held up the project. With online web applications, which are more and more becoming the architecture used for distributing research tools of this sort, this would have been less of an issue. However, workshops and training sessions are going to remain necessary for any similar project to be successful.

26 With music documents, bleed-through is often stronger than with text documents because some symbols in music notation, such as filled note heads, cover a large area on the paper.

27 John Ashley Burgoyne, Laurent Pugin, Greg Eustace, and Ichiro Fujinaga, »A comparative survey of image binarisation algorithms for optical recognition on degraded musical sources,« in *Proceedings of the 8th International Society on Music Information Retrieval Conference (ISMIR 2007)*, Vienna, Austria (2007), pp. 509–12.

However, only a couple of books could not be compared automatically with Aruspix and had to be compared visually in a traditional manner.

The overall experience of the project is that the source comparison by OMR and digital collation remains a complex workflow to put in place. In addition to the complexity of the workflow itself and the problem that the source degradation or the image quality cannot be guaranteed in advance, there is also the fact that, as it stands, building digital collation in Aruspix still requires quite some manual work for specifying which page in an edition has to be compared with which other page of the reprint. This is quite straightforward when each piece is always printed on one single page, and in such cases the amount of manual work remains very limited and acceptable. However, this is not always the case, and preparing the digital collation can become a quite significant task in the process. Another important limitation with the current developmental stage of Aruspix is that the lyrics are not taken into account in the digital collation process. This remains left to the editor and needs to be done visually. This limitation is particularly problematic with madrigal repertoire simply because variants or corrections in the lyrics of this repertoire are noteworthy. They are certainly as important as variants or corrections in the music, if not even more so.

On the one side, the experience in preparing MODE showed that comparing reprints using OMR and digital collation at the scale of a full editorial project remains a significant task for the editors despite the very good results yielded by the Aruspix software for recognising the music itself. Considering the limited findings in terms of variants or corrections brought to light by the process, one can reasonably argue that at the current developmental stage of the technology the endeavour remains very expensive, considering the required worktime of such a project. This of course does not invalidate the approach itself, nor does it set aside the hope to see in the future improved workflows allowing for sources to be exhaustively compared automatically at a more reasonable worktime cost.

On the other side, however, the project confirmed that comparing sources by superimposition has to be more than highly recommended. This is fairly easily done once the images are available. Furthermore, the degradation of the sources has a lower impact on the workflow. The superimposition algorithms are much simpler and much more robust to document degradation such as bleed-through. The process does not involve the systematic verification of the OMR results before building the collation as it is the case with the comparison of the reprints. Finally, the pages can be superimposed independently of their content, i.e. without having to specify manually where a piece starts or where it ends because this does not affect the image superimposition process. Overall, the process for comparing copies of an edition is quite straightforward in comparison to the work-

flow for comparing reprints. Its usefulness is reinforced by the fact that, when applied to the first edition, it is also much more likely to bring to light important differences between the copies than differences between subsequent reprints. The limited findings made when comparing reprints in MODE confirm that reprints were most often copied from a previous version in a quite mechanical manner and without significant editorial revisions. For the first editions, on the contrary, the comparison of the copies confirmed that intervention within the printing process was quite common. Finding all stop-press corrections in the first edition should not be avoided by editorial projects aiming at producing high-quality critical editions. Stop-press correction can be of various kinds and in some cases can be the key to understanding what happened during the original editorial process.[28]

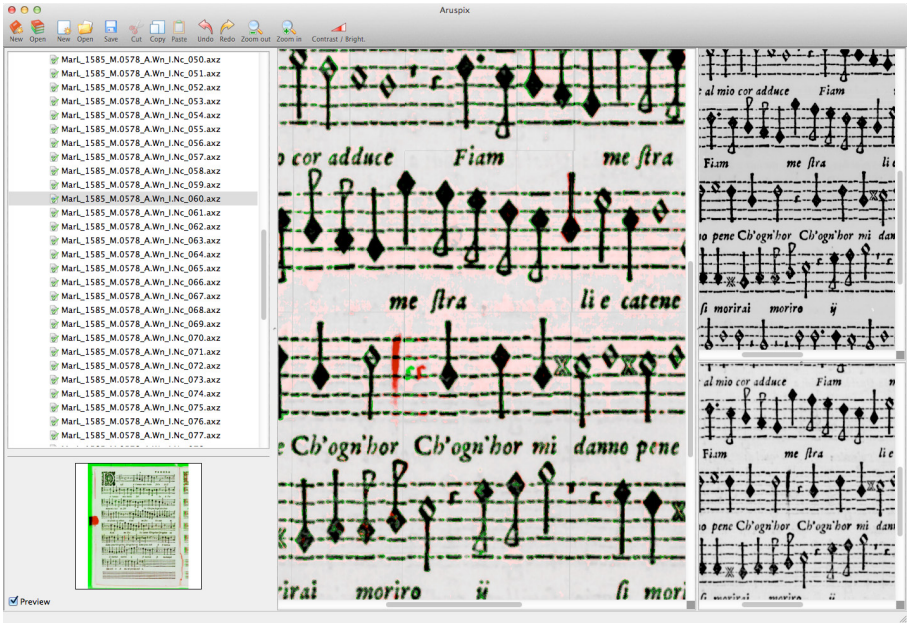


Figure 5. The comparison of different copies of the *edition princeps* revealed itself to be the most valuable operation in the editorial process of the MODE project. The automatic superimposition algorithm performs quite well even with fairly degraded sources and no additional work is required for the human editor to look for the differences that are highlighted in colour.

28 For an example of the differences identified in MODE, see Laurent Pugin, »Music Printers at Work« (cf. fn. 4)

5. Leveraging the full potential of OMR transcription

The output of the part-books transcribed with Aruspix for the comparison of the sources remains monophonic. The logical next step in an editorial process would be to use transcriptions resulting from the OMR output to directly build the score. This was planned in the MODE project as a follow-up of the NEH grant. However, due to the lack of funding, it was not possible to put this into place. What remains complex in this process? Which steps do we need to go through for moving from the OMR output to the score and will this be possible in the near future? While this looks conceptually like a straightforward task where parts simply need to be put together, different parameters listed below still make it quite challenging.

The first challenge for assembling the parts into a score is to determine which pages belong to which pieces. In some cases, when the part-books are structured in a very systematic way, the task can be quite straightforward. The part-books were frequently organised systematically because the music printers used to favour it. For example, in order to make the printing process as streamlined as possible, printers always tried to apply the same layout pattern. This made the typesetting process simpler and even allowed for keeping text elements on the printing form from one page or one part to another. This can be observed easily from typesetting errors such as wrong page numbering or any other anomaly such as broken types that often appear repeatedly on all pages or on all parts in exactly the same place. The best-case scenario for the printer, and for us today when processing the books, was to have one piece (i.e., one madrigal) per page and also to have the same number of madrigals throughout the books. Each part-book had the same number of pages (or folios) with the same page numbering and also the same table of contents, which they did not have to re-typeset for each part-book. The same form could then simply be reused for all part-books.

The situation quickly becomes more complicated when such a systematic organisation of the part-books is missing. It also often happens that each part of a piece is not printed on a single page but across several pages. Conversely, one page may contain more than one piece or part of a piece. Typically, with madrigals of various lengths, printers would try to optimise the use of the paper and fill the pages as much as possible. A long madrigal can be printed on more than one page, with a staff or more on the next page, followed by a shorter one that would fill the rest.

In the future, it would be interesting to integrate an algorithm in the workflow that can detect the beginning and the end of pieces throughout a part-book. It would then be possible to use the output of these algorithms in order to prepare

the assembling of the parts without having to individually label the manual annotations, or at least with significantly less work.

Another complication arises when the number of voices in the pieces is not consistent throughout the book. The *Sesto libro de madrigali a cinque voci* (Venice: Angelo Gardano, 1594; RISM M-557) exemplifies this, with all madrigals composed for five voices except for the last, *Cantiam la bella Clori*, which is set to eight voices in two choirs of four voices each. Because there are only five part-books, the madrigal at eight voices is printed as what can be interpreted as a mixed mode of part-book and choir book, with two voices in some of the part-books. The *Canto* part-book contains *Canto* and *Tenor* of the *Primo choro*, the *Alto* part-book the *Alto* and *Basso* of the *Primo choro,* the *Tenor* part-book only one voice, namely the *Tenor* of the *Secondo choro*, the *Basso* only the *Basso* of the *Secondo choro* (indication is missing), and the *Quinto* the *Canto* and *Alto* of the *Secondo choro.* Where more than one voice is contained in a part-book, two singers are expected to share a part-book in the same way singers share a choir book. Although this represents a quite common practice, these types of irregularities do make automatic assembling of parts from OMR output quite challenging.[29]

Finally, with Renaissance music in general, assembling part-books is made even more difficult when the music is in ternary meter. In Marenzio's secular music, however, this is not a significant challenge because sections in ternary meter are limited and do not include complex proportions. The number of alterations or imperfections is very limited and can easily be handled by hand. Nonetheless, recent work in the field showed that resolving mensural rules algorithmically is possible and that it is perfectly feasible to integrate these algorithms into the score assembling workflow.[30]

29 More generally, we can observe patterns in the layout of the printed books that made it easier for the printers to organise the printing process, from typesetting to binding. However, the typesetting layout of music notation was unconstrained, and the printers had the freedom to lay out the music as needed. In the simplest cases, with one piece per page and one page per piece, with the same number of voices throughout the book, grouping the parts to build the score is fairly trivial. With more complex cases, it is possible to envisage approaches using intelligent text-mining based on text elements of the part-books extracted via OCR, such as voice labels (*Canto*, *Alto*, etc.), lyrics, or piece titles. However, any of these solutions will certainly require human supervision and verification.

30 Martha Thomae Elias, »Automatic scoring up of mensural music using perfect mensurations, 1300- 1550« (MA dissertation, McGill University, Montreal, 2017).

6. Conclusion

The evolution of the MODE project illustrates well the need for digital edition projects in order to be able to react to technological advances continuously. When the project started, MEI, Verovio, and Git did not yet exist – although MEI already existed it was only as a one-person research project with no released specifications and no community support. Today, they provide the core of the MODE project. These innovations had a profound impact on the overall goal of the project. Throughout the years, by integrating the possibilities offered by these new resources, the project moved its target from a digital edition designed as a publication to an edition designed as an extensible open dataset and reusable open-source environment, i.e. extending the outcome of the project beyond just the edition itself by making all the sources of the edition, data, and tools available under a form that can be re-used and extended by other projects.

A key approach behind this new concept is the clear separation between data and tools. For a project such as MODE to be maintainable in the long run, this separation is absolutely essential. It guarantees that the data remain readable and usable even if one day the tools on which the edition is built are no longer maintained or no longer work. This separation is one of the many contributions brought by MEI and the continuing work of its community. For the MODE project, Verovio has opened up brand new possibilities in the way the music notation is made accessible to the reader. The modular approach of Verovio makes it possible for it to be used in a very wide range of environments and not only digital edition projects. By growing the community of users and also of developers who are willing to contribute to the code and its documentation, the project maximises its sustainability perspectives. Enabling contributions from third-party projects is a unique feature of open-source tools, and the more widely they are used, the more likely they will be maintained and supported by the community. Finally, with the use of Git and hosting on GitHub, the MODE project benefits from cutting edge tools for managing digital workflow but also from a reliable and flexible hosting solution made available for free by a very large technology company willing to support open-source projects. The publication tools integrated in GitHub offer a simple, static, and self-contained solution.

The experience regarding the use of Aruspix gathered throughout the NEH project for MODE is very valuable. On the one side, it highlighted that the comparison of reprints remains quite demanding in terms of organisation and human resources to be involved in the process. As discussed in the paper, developing algorithms for automatically detecting and processing the structure of the part-books (e.g., detecting pieces, detecting voices) will significantly reduce the

resources needed for comparing reprints. Furthermore, these algorithms will also help to facilitate the use of the OMR transcription for generating scores from them even though we have seen that this process requires to shift the viewpoint at various steps. This is not always straightforward. Automatically assembling scores will undoubtedly be useful for large-scale approaches, a domain where the use of Aruspix still has considerable potential, and various research projects outside the digital edition realm already benefit from it.[31] On the other side, the use of Aruspix in the MODE project confirmed the efficiency and the usefulness of comparing existing copies of the first edition in particular. Not only is this comparison relatively easy and not highly time consuming, but it also promises to bring to light significant and relevant differences.

The MODE project will have to continue to evolve and to adjust itself to innovations. What will they be? This is of course difficult to predict. However, changes in various domains, and not exclusively scholarly ones, have shown us in the past that we tend to overestimate the changes that will occur in the next five years, while we simultaneously underestimate the ones that will occur in the next ten years. It sounds indeed fairly likely that the resources on which the MODE project is built will still be at its core in five years. It is not unlikely that this will also be the case in ten years even though this is clearly more difficult to predict. For MEI, we can see shifts occurring from the traditional quite monolithic modelling approach to solutions making more use of Linked Data (LD) technologies. These will quite undoubtedly be a key technology that will enable the structuring of data and the related tools to be rethought and adjusted. In this context, the conceptual shift the MODE project went through, moving from an edition designed as a publication to a digital environment where the dataset and the publication framework can continuously evolve, appears to be appropriate and will hopefully offer the required flexibility.

31 See the Single Interface for Music Score Searching and Analysis (SIMSSA) https://simssa.ca/ and the Full-Text search of Early Music Prints Online (F-Tempo) https://f-tempo.org projects.

Peter Ackermann

Das digitale Verzeichnis der Werke Giovanni Pierluigi da Palestrinas (PdPWV). Struktur und Schnittstellen

Blickt man auf die rund 450-jährige Wirkungsgeschichte der Musik Giovanni Pierluigi da Palestrinas, so ist neben ihrer internationalen Ausrichtung das frappierendste daran wohl ihre Kontinuität. Die Rezeption seiner Werke und seines kompositorischen Stils beginnt zu Lebzeiten des Komponisten und reicht nahezu ungebrochen bis in die unmittelbare Gegenwart. Über ihren Einfluss auf die kirchenmusikalische Kompositions- und Aufführungspraxis hinaus wirkte sie seit dem Beginn des Generalbasszeitalters insbesondere prägend auf die Entwicklung der Musiktheorie.[1] Hieraus resultiert nicht zuletzt auch das früh einsetzende wissenschaftliche Interesse an der Musik Palestrin as, das in den caecilianischen Strömungen des 19. Jahrhunderts seine Wurzeln hat.[2] Und dennoch weist die musikphilologische Forschungslage bis heute in vielen Bereichen Lücken auf, am deutlichsten erkennbar am Fehlen eines wissenschaftlich fundierten, auf umfassender Quellenforschung gegründeten Werkverzeichnisses.

1 Arbeiten zur Rezeptionsgeschichte nehmen innerhalb der Palestrina-Forschungsliteratur seit langer Zeit einen wichtigen Platz ein. Zu nennen sind u. a.: Otto Ursprung, *Restauration und Palestrina-Renaissance in der katholischen Kirchenmusik der letzten zwei Jahrhunderte. Vergangenheitsfragen und Gegenwartsaufgaben*, Augsburg 1924; Karl Gustav Fellerer, *Der Palestrinastil und seine Bedeutung in der vokalen Kirchenmusik des 18. Jahrhunderts. Ein Beitrag zur Geschichte der Kirchenmusik in Italien und Deutschland*, Augsburg 1929, Reprint Wiesbaden 1972; Helmut Hucke, »Palestrina als Autorität und Vorbild im 17. Jahrhundert«, in: *Congresso internazionale sul tema Claudio Monteverdi e il suo tempo. Venezia, Mantova, Cremona 3–7 maggio 1968. Relazioni e comunicazioni*, hrsg. von Raffaello Monterosso, Verona 1969, S. 253–261; Thomas Charles Day, *Palestrina in History: a Preliminary Study of Palestrina's Reputation and Influence since His Death*, Diss. Columbia University 1970; *Der Caecilianismus. Anfänge – Grundlagen – Wirkungen*, hrsg. von Hubert Unverricht, Tutzing 1988 (Eichstätter Abhandlungen zur Musikwissenschaft, 5); *Palestrina und die Kirchenmusik im 19. Jahrhundert*, hrsg. von Winfried Kirsch, 3 Bde., Regensburg 1989–1999; Peter Ackermann, »Die Werke Palestrinas im Repertoire der Cappella Sistina«, in: *Collectanea II. Studien zur Geschichte der päpstlichen Kapelle. Tagungsbericht Heidelberg 1989*, Città del Vaticano 1994 (Capellae Apostolicae Sixtinaeque Collectanea Acta Monumenta, 4), S. 405–430; Peter Lüttig, *Der Palestrina-Stil als Satzideal in der Musiktheorie zwischen 1750 und 1900*, Tutzing 1994 (Frankfurter Beiträge zur Musikwissenschaft, 23); *Aufführungs- und Bearbeitungspraxis der Werke Palestrinas vom 16. bis zum 20. Jahrhundert*, hrsg. von Friedrich Wilhelm Riedel, Sinzig 1997 (Kirchenmusikalische Studien, 3); *La recezione di Palestrina in Europa fino all'Ottocento*, hrsg. von Rodobaldo Tibaldi, Lucca 1999 (Strumenti della ricerca musicale, 6); James Garratt, *Palestrina and the German Romantic Imagination. Interpreting Historicism in Nineteenth-Century Music*, Cambridge 2002.

2 Vgl. *Bibliografia degli scritti su Giovanni Pierluigi da Palestrina (1568–1996)*, a cura di Giancarlo Rostirolla con la collaborazione di Luciano Luciani, Palestrina 1997 (I quaderni della Biblioteca Pierluigi, 3).

Diese Lücke zu füllen, ist das Ziel des im Folgenden skizzierten Forschungsprojektes. Das *Verzeichnis der Werke Giovanni Pierluigi da Palestrinas* (PdPWV) versteht sich als *Online-Datenbank mit textkritischer Darstellung der Quellen*, wird seit Beginn des Jahres 2017 von der Deutschen Forschungsgemeinschaft gefördert und hat seinen Sitz an der Hochschule für Musik und Darstellende Kunst Frankfurt am Main. Kooperationspartner des Projektes sind RISM, die Fondazione Giovanni Pierluigi da Palestrina, Palestrina/Rom und der Verlag Schott Music.

Dass die Realisierung eines Palestrina-Werkverzeichnisses bislang über einige Ansätze[3] hinaus nicht weiterverfolgt wurde – nicht einmal im Entstehungskontext der Gesamtausgaben[4] –, dürfte zunächst am großen Umfang des von Palestrina hinterlassenen Œuvres gelegen haben. Ein gravierenderes Hindernis stellt aber zweifellos die weitverzweigte Quellenüberlieferung dar. Aktuell liegt folgender Bestand an authentisch zu erachtenden Werken vor: 113 Messen, 39 Magnificat, 11 Litaneien, 5 Lamentationszyklen und 10 einzelne Lektionen, 77 Hymnen, 270 einteilige und 66 zweiteilige Motetten (einschließlich verwandten Gattungen angehörende Kompositionen wie Offertorien, Improperien, Marianische Antiphonen, Cantica und Psalmvertonungen), 59 geistliche Madrigale, 70 einteilige und 14 mehrteilige weltliche Madrigale und Kanzonetten sowie 8 Ricercari. Daneben lassen sich noch ca. 310 Opera dubia nachweisen, bei denen es sich es sich zum größten Teil um Kompositionen handelt, die erstmalig in Handschriften des 19. Jahrhunderts auftreten und deren Echtheit somit bereits im Vorfeld eingehenderer Untersuchungen in Frage zu stellen ist.

Der hier skizzierte Werkbestand ist nach dem derzeitigen Forschungsstand verteilt auf 4.773 Quellen aus dem Zeitraum von ca. 1550 bis 1900. 321 davon sind Einzel- und Sammeldrucke, denen der überwältigende Anteil von weit über 4000 Handschriften gegenübersteht. Die Gesamtzahl der Palestrina betreffenden Werkeinträge liegt bei knapp 22.000.

Den musikphilologischen Intentionen des Projekts zufolge sollen auf der einen Seite die traditionellen Ziele eines Werkverzeichnisses angestrebt werden, indem dieses detaillierte Beschreibungen und weitere Informationen zu einzelnen

3 Vgl. die jeweiligen Werkverzeichnisse in den lexikalischen Beiträgen von Knud Jeppesen, »Palestrina, Giovanni Pierluigi da«, in: *Die Musik in Geschichte und Gegenwart*, Bd. 10, Kassel [usw.] 1962, Sp. 658–706 und Peter Ackermann, »Palestrina, Giovanni Pierluigi da«, in: *Die Musik in Geschichte und Gegenwart*, 2. Aufl., Personenteil, Bd. 13, Kassel [usw.], Stuttgart und Weimar 2005, Sp. 7–46 sowie Clara Marvin, *Giovanni Pierluigi da Palestrina: A guide to research*, New York 2002 (Routledge musical bibliographies: Composers).

4 *Pierluigi da Palestrinas Werke*, 33 Bde., Leipzig o. J. [1862–1907]; *Le opere complete di Giovanni Pierluigi da Palestrina*, 35 Bde., Rom 1939–1999; *Edizione nazionale delle opere di Giovanni Pierluigi da Palestrina*, Rom 2002– [bisher 5 Doppelbände erschienen].

Werken enthält und sich mit Fragen der Authentizität befasst. Mit dem Versuch jedoch, diese Werke und ihre Quellen in einem digitalen Online-Katalog zu verzeichnen, rücken die hierdurch sich eröffnenden erweiterten Möglichkeiten im Umgang mit den Werk- und Quellendaten in den Mittelpunkt. Diese betreffen die Bereiche Suchmethoden, Visualisierung von musikalischem Material und Bildung von projektübergreifenden Schnittstellen: zur Editionspraxis einerseits und zur softwarebasierten musikalischen Analyse andererseits. Für die Quellen bedeutet dies, dass sie nicht nur so umfassend und detailliert wie möglich beschrieben, sondern auch visualisiert und so für den Vergleich untereinander aufbereitet werden. Insofern ist eines der Hauptziele des Projekts – neben der üblichen Recherche und Präsentation bibliografischer Daten – die Erstellung digitaler ›Partituren‹ für die frühen – und damit auch editorisch relevanten – Quellen jedes einzelnen Werkes. Leitlinie hierfür ist die diplomatisch strenge Transkription der Stimmen in Mensuralnotation und ihre Präsentation in einer vertikalen partiturähnlichen Anordnung. Für die Codierung und typografische Darstellung der Noten wird die textbasierte, quelloffene Notationssoftware LilyPond verwendet. Auf dieser Basis lassen sich die verschiedenen Quellen eines Werkes automatisch vergleichen und textliche wie musikalische Abweichungen anzeigen. Über die Quellenvarianten, die zum Beispiel melodische und rhythmische Differenzen, die Akzidentiensetzung, Notations-Alternativen oder unterschiedliche Textunterlegungen betreffen und damit Aufführungskonventionen in einem konkreten (zeitlichen, geographischen, sozialgeschichtlichen) Kontext abbilden, lassen sich Kontexte erschließen, die über eine rein wissenschaftliche Relevanz hinausweisen. Insbesondere der historischen Interpretationspraxis könnten neue Wege eröffnet werden, da es möglich sein wird, aus der Vielzahl an überlieferten Fassungen spezielle Partituren zu erstellen, auf deren Grundlage ein Werk aus einem konkreten historischen Aufführungskontext heraus zum Klingen gebracht werden kann, womit zugleich – auch im konkreten programmiertechnischen Sinn – eine Schnittstelle zur Digitalen Edition implementiert wäre.

Grundlage der technischen Umsetzung des dargestellten Konzepts ist die eigens für das Projekt entwickelte Software, die, in Java geschrieben, derzeit als Desktopversion für Debian GNU/Linux-Betriebssysteme vorliegt.[5] Ursprünglich vorgesehen als relationale Datenbank, basierend auf einer komplexen Vernetzung von Java-Properties-Klassen mit der Werkverzeichnisnummer der einzelnen Kompositionen als gemeinsamen Schlüssel, wurde dieses Konzept inzwischen ersetzt durch ein auf utf8-codierten Textdateien (txt) basierendes Datenbanksystem, das

5 Die Server-Version soll bis Herbst 2019 fertiggestellt sein.

mittels einer elementaren textzeichengesteuerten Strukturierung die Generierung komplexer Datenstrukturen im Arbeitsspeicher allein in die Verantwortung der Anwendungssoftware legt. Grund hierfür waren Nachhaltigkeits-Überlegungen, angesichts des – auf lange Sicht hin – u. U. entstehenden Problems der Objekt-Serialisierung bei komplexen Objekten wie etwa der aus Properties-Klassen erzeugten Datenobjekte.

Die Aufnahme der Daten zu den einzelnen Werken und ihrer Quellen erfolgt über eine Eingabemaske, wie in Abbildung 1 zu sehen.

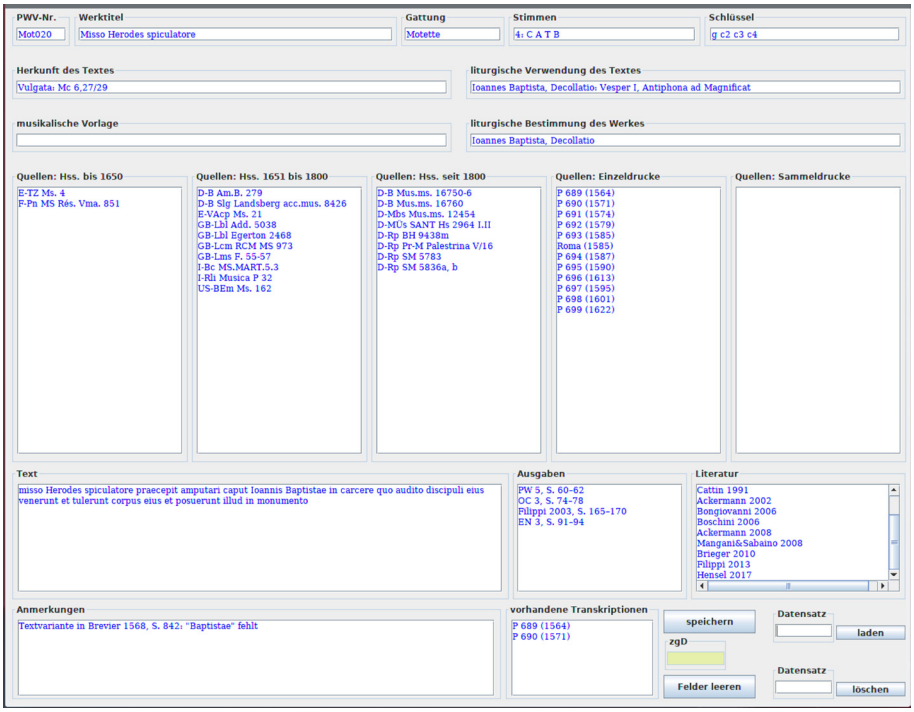


Abbildung 1. Eingabemaske.

In der Maske werden erfasst:

- die Werkverzeichnisnummer, bestehend aus drei Buchstaben zur Kennzeichnung der Gattung, gefolgt von drei Ziffern zur fortlaufenden Zählung;
- der Werktitel;
- die musikalische Gattung;
- die Stimmendisposition;

- die Schlüssel;
- die Herkunft des Textes;
- die liturgische Verwendung des Textes, in der Regel gemäß dem römischen Brevier von 1568 bzw. dem Missale von 1570; gegebenenfalls – vor allem bezüglich der Messen – die Verwendung einer musikalischen Vorlage;
- falls in den Quellen vermerkt: die liturgische Bestimmung des Werks, die von der liturgischen Verwendung des Textes abweichen kann;
- die Quellennachweise, gegliedert in Handschriften, Einzel- und Sammeldrucke;
- der vertonte Text;
- textkritische Editionen;
- die auf das Werk bezogene Sekundärliteratur;
- weitere Anmerkungen;
- die in die Datenbank aufgenommenen diplomatischen Transkriptionen in Partituranordnung.

Die Unterteilung der über 4000 handschriftlichen Quellen in drei Gruppen erschien aus Gründen der Übersichtlichkeit geboten. Die erste Gruppe enthält die frühen Quellen bis zur Mitte des 17. Jahrhunderts, dem Zeitpunkt, an dem die Folge der Nachdrucke der Werke Palestrinas endet. Die zweite umfasst den Zeitraum, in dem Palestrinas Musik zu einem Modell für den stile antico und die Basis der Theorie des klassischen Kontrapunkts wurde, während in der dritten Gruppe die im Geist der Palestrina-Renaissance entstandenen Abschriften des 19. Jahrhunderts zu finden sind.

Im Rahmen der grafischen Benutzeroberfläche stellt die in Abbildung 2 gezeigte Seite das Hauptfenster für die Datenrecherche und -ausgabe dar.

Das Hauptfenster besteht aus zwei großen Bereichen. Links befindet sich der Eingabebereich für die Suche, in der rechten Abteilung werden die Resultate angezeigt. Die Suchbegriffe können in den einzelnen inhaltlich definierten Feldern entweder frei eingegeben oder durch Klicken auf das rechte Pfeilsymbol aus einer Liste ausgewählt werden. Eine freie Suche in allen Feldern ist ebenso möglich wie die Suche nach Wörtern oder Wortgruppen innerhalb der vertonten Texte. Die Suchfelder lassen sich ohne Einschränkungen verknüpfen, sowohl untereinander als auch mit den musikbezogenen Suchfunktionen. Diese sind über den Button ›Eingabe: Noten- und Intervallsuche‹ erreichbar und können mit Hilfe grafischer Eingabemethoden bedient werden (vgl. Abbildung 3).

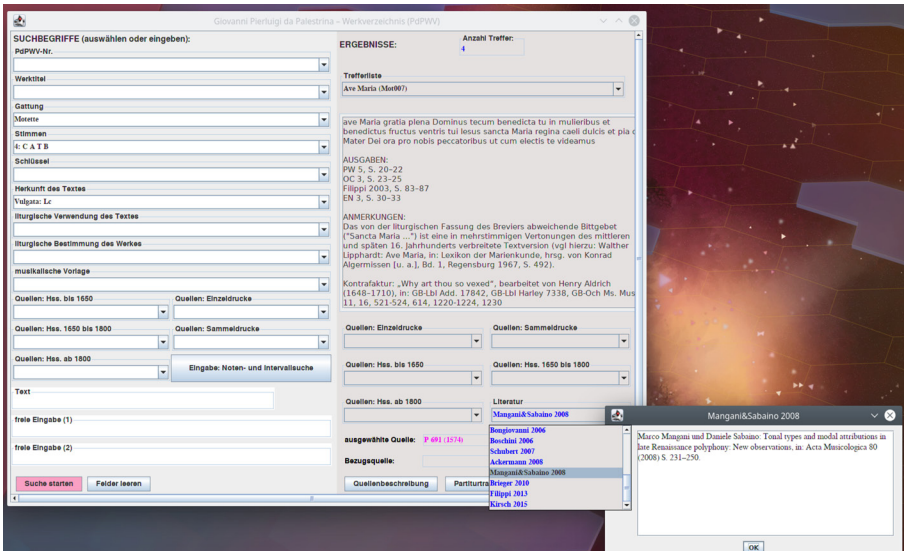


Abbildung 2. Hauptfenster für die Datenrecherche und -ausgabe.

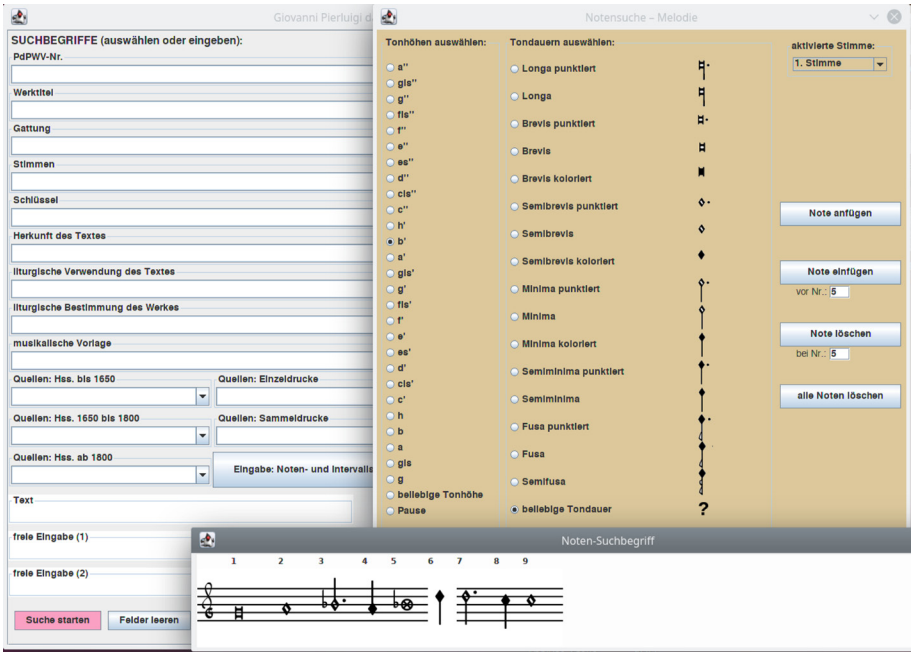


Abbildung 3. Eingabebereich für die notenbezogene Suche (einstimmig und mehrstimmig).

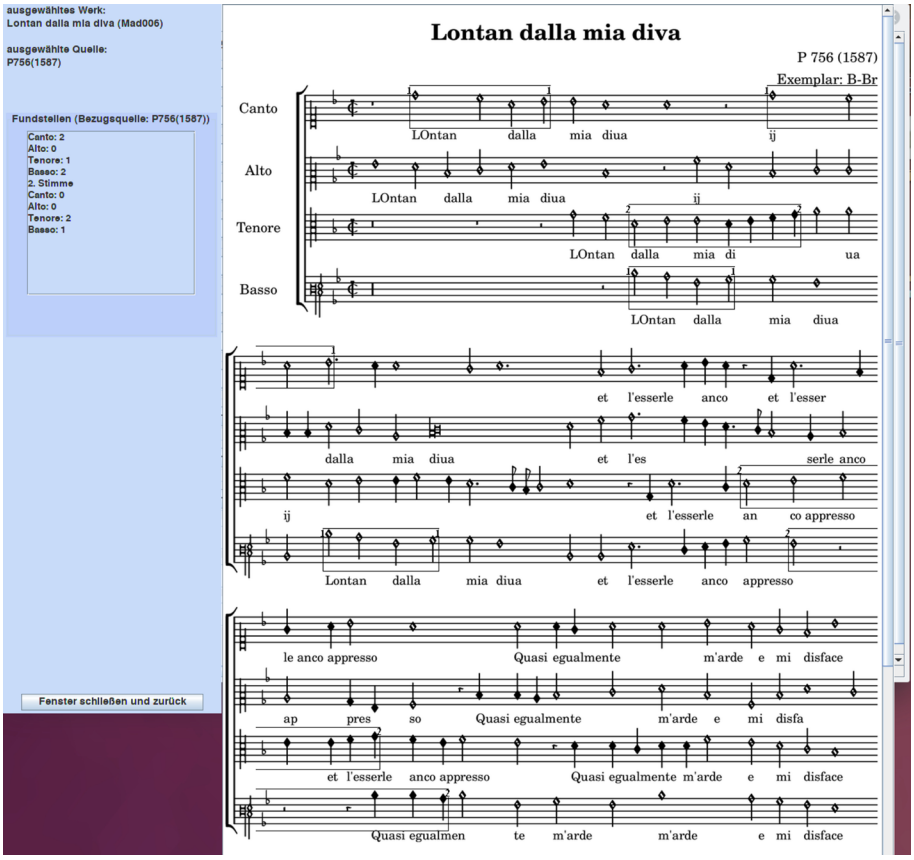


Abbildung 4. Anzahl der Treffer einer notenbezogenen Suche.

Für die Notensuche steht je eine Spalte zur Auswahl einer Tonhöhe und eines rhythmischen Wertes zur Verfügung; die Anzeige der ausgewählten Elemente erfolgt auf einem Liniensystem am unteren Rand. Es kann nach bis zu vier Stimmen, aufrufbar mittels der Auswahlliste rechts oben, gleichzeitig gesucht werden, und zwar als polyphoner Satz oder im Sinne einer Bündelung mehrerer musikalisch unabhängiger Motive zu einem komplexen Suchbegriff. Möglich ist darüber hinaus eine vom Anwender mittels regulärer Ausdrücke steuerbare Ähnlichkeitssuche, da sowohl die Höhe als auch die Dauer eines Tones sowie die Kombination beider Parameter über den Auswahl-Button ›beliebige Tonhöhe‹ bzw. ›beliebige Tondauer‹ unbestimmt gelassen werden können, wodurch Abschnitte unterschiedlicher Bestimmtheitsgrade innerhalb eines zu suchenden Melodiemodells definierbar sind: z. B. ein soggetto mit einem eindeutig festgelegten Themen-

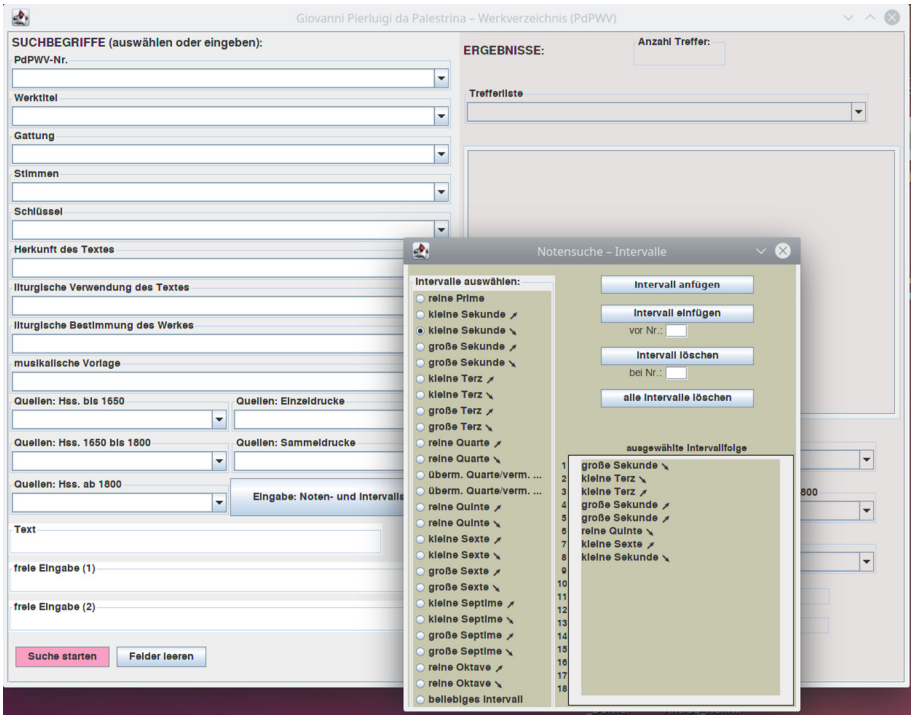


Abbildung 5. Eingabebereich für die intervallbezogene Suche.

kopf (die Töne 1–4 in Abbildung 3), gefolgt von einem kurzen variablen Bereich (Ton 5: ein *b* beliebiger Dauer, Ton 6: eine Semiminima beliebiger Tonhöhe) und drei weiteren melodisch wie rhythmisch definierten Tönen. Auf diese Weise ist es auch möglich, nach rein rhythmischen oder melodischen Modellen zu suchen.

Die Ausgabe der Treffer erfolgt in Partiturdarstellung mittels Markierung durch rechteckige Rahmen, in die die jeweilige Nummer des melodischen Suchbegriffs (1. Stimme, 2. Stimme usw.) als Ziffer eingelassen ist. Im linken Textfeld ist die Anzahl der Treffer, bezogen auf die einzelnen Noten-Suchbegriffe (»Stimmen«) angezeigt. Im folgenden Beispiel (Abbildung 4) wurden als Suchbegriffe ein rein melodisches (1) sowie ein rhythmisches Modell beliebiger Tonhöhe (2) eingegeben.

Ein Beispiel für die Intervallsuche zeigt Abbildung 5. In dem dargestellten Fenster lassen sich Intervallfolgen als Suchbegriffe generieren, wobei auch hier wieder benutzerdefinierte Unschärfen in Gestalt von ›beliebigen Intervallen‹ eingefügt werden können. Die Anzeige der Treffer erfolgt wie oben beschrieben über Rechteck-Markierungen.

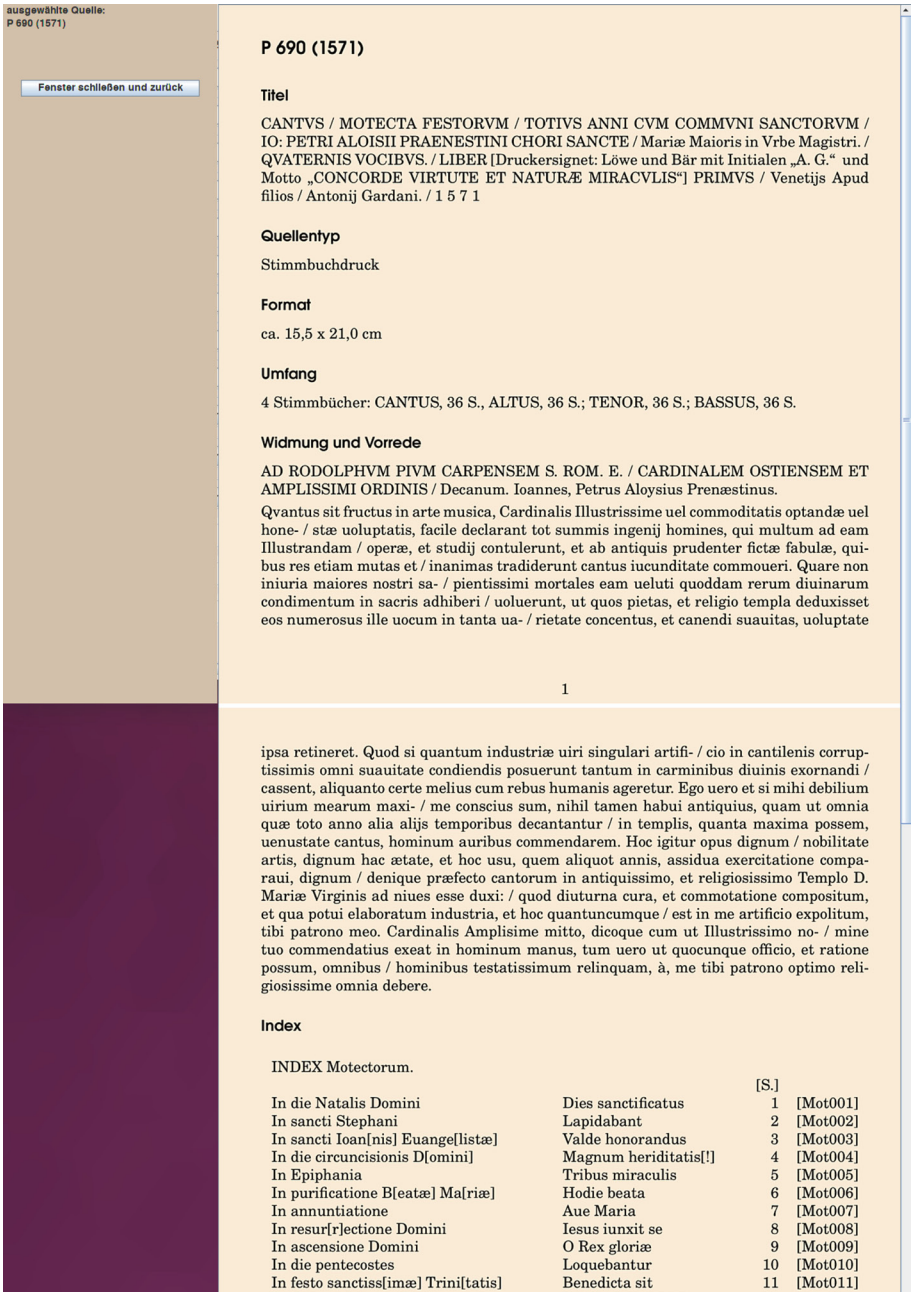


Abbildung 6. Detaillierte Quellenbeschreibungen

Im rechts befindlichen Anzeigebereich für die Ergebnisse der Suche (vgl. Abbildung 2) lassen sich die spezifischen Daten für das jeweils aus der Trefferliste ausgewählte Werk anzeigen, dazu die relevante Sekundärliteratur und vor allem die nachweisbaren Quellen, gelistet in den fünf Boxen entsprechend dem bereits beschriebenen Gliederungsmodell. Für Quellen bis ca. 1600 können im Rahmen des ausgewählten Werks die Partiturtranskriptionen aufgerufen werden sowie für jede einzelne Quelle aus dem gesamten Zeitraum eine detaillierte Beschreibung (vgl. Abbildung 6).
Die Quellenbeschreibungen beinhalten in der Regel folgende Angaben: Titel, Quellentyp, Format, Umfang, ggfs. Widmung, Vorrede, Index, vollständiger Inhalt, RISM-Sigel, Angaben zur Sekundärliteratur sowie weiterführende Anmerkungen; bei Handschriften zusätzlich: Beschreibstoff, Einband, Fundort, Schreiber, Entstehung, Herkunft, Datierung; bei Drucken zusätzlich: Erscheinungsort und -jahr, verwendetes Exemplar; am Ende jeder Quellenbeschreibung: Herkunftsnachweise zu den aufgeführten Angaben.

Zu den musikalischen Funktionen der Software gehört außerdem die Unterstützung bei der Ermittlung quellenspezifischer Lesarten. Das Programm führt anhand der Gegenüberstellung einzelner Stimmen automatische Quellenvergleiche durch, wobei die miteinander zu konfrontierenden Quellen frei gewählt werden können. Um die verschiedenen Varianten einer Komposition zu erschließen, kann man aus den vorhandenen Quellen diejenigen in beliebiger Anordnung auswählen, die stimmenweise miteinander verglichen werden sollen. Die Stimmen der einzelnen Quellentranskriptionen werden dann in vertikaler Anordnung präsentiert, so dass Varianten deutlich erkennbar sind. Abbildung 7 zeigt – im Cantuspart – die Schlussabschnitte der Motette *Dies sanctificatus* aus den *Motecta festorum totius anni*, für die derzeit sieben transkribierte Quellen aus dem Zeitraum von 1564 bis 1622 in der Datenbank vorhanden sind. Die obere Notenzeile entstammt dem Druck von 1571, darunter befinden sich je eine handschriftliche Fassung aus Barcelona (E-Bbc Ms. 682) und aus Tarazona (E-TZ Ms. 4).

Was schließlich die Weitergabe der Daten – vorerst der reinen Textdaten – an die Nutzer betrifft, so befinden sich in der derzeitigen Programmversion die nach der Eingabe von Suchbegriffen recherchierten und über das Ausgabefenster angezeigten Daten permanent in der Zwischenablage und können von dort in jedes Programm, das utf8-codierte Textdaten einlesen kann, kopiert und weiterverarbeitet oder ausgedruckt werden. Dieses Verfahren der Datenweitergabe soll für die Server-Version durch eine herunterladbare XML-basierte Textdatei, vorzugsweise TEI, ergänzt werden. Eine derart erweiterte Textausgabe der werkbezogenen Daten soll nicht nur für eine nachhaltigere Datensicherung, sondern auch für deren Nutzungsmöglichkeiten in anderen digitalen Projekten sorgen.

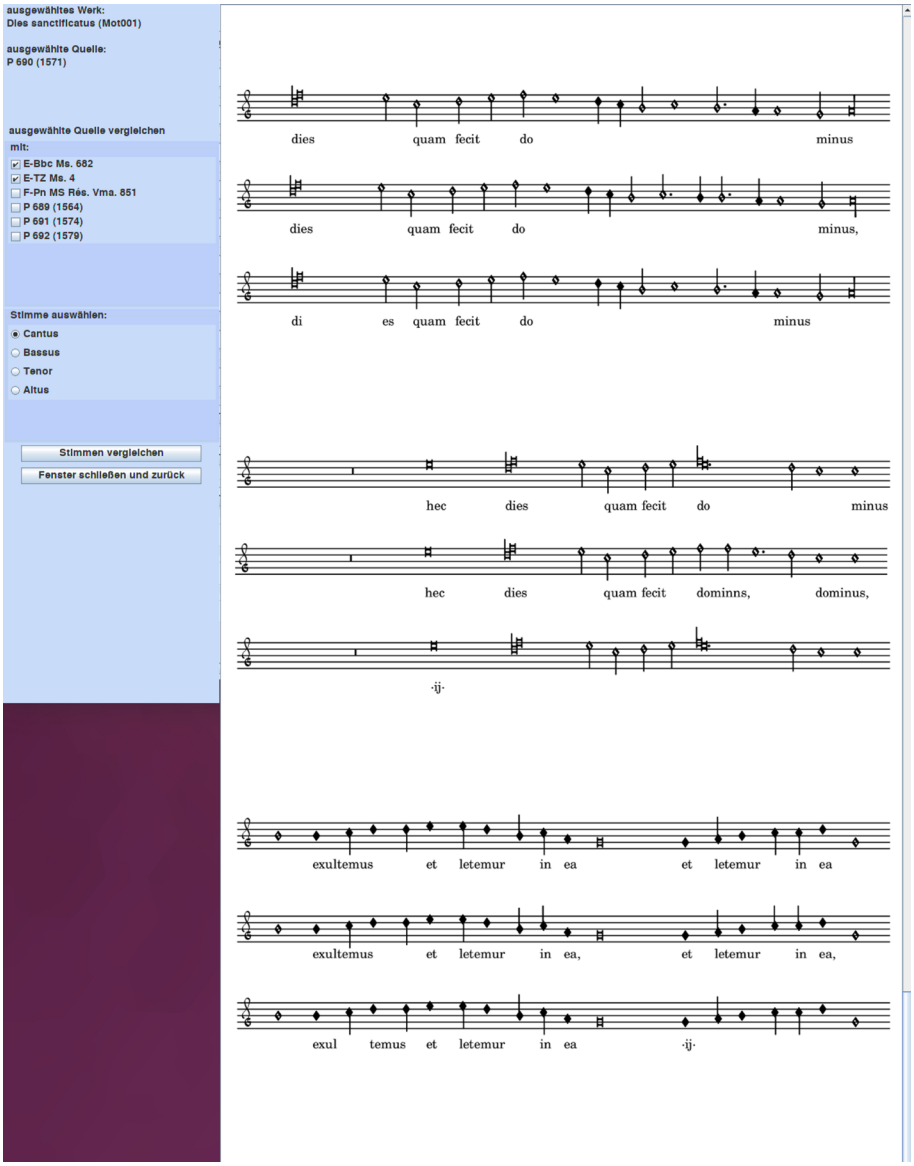


Abbildung 7. Quellenvergleich zur Cantus-firmus-Stimme der Motette *Dies sanctificatus*.

Hinsichtlich der Notentranskriptionen sind grundsätzlichere Überlegungen anzustellen. Hier muss zunächst der Blick nochmals auf LilyPond und einige essentielle Programm-Interna geworfen werden. Für die grafische Präsentation

der Partituren wird zwar vollständig auf LilyPond zurückgegriffen, die internen Volltext-Suchfunktionen in den Noten jedoch beruhen auf einer programmeigenen Codierung, die es ermöglicht, vor allem mit Hilfe der Java-Klassen ›Pattern‹ und ›Matcher‹ eigene Suchmethoden auf der Basis von regulären Ausdrücken zu entwickeln. Es handelt sich um einen 4-Zeichen-Code, der alle für die reine Notensuche – die prinzipiell oktavunabhängig, d. h. in allen Bereichen des Tonraums einer Komposition durchgeführt wird – relevanten Parameter beinhaltet: die ersten beiden Ziffern repräsentieren die Tonhöhe (01 bis 12 für die diatonische Skala und die alterierten Töne *fis*, *cis*, *gis*, *b*, *es*), Ziffer 3 ist ein Index für die Intervallrichtung, der Großbuchstabe an 4. Stelle steht für einen Tondauern- bzw. Pausenwert. Die Konvertierung der LilyPond-Dateien in den internen Code erfolgt über ein eigenes Programm-Modul (vgl. Abbildung 8).

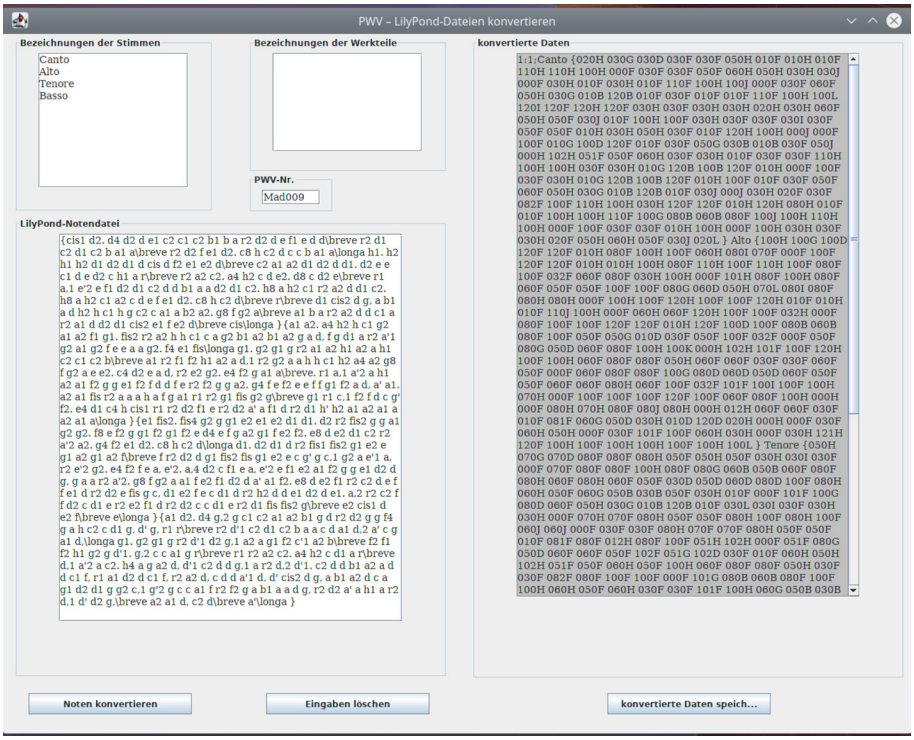


Abbildung 8. Programm-Modul für die Konvertierung der LilyPond-Dateien.

Ein Problem bietet allerdings die Akzidentienfrage. Das Grundprinzip der streng diplomatischen Transkription schließt jeden Eingriff in die Notationsweise der Quellen aus. Dieses Prinzip wird nicht nur bezüglich des Schriftbildes ohne Ein-

schränkung umgesetzt, sondern auch hinsichtlich der Codierung, selbst an Stellen, die aufgrund der theoretischen Schriften des 16. Jahrhunderts eine akzidentelle Veränderung des Tons ohne jeden Zweifel erfordern. Erscheint in der Quelle kein Akzidenz, darf dieses auch nicht – unter Ausschaltung der bloßen Sichtbarkeit in der grafischen Darstellung – zu einer Veränderung im internen Code führen, auch wenn dadurch Anwender-Suchvorgänge erschwert werden. Zwei Maßnahmen sollen jedoch die Nutzerfreundlichkeit in diesem problematischen Kontext erhöhen: Tritt ein Akzidenz auf, das mehreren Noten in seiner Umgebung zweifelsfrei zugeordnet werden kann, dann wird, bei unverändertem Schriftbild, die Codierung entsprechend angepasst. Dies findet man häufig im Falle von Tonrepetitionen bzw. erweiterten Tonrepetitionen, bei denen nicht vor jeder Note ein Akzidenz steht und das vorhandene eindeutig für alle repetierten Noten gilt (zumal Chromatik bei Palestrina generell auszuschließen ist). In Beispiel a der Abbildung 9 sind beide Noten als *fis* und in Beispiel b alle drei Noten als *cis* zu codieren. Eine erweiterte Tonrepetition zeigt Beispiel c, wo das Akzidenz vor der ersten Note selbstverständlich auch für die dritte Gültigkeit besitzt. Die zweite Maßnahme betrifft die in Beispiel d abgebildete, häufig auftretende Quarte *f–b* bzw. *b–es*, bei der vor der zweiten Note das *b* rotundum fehlt, da das Vermeiden des melodischen Tritonus eine Selbstverständlichkeit war. Wird vom Anwender in einem Melodie-Suchbegriff eine dieser beiden Tonfolgen oder beide verwendet bzw. in einem Intervall-Suchbegriff die reine Quarte aufwärts, so wird in einem Hinweis-Fenster die Möglichkeit angeboten, bei der Suche auch die in den Quellen als *f–h* oder *b–e* bzw. Tritonus aufwärts erscheinenden Notationsformen als Alternativen zu berücksichtigen und in die Trefferliste mit aufzunehmen.

Die Verwendung eines internen Codes, verbunden mit der Notwendigkeit, die LilyPond-Dateien zu konvertieren, hat zu der Überlegung geführt, durch entsprechende Konvertierungsprogramme auch anderen Dateiformaten, konkret: MusicXML und MEI, die Möglichkeit als Input-Alternativen zu eröffnen, woraus sich zugleich Optionen für den Export der codierten Stimmen ergeben.

Dies verweist schließlich auf die Problematik um die nachhaltige Nutzung der Daten, die innerhalb des Projektes zukünftig eine zentrale Rolle spielen wird. Da das diplomatisch transkribierte und codierte Stimmenmaterial in partiturmäßiger Anordnung in den kommenden Jahren auf ca. 4000 Einheiten anwachsen wird, haben Überlegungen zur Datennutzung über die Projektgrenzen hinaus hohe Priorität.[6] Schon jetzt wird deutlich, dass ein im Grunde traditionelles musik-

6 Generell zu aktuellen Fragen und Konzepten wissenstrukturierender Ontologien im Rahmen der digitalen Musikwissenschaft vgl.: Stefan Münnich, »Ontologien in der Praxis: Möglichkeiten und Herausforderungen für die Modellierung musikwissenschaftlicher / musikeditorischer Wissensstrukturen«, in: *Die Musikforschung* 71 (2018), S. 319–337.

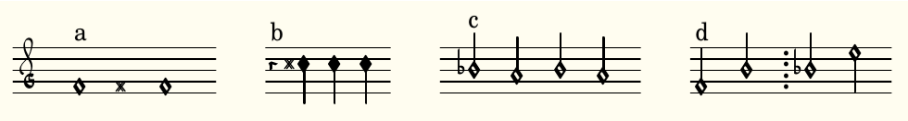


Abbildung 9. Codierung der Akzidentien.

wissenschaftliches Projekt – wie in diesem Fall die Erstellung eines Werkverzeichnisses – bei der Anwendung digitaler Methoden schnell über die ursprünglich intendierten Ziele hinausweist. In diesem Fall ist es einerseits die Schnittstelle zur Musiktheorie, die aus der Möglichkeit resultiert, mit Hilfe der implementierten polyphonen Volltextrecherche eine Materialbasis für Methoden digitaler Musikanalyse zu schaffen.[7] Andererseits ist die Schnittstelle zur digitalen Musikedition offenkundig – und damit zur Aufführungspraxis. In der traditionellen Palestrina-Editionspraxis dienten in der Regel die ältesten der überlieferten Einzeldrucke als Leitquellen der Edition. Wie in dem abschließenden Beispiel, dem Stemma der frühen Quellen zu Palestrinas *Motecta festorum totius anni* (Abbildung 10)[8] zu erkennen, weist dieser Motettenzyklus aus dem Jahr 1564 eine reichhaltige und verzweigte Folge von Nachdrucken (blauer Hintergrund) auf. In den Handschriften (roter Hintergrund), meist Chorbücher, die an verschiedene Stadien der Drucküberlieferung anknüpfen, spiegelt sich jedoch die konkrete, oft von lokalen Traditionen bestimmte Aufführungspraxis – etwa in Gestalt von Varianten innerhalb der Textunterlegung und Akzidentiensetzung – auf individuelle Weise wider. Was sich in der herkömmlichen buchgebundenen Editionsform nur aufwendig über den Lesartenapparat (der in den beiden älteren Palestrina-Gesamtausgaben nicht einmal vorhanden ist) erschließen lässt, ist mit Hilfe des Palestrina-Werkverzeichnisses für Wissenschaft wie Historische Interpretationspraxis auf einfachem Wege rekonstruierbar.

7 Hierzu jüngst: Robert Klugseder, »Neue Bruckner-Forschungsprojekte an der Österreichischen Akademie der Wissenschaften (ÖAW)«, in: *Mitteilungen des Anton Bruckner Instituts Linz* Nr. 19 (Juni 2017), S. 14–17 sowie Agnes Seipelt, Paul Gulewycz und Robert Klugseder, »Digitale Musikanalyse mit den Techniken der Music Encoding Initiative (MEI) am Beispiel von Kompositionsstudien Anton Bruckners«, in: *Die Musikforschung* 71 (2018), S. 366–378.

8 Das Stemma ist näher erläutert in: *Giovanni Pierluigi da Palestrina: Motecta festorum totius anni [...] quaternis vocibus [...] Liber Primus*, hrsg. von Peter Ackermann, Rom 2008 (Edizione nazionale delle opere di Giovanni Pierluigi da Palestrina III.1), S. XXI–XXIII.

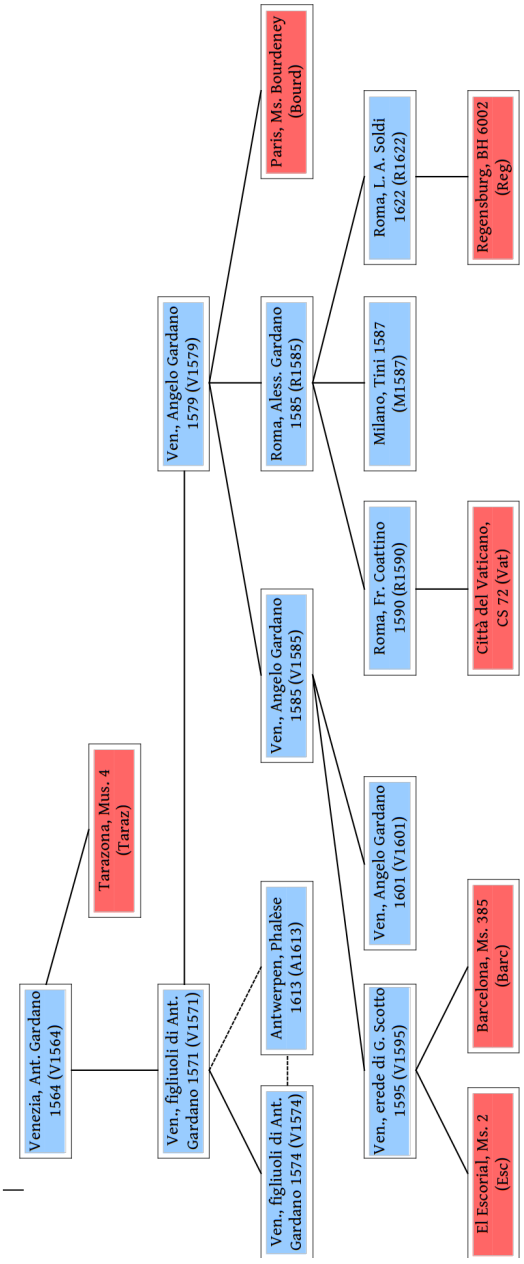


Abbildung 10. Stemma zu Palestrinas *Motecta festorum totius anni*.

Jaap van Benthem

Das zweite Gesicht einer Josquin zugeschriebenen Kontrafaktur*

Dank dem Fund des verloren geglaubten Tenor-Stimmbuches von Egenolffs *Cantiones vocum quatuor* von 1535/36 in der Schweizerischen Nationalbibliothek in Bern, überraschte mich David Fallows mit einem zusätzlichen *Critical Commentary* zu seinem Band mit vierstimmigen Chansons in der *New Josquin Edition* (NJE 28).[1] Unter mehreren uns bis jetzt unbekannten Zuschreibungen überliefert dieses neu aufgefundene Stimmbuch Josquins Autorschaft einer vierstimmigen Vertonung, *Au bois, au bois ma dame*. Bekannt war sie uns bisher nur mit einer Zuschreibung an Pierre Moulu.[2]

Au bois, au bois ma dame,
au joli bois m'en vois.

En celuy bois ma dame
sçaves vous qu'il y a?
Un nid, un nid ma dame,
un nid d'oyseau y a.

Au bois, au bois ma dame,
au joli bois m'en vois.

En celuy nid ma dame
sçaves vous qu'il y a?
Trois vifz, trois vifz ma dame,
trois vifz oyseaux y a.

Au bois, au bois ma dame,
au joli bois m'en vois.

* Für David Fallows, in Dankbarkeit für seine nie endende Inspiration und unsere langjährige Freundschaft auf unterschiedlichen, sich dann und wann auch ›kreuzenden‹ Pfaden.

1 David Fallows, »A new Josquin ascription. The four-voice *Au bois, au bois ma dame*, previously credited only to Moulu«, in: *Tijdschrift van de Koninklijke Vereniging voor Nederlandse Muziek geschiedenis* 67 (2017), S. 163–176.

2 Scotto 1535[8]; 1536, *Canzoni francese di messer Adriano & de Altri ... Libro primo*, Nr. 23, Anonymous; Egenolff [c. 1535][14a], *Cantiones vocum quatuor*, Nr. 6, Tenor: Josquin; Le Roy & Ballard 1556[1][5], 1559[8], 1569[13], Moullu; 1578[6], Anonymous.

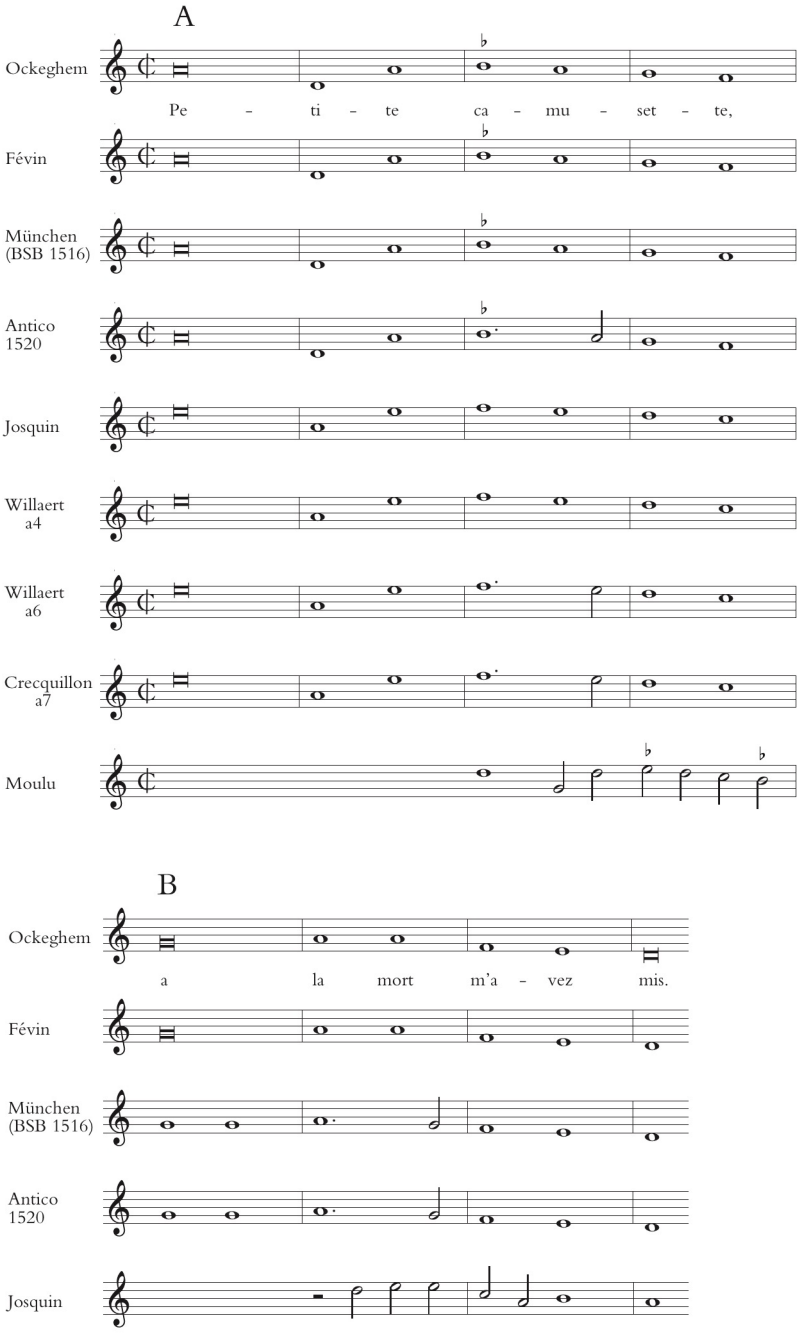
Der anscheinend harmlose Text, zwei Vierzeiler von einem zweizeiligen Kehrreim umklammert, lädt zu einem Spaziergang im Wald ein, um sich dort ein Nest mit drei jungen Vöglein anzuschauen. Man könnte sich also fragen, welcher der beiden Komponisten sich von diesem subtil angedeuteten Wunsch ein reichgesegnetes Familienleben zu gründen, musikalisch inspirieren ließ. Betrachten wir aber zuerst einige Aspekte ihrer Vertonung.

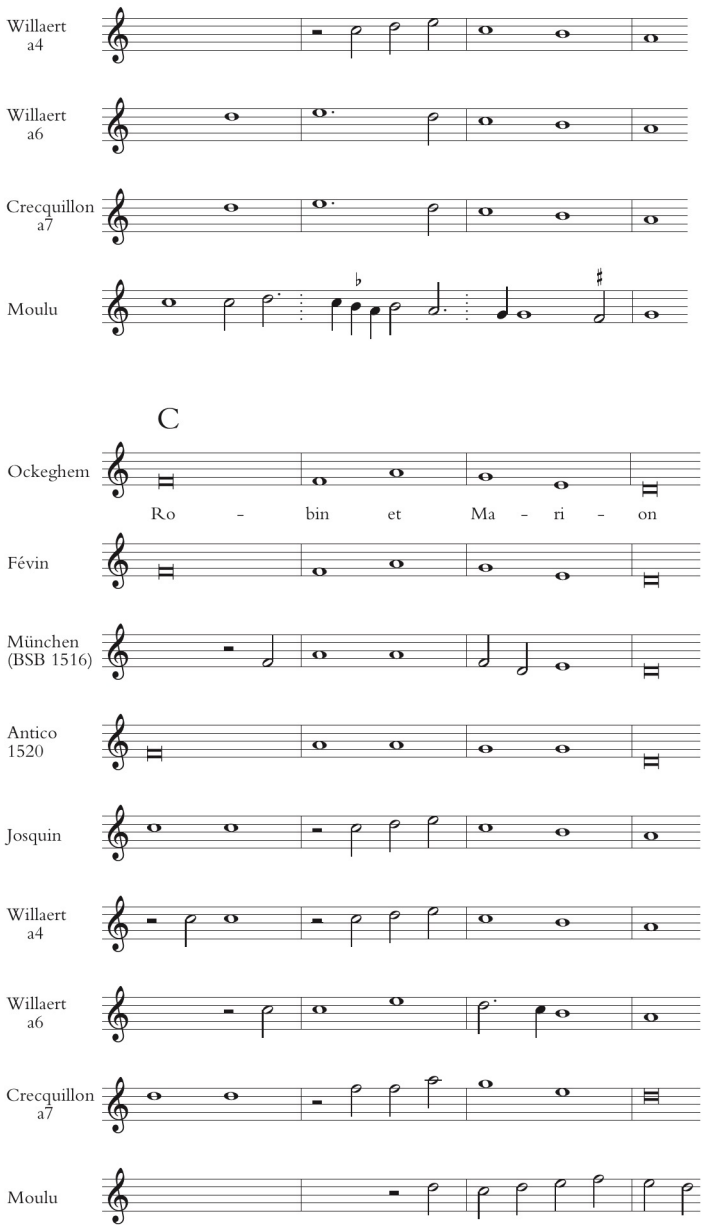
Schon ein erster Blick auf die Noten lässt vermuten, dass der Komponist sich von der Melodiestruktur des im 16. Jahrhundert wohlbekannten Liedes *Petite camusette* hat inspirieren lassen; eine Vermutung, die sich bei weiterem Vergleich leicht bestätigen lässt. Nur die melodischen Umrisse der dritten und vierten Zeile ihrer ersten und zweiten Vierzeiler sind in den Melodieabschnitten A bis F der überlieferten *Petite camusette*-Vertonungen nicht eindeutig nachweisbar.[3]

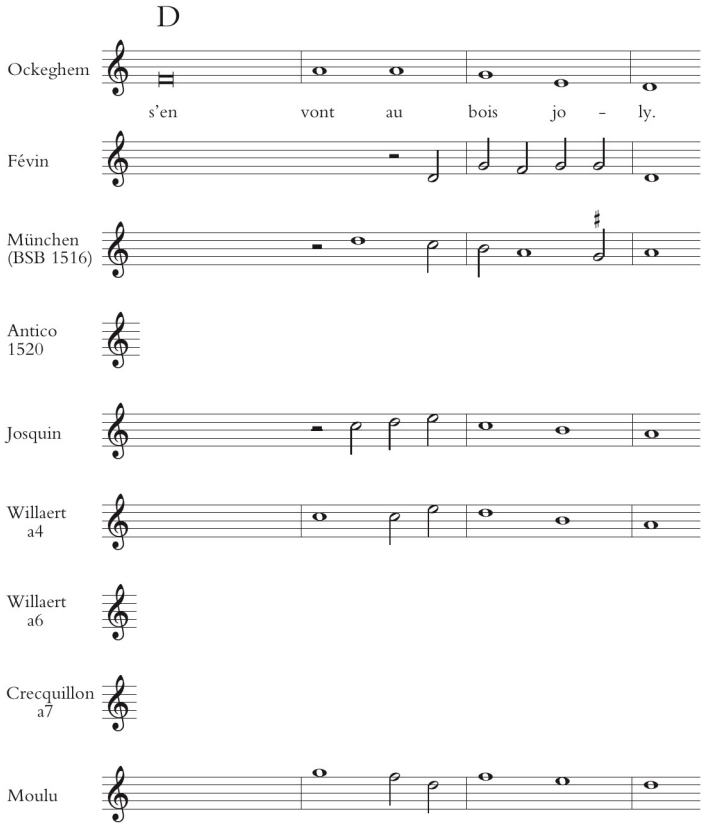
Beispiel 1: Unterschiedliche Lesarten der *Petite camusette*-Melodie in mehrstimmigen Kompositionen

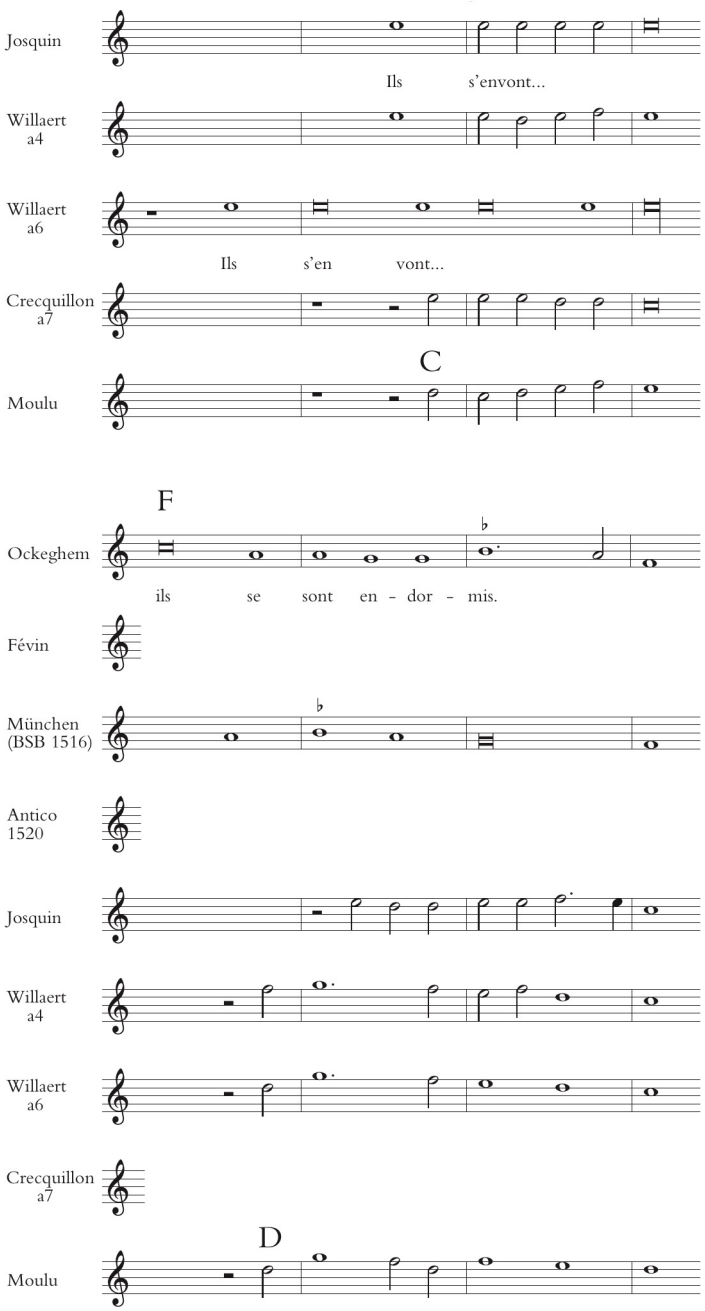
Takt 1–11:			
Au bois, au bois ma dame,	A	Petite camusette,	A
au joli bois m'en vois.	B	a la mort m'avez mis!	B
Takt 11–36:			
En celuy bois ma dame	C	Robin et Marion	C
sçaves vous qu'il y a?	D	s'en vont au bois joly.	D
Un nid, un nid ma dame,			
un nid d'oyseau y a.			
Takt 36–46:			
Au bois, au bois ma dame,	A	Petite camusette,	A
au joli bois m'en vois.	B	a la mort m'avez mis!	B
Takt 47–60:			
En celuy nid ma dame	C	Ils s'en vont bras a bras,	C
sçaves vous qu'il y a?	D	iIs se sont endormis.	D
Trois vifz, trois vifz ma dame,			
trois vifz oyseaux y a.			
Takt 60–74:			
Au bois, au bois ma dame	A	Petite camusette,	A
Au joli bois m'en vois.	B	a la mort m'avez mis!	B

3 Eine Quellenübersicht der unterschiedlichen Kompositionen in *New Josquin Edition*, Bd. 30: *Secular Works for Six Voices. Critical Commentary*, hrsg. von Patrick Macey, Utrecht 2015, S. 101–104.


A
Ockeghem
Pe - ti - te ca - mu - set - te,
Févin
München (BSB 1516)
Antico 1520
Josquin
Willaert a4
Willaert a6
Crecquillon a7
Moulu
B
Ockeghem
a la mort m'a - vez mis.
Févin
München (BSB 1516)
Antico 1520
Josquin


Willaert a4
Willaert a6
Crecquillon a7
Moulu
C
Ockeghem
Ro - bin et Ma - ri - on
Févin
München (BSB 1516)
Antico 1520
Josquin
Willaert a4
Willaert a6
Crecquillon a7
Moulu


D
Ockeghem
s'en vont au bois jo - ly.
Févin
München (BSB 1516)
Antico 1520
Josquin
Willaert a4
Willaert a6
Crecquillon a7
Moulu
E
Ockeghem
Ils s'en vont bras a bras,
Févin
München (BSB 1516)
Antico 1520
s'en vont au bois jou - er


Josquin
Ils s'envont...
Willaert a4
Willaert a6
Ils s'en vont...
Crecquillon a7
C
Moulu
F
Ockeghem
ils se sont en - dor - mis.
Févin
München (BSB 1516)
Antico 1520
Josquin
Willaert a4
Willaert a6
Crecquillon a7
D
Moulu

Eine Urfassung der *Petite camusette*-Melodie wird wohl nie zu finden sein, denn in jeder überlieferten mehrstimmigen Bearbeitung wurde nach dem Anfang mit den weithin bekannten sieben Noten der ersten Zeile (A) ihre Fortsetzung mit den fünf weiteren kurzen Melodie-Abschnitten (B–F) von jedem Komponisten nach persönlichem Geschmack und Möglichkeiten mehr oder weniger erkennbar manipuliert. Nur die Wiederholung der ersten sieben Noten blieb unverändert.

Vor allem demonstrieren die überlieferten mehrstimmigen *Petite camusette*-Bearbeitungen die Herausforderungen, die ihre melodischen Bausteine bergen und von denen sich jeder Komponist inspirieren ließ, seine kontrapunktischen Fähigkeiten zu präsentieren: in virtuoser Dreistimmigkeit, vernünftig konstruierten vierstimmigen Doppel-Canons, bis hin zur sechs- und siebenstimmigen Anlage. Dazu wurden bestimmte Zeilen der beiden Strophen von *Petite camusette* mehrmals miteinander verknüpft oder weggelassen. So sind uns nicht weniger als acht mehrstimmige Bearbeitungen von *Petite camusette* überliefert.

Wie aber passt der naiv-sentimentale Text *Au bois, au bois ma dame* in die Welt der kontrastreichen Vertonungen von *Petite camusette*? Zugegeben, der formale Aufbau und die Silbenstruktur von *Au bois, au bois ma dame* lassen sich auch in David Fallows' Edition überwiegend problemlos auf das entlehnte Liedmaterial übertragen; jedoch bleiben der doch ziemlich alberne Text und ihre Vertonung einander emotional wesentlich fremd:

Un nid, un nid ma dame,	Gnädigste, schauen Sie sich das mal an:
un nid d'oyseau y a.	ein Vogelnestchen!

Übermittelt uns *Au bois, au bois ma dame* mit dem nur in der Struktur verwandten Text vielleicht eine neunte *Petite camusette*-Komposition? Meines Erachtens enthüllt die Komposition erst bei dieser alternativen Textunterlegung ihre wahre Charakteristik und Qualität. Aber woher stammt dann das musikalische Material der Takte 23–36 und 53–60 für die dritte und vierte Zeile ihres ersten und zweiten Vierzeilers?

Zunächst könnte man sich fragen, ob unsere modernen Übersetzungen des Gedichtes, besonders der zweiten Zeile, » … a la mort m'avez mis«, wirklich mit der damaligen Empfindung ihrer wahren Aussage übereinstimmen:

»Little snub-nose, you have brought me to death's door.«[4]

4 Johannes Ockeghem, *Collected Works*, Bd. III: *Motets and Chansons*, hrsg. von Richard Wexler und Dragan Plamenac, Philadelphia 1992, S. xcvi.

entweder

» … you have driven me to the point of death.«[5]

oder

» … [You] have put me to death.«[6]

Eine inhaltlich korrekte Übersetzung wäre meines Erachtens folgende:

»Mopsnäschen,	»Little snub-nose,
Dir bin ich ganz verfallen.«	I'm totally yours.«

Nur so verstanden enthüllen auch die Verweise auf Robin und Marion im *Petite camusette*-Text ihre wahre Funktion als hoffnungsvolle Andeutungen. Aber wie hätte Robins direkte Umgebung dieses Geständnis aufgenommen? Hierzu bietet die Komposition eine klare Antwort: In der Melodik der Takte 22 bis 36 sowie in ihrer Imitationsstruktur hat der Komponist sich Josquins dreistimmigem Satz *La belle se siet au pied de la Tour* anscheinend bewusst angenähert.[7]

Beispiel 2: Josquin des Prez: La belle se siet, Takt 30–39

In Josquins Komposition befragt der Vater ziemlich bedrängend seine Tochter:

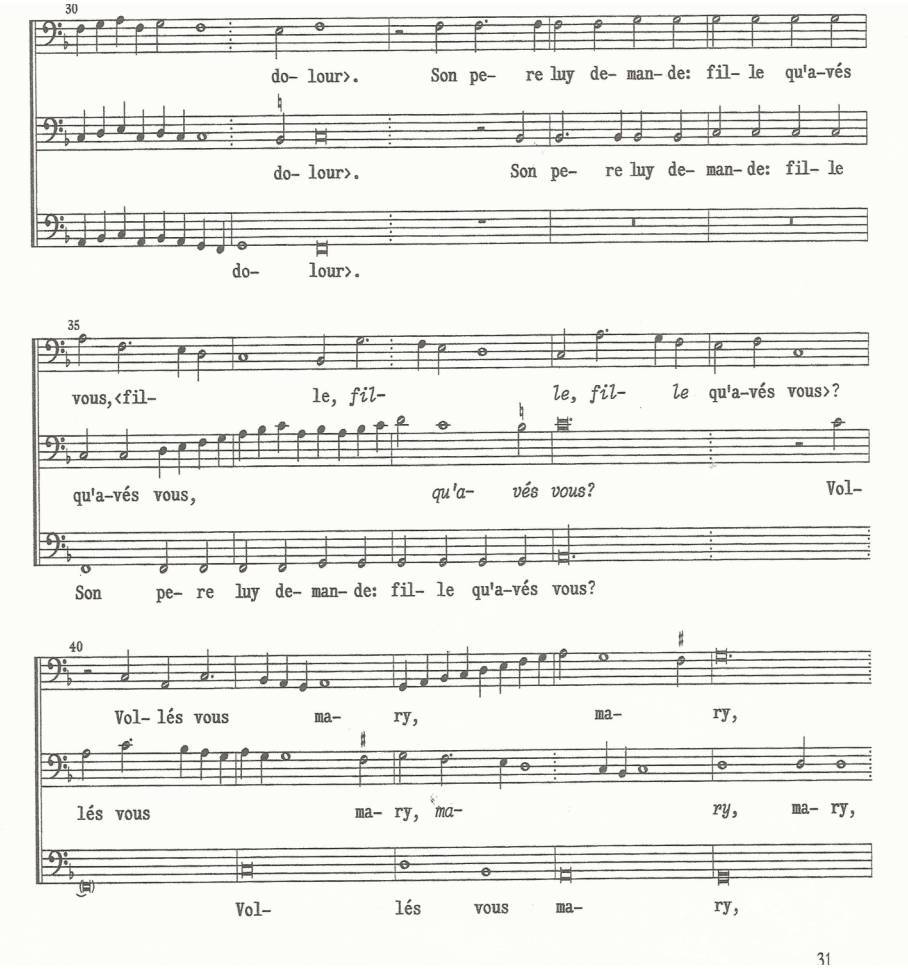
Son pere luy demande »file qu'avez vous?	»… nun, Töchterchen, was soll es sein:
Volez vous mari ou volez vous signour?«.	ein Mann oder das Kloster?«

Zu einer Auseinandersetzung zwischen Vater und Sohn konnte die erste Textzeile vom Komponisten leicht angepasst werden:

Sein Vater befragt ihn:
»Was ist los mit Dir?«
Worauf der Sohn antwortet:
»Ich bin dem Mopsnäschen ganz verfallen!«

Was wäre einer solchen Aussage noch zu erwidern!

5 NJE 30, Critical Commentary (wie Anm. 3), S. 97.
6 *LeRoy & Ballard's 1572 Mellange de Chansons*, hrsg. von Charles Jacobs, University Park und London 1982, S. 982.
7 NJE 27, Nr. 20.



Au bois, au bois ma dame,	A	Petite camusette,	A
au joli bois m'en vois.	B	a la mort m'avez mis!	B
En celuy bois ma dame	C	Robin et Marion	C
sçaves vous qu'il y a?	D	s'en vont au bois joly.	D
Un nid, un nid ma dame,		Son pere luy demande:	
un nid d'oyseau y a.		»qu'avez vous, qu'avez vous?«	
Au bois, au bois ma dame,	A	»Petite camusette	A
au joli bois m'en vois.	B	a la mort m'avez mis!«	B

En celuy nid ma dame	C	Ils s'en vont bras a bras,	C
sçaves vous qu'il y a?	D	iIs se sont endormis.	D
Trois vifz, trois vifz ma dame, trois vifz oyseaux y a.			
Au bois, au bois ma dame	A	Petite camusette,	A
Au joli bois m'en vois.	B	a la mort m'avez mis!	B

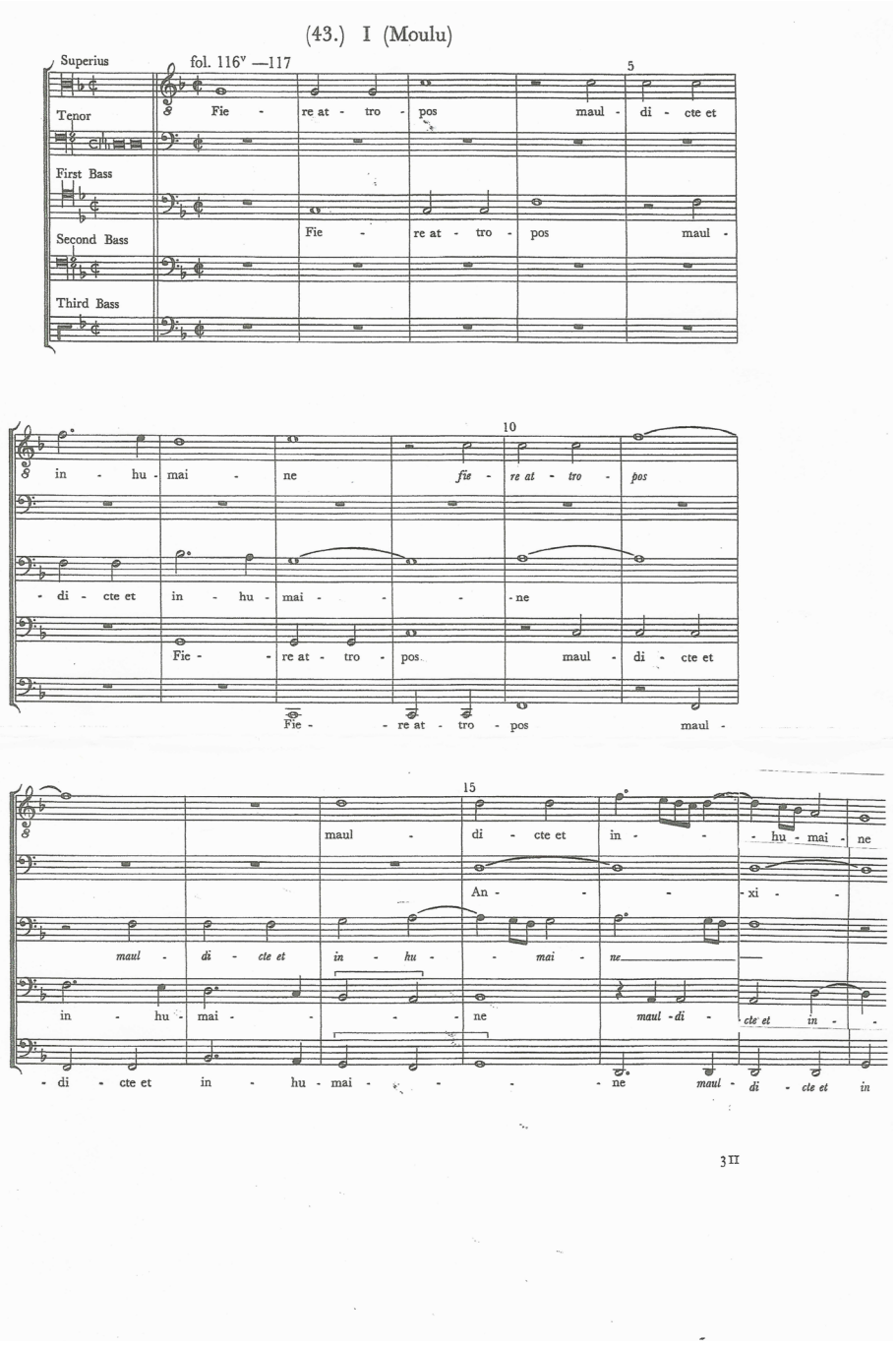
Bleibt jedoch noch eine Frage offen: Könnte auch die Musik der verbleibenden Takte 53–60 ebenso auf irgendeine Weise sinngemäß auf eine andere Komposition rekurrieren? Bei einer Aufnahme in die *New Josquin Edition* hätte der Editor *Au bois, au bois ma dame* sicherlich gleichwohl als ›fragwürdig‹ mit einem Sternchen versehen, denn schon im Vergleich beispielsweise mit Josquins drei- und vierstimmigen Vertonungen von *Entré je suis en grant pensée* (NJE 27, 8 und NJE 28, 14) entsprechen ihre geradlinig vorwärts strebende Kompositionsstruktur und der fast obsessive Imitationsstil nicht der frei-atmenden Entwicklung in Josquins verwandten vierstimmigen Liedvertonungen. Aber die Durchsicht mehrerer Kompositionen Moulus mit besonderem Augenmerk auf sein ausgeprägtes Imitations-Verfahren lieferte eine besondere Überraschung: Es handelt sich um die ersten Takte von Moulus Trauermotette *Fiere Atropos* anlässlich des Todes der Anne de Bretagne, der Gemahlin der französischen Könige Karls VIII. und anschließend Ludwigs XII. Anne de Bretagne starb Januar 1514.[8]

Beispiel 3: Pierre Moulu: *Fière Atropos*

Fière Atropos, mauldicte et inhumaine,	Grausamer Tod, verflucht und unmenschlich,
Grant ennemye de toute vie humaine.	Erbfeind der Menschlichen Existenz.

Der Anfang von Moulus Motette zeigt denselben imitatorischen Aufbau wie *Petite camusette*. Ab Takt 9 begleitet eine rhythmische Variante der Textwiederholung in der Oberstimme die Fortsetzung der formalen Imitationsstruktur in den beiden Unterstimmen, um sich dann ab Takt 14 mittels der nach d^2 transponierten Melodielinie der Oberstimme wiederum an den Anfang der Motette rhythmisch anzulehnen und, wie in *Petite camusette*, in verwandtem Stil auf *G* zu kadenzieren.

8 *The Medici Codex of 1518. A Choirbook of Motets Dedicated to Lorenzo de' Medici, Duke of Urbino*, hrsg. von Edward E. Lowinsky, Chicago und London 1968 (Monuments of Renaissance Music, III–V), Bd. IV, Nr. 43. Als inspirierendes Modell für diese Motette verweist Lowinsky auf einige melodische Übereinstimmungen mit Josquins *Déploration d'Ockeghem: ›Nymphes des boys‹*; siehe Bd. III, S. 201–202.


(43.) I (Moulu)
Superius
fol. 116v —117
Tenor
First Bass
Second Bass
Third Bass
Fie - re at - tro - pos maul - di - cte et
Fie - re at - tro - pos maul -
in - hu - mai - ne fie - re at - tro - pos
- di - cte et in - hu - mai - - - ne
Fie - - re at - tro - pos maul - di - cte et
Fie - - re at - tro - pos maul -
maul - di - cte et in - - - hu - mai - ne
An - - - xi - -
maul - di - cte et in - hu - - mai - ne
in - hu - mai - - - - ne maul - di - cte et in - -
- di - cte et in - hu - mai - - - - ne maul - di - cte et in
3 II

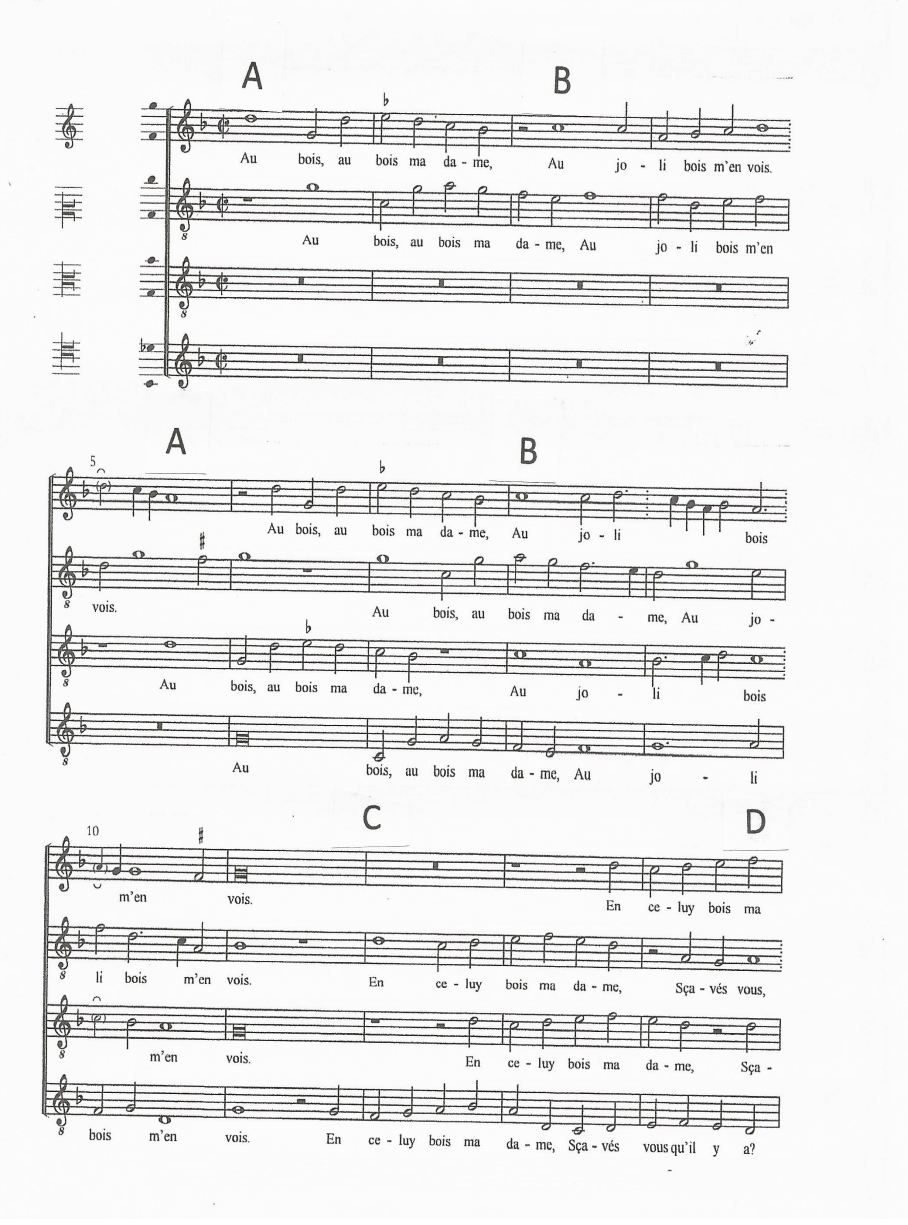
Könnte vielleicht durch diese satztechnische Annäherung an Moulus Trauermotette auch die doppeldeutige Anspielung »a la mort m'avez mis« musikalisch hervorgehoben sein? Umso verständlicher wird dann innerhalb der Struktur der Komposition in den Takten 53–57 auch die Funktion der kurzen rhythmischen Referenz an Josquins schon vorher genannte Komposition *La belle se siet*: als subtile Überwindung von Vorurteilen vermittelt sie uns jetzt ihre letzte Textzeile: »Ainsi diront les gens: voyci loyaulx amours.«

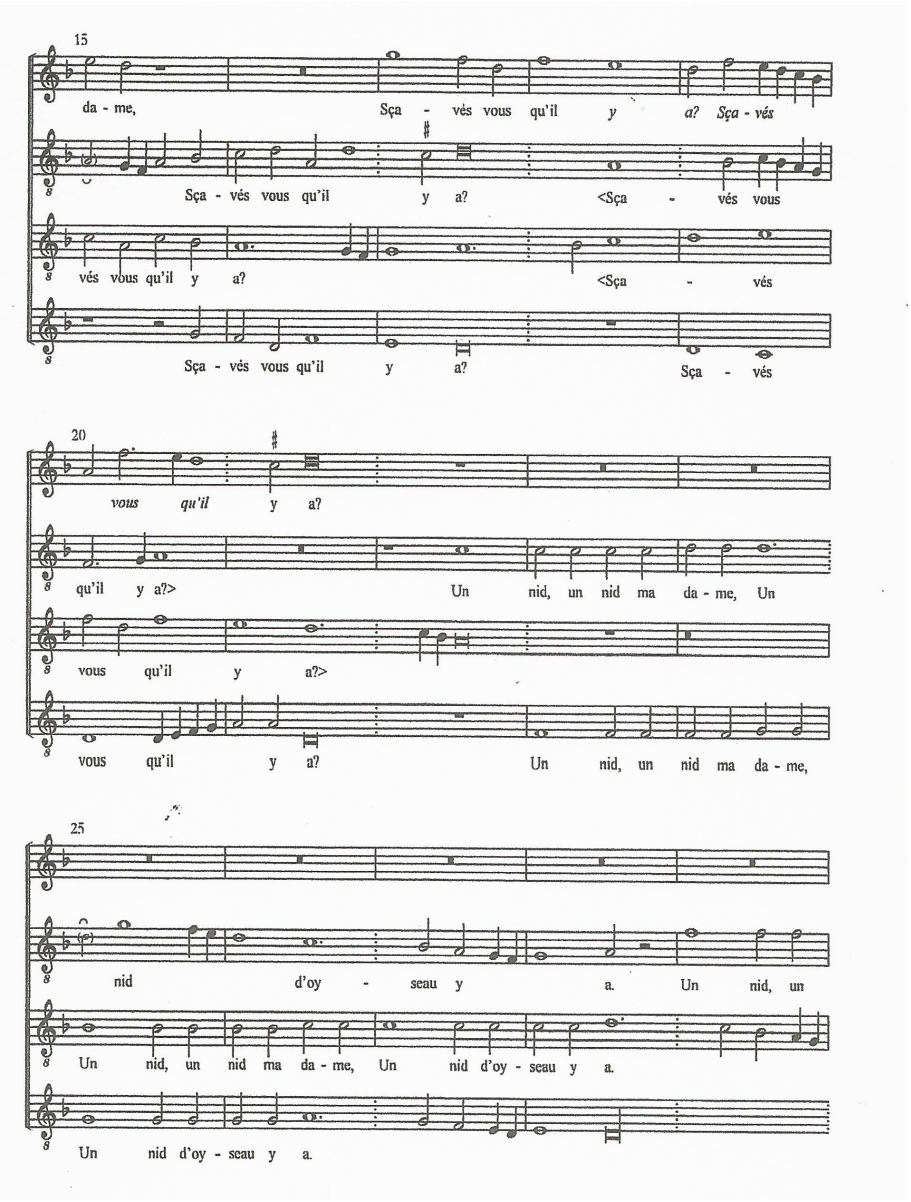
Somit enthüllt sich eine weitere und überraschend originelle Bearbeitung von wohlbekanntem Liedmaterial des 16. Jahrhunderts:

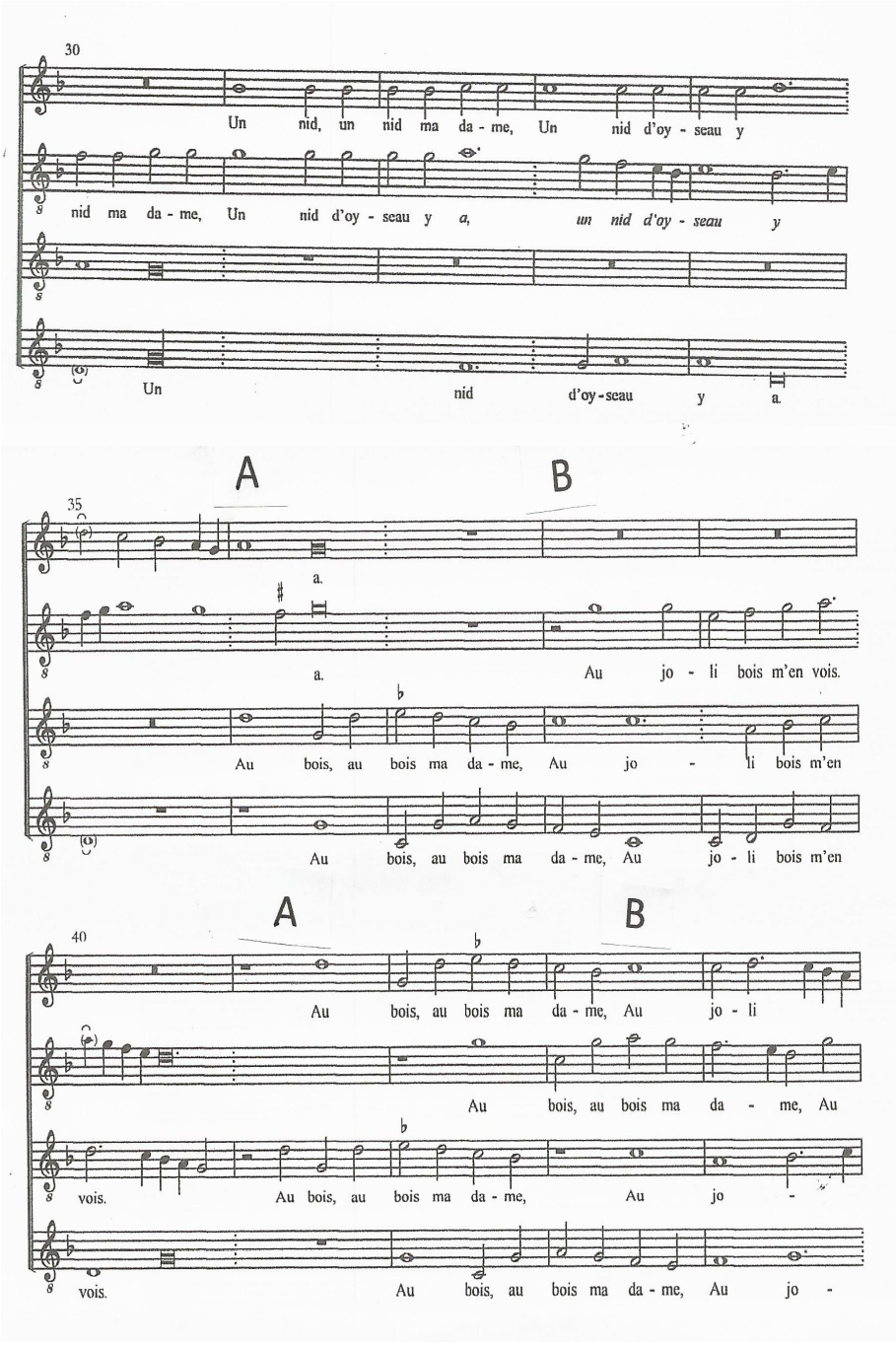
»Mopsnäschen,	A
Dir bin ich ganz *verfallen*«.	B
Robin und Marion	C
gehen in den vielversprechenden Wald.	D
Sein Vater befragt ihn:	
»Was ist los mit Dir?«	
»Ich bin dem Mopsnäschen ganz verfallen.«	A B
Nah an einander gehen sie ...	C
Jetzt schlummern sie …	D
Wie man so sagen wird:	
»Wahre Geliebte!«	
»Mopsnäschen,	A
Dir bin ich ganz verfallen«.	B

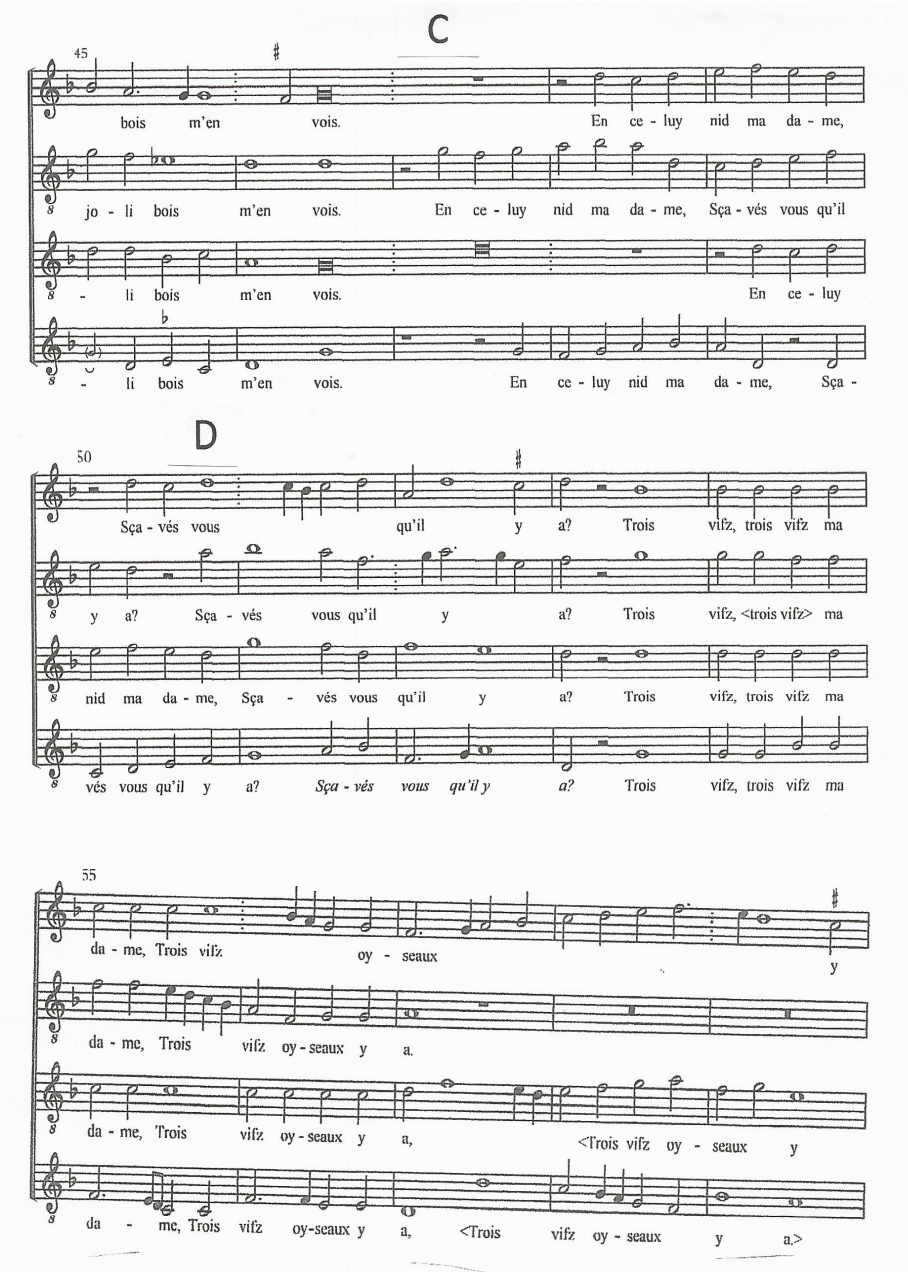
Appendix

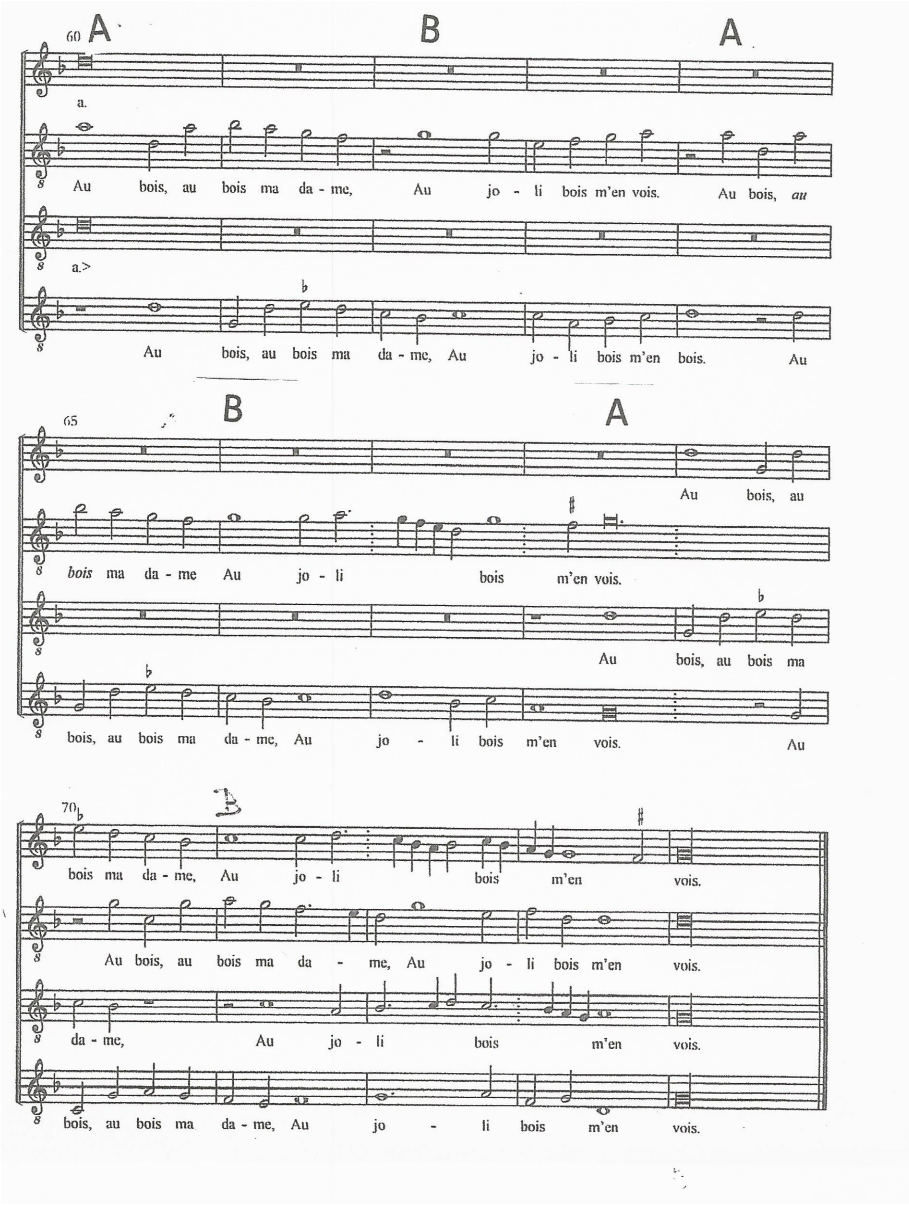
Au bois, au bois ma dame
(Cf. TVNM 2017, S. 163-176)



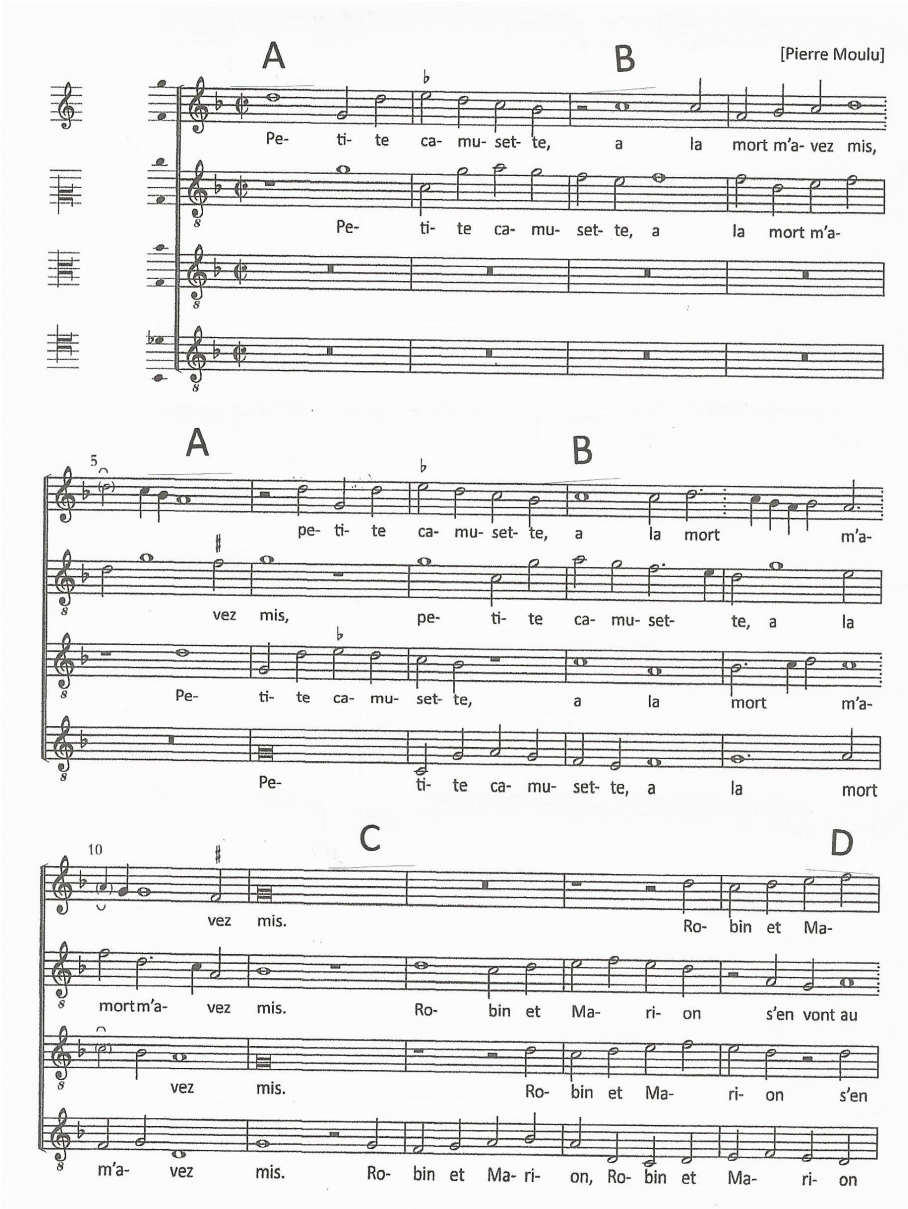

15
da - me, Sça - vés vous qu'il y a? Sça - vés
Sça - vés vous qu'il y a? <Sça - vés vous
vés vous qu'il y a? <Sça - vés
Sça - vés vous qu'il y a? Sça - vés
20
vous qu'il y a?
qu'il y a?> Un nid, un nid ma da - me, Un
vous qu'il y a?>
vous qu'il y a? Un nid, un nid ma da - me,
25
nid d'oy - seau y a. Un nid, un
Un nid, un nid ma da - me, Un nid d'oy - seau y a.
Un nid d'oy - seau y a.

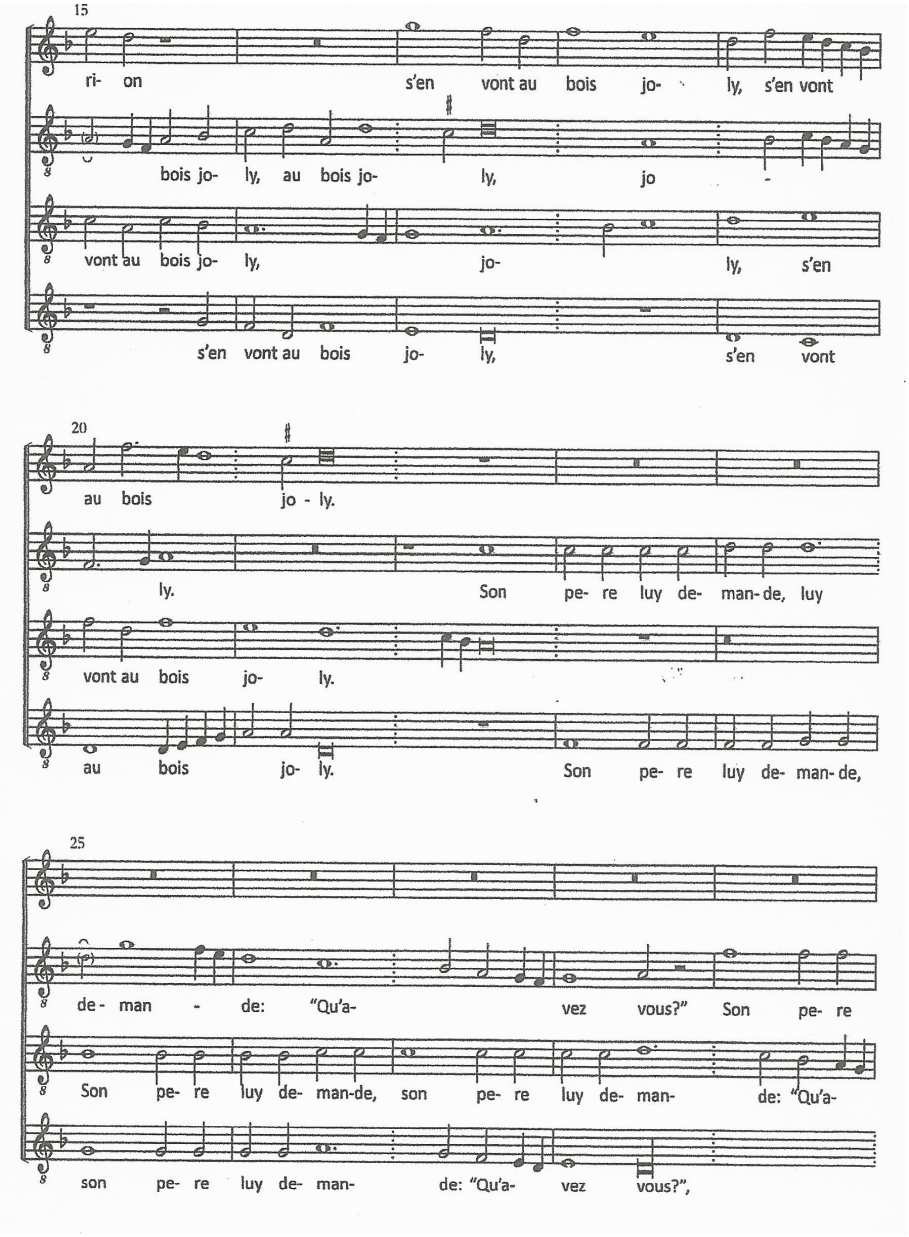

30
Un nid, un nid ma da - me, Un nid d'oy - seau y
nid ma da - me, Un nid d'oy - seau y a, un nid d'oy - seau y
Un nid d'oy - seau y a.
A
B
35
a.
a. Au jo - li bois m'en vois.
Au bois, au bois ma da - me, Au jo - li bois m'en
Au bois, au bois ma da - me, Au jo - li bois m'en
A
B
40
Au bois, au bois ma da - me, Au jo - li
Au bois, au bois ma da - me, Au
vois. Au bois, au bois ma da - me, Au jo -
vois. Au bois, au bois ma da - me, Au jo -

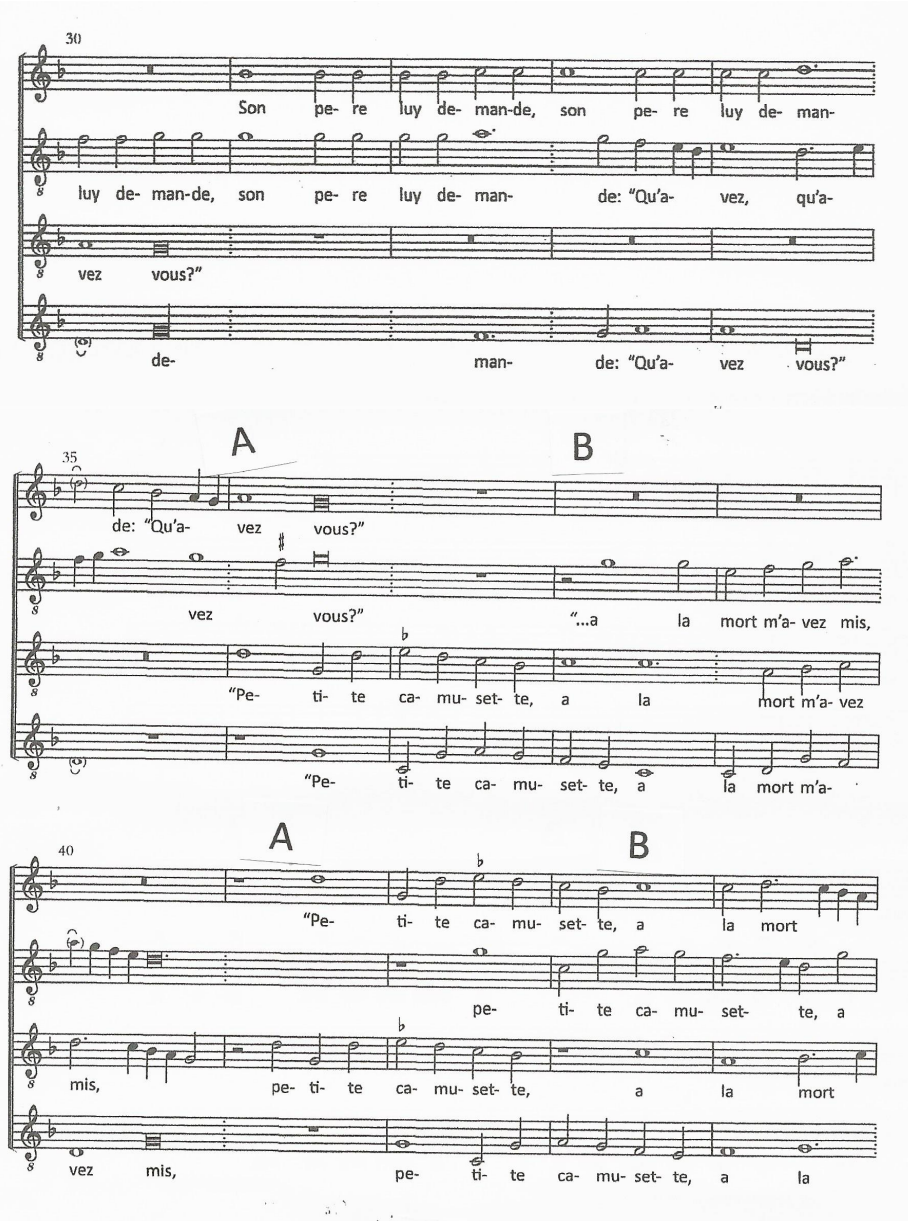

C
45
bois m'en vois. En ce - luy nid ma da - me,
jo - li bois m'en vois. En ce - luy nid ma da - me, Sça - vés vous qu'il
- li bois m'en vois. En ce - luy
- li bois m'en vois. En ce - luy nid ma da - me, Sça -
D
50
Sça - vés vous qu'il y a? Trois vifz, trois vifz ma
y a? Sça - vés vous qu'il y a? Trois vifz, <trois vifz> ma
nid ma da - me, Sça - vés vous qu'il y a? Trois vifz, trois vifz ma
vés vous qu'il y a? Sça - vés vous qu'il y a? Trois vifz, trois vifz ma
55
da - me, Trois vifz oy - seaux y
da - me, Trois vifz oy - seaux y a.
da - me, Trois vifz oy - seaux y a, <Trois vifz oy - seaux y
da - me, Trois vifz oy-seaux y a, <Trois vifz oy - seaux y a.>

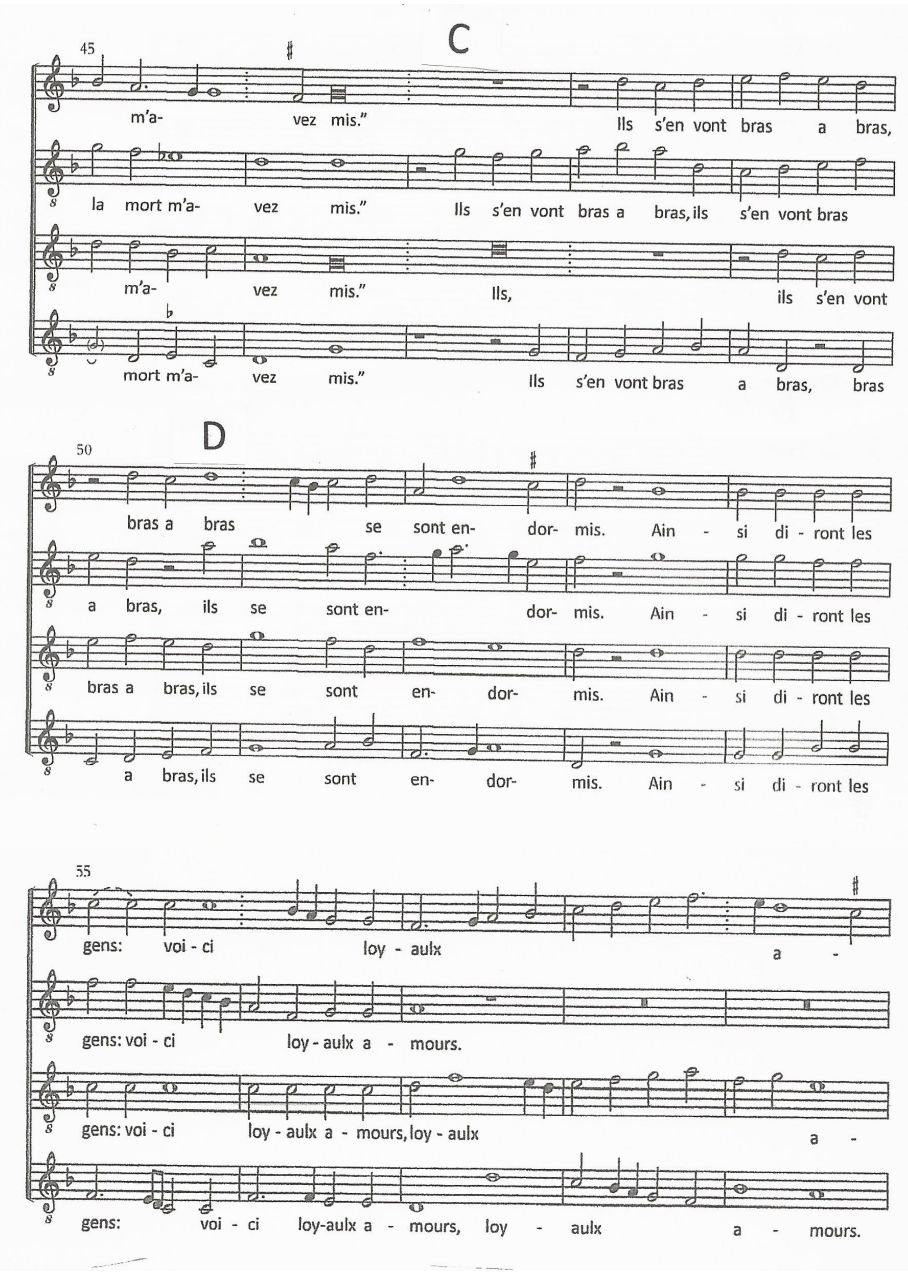

60
A
B
A
a.
Au bois, au bois ma da - me, Au jo - li bois m'en vois. Au bois, au
a.
Au bois, au bois ma da - me, Au jo - li bois m'en bois. Au
65
B
A
Au bois, au
bois ma da - me Au jo - li bois m'en vois.
Au bois, au bois ma
bois, au bois ma da - me, Au jo - li bois m'en vois. Au
70
bois ma da - me, Au jo - li bois m'en vois.
Au bois, au bois ma da - me, Au jo - li bois m'en vois.
da - me, Au jo - li bois m'en vois.
bois, au bois ma da - me, Au jo - li bois m'en vois.

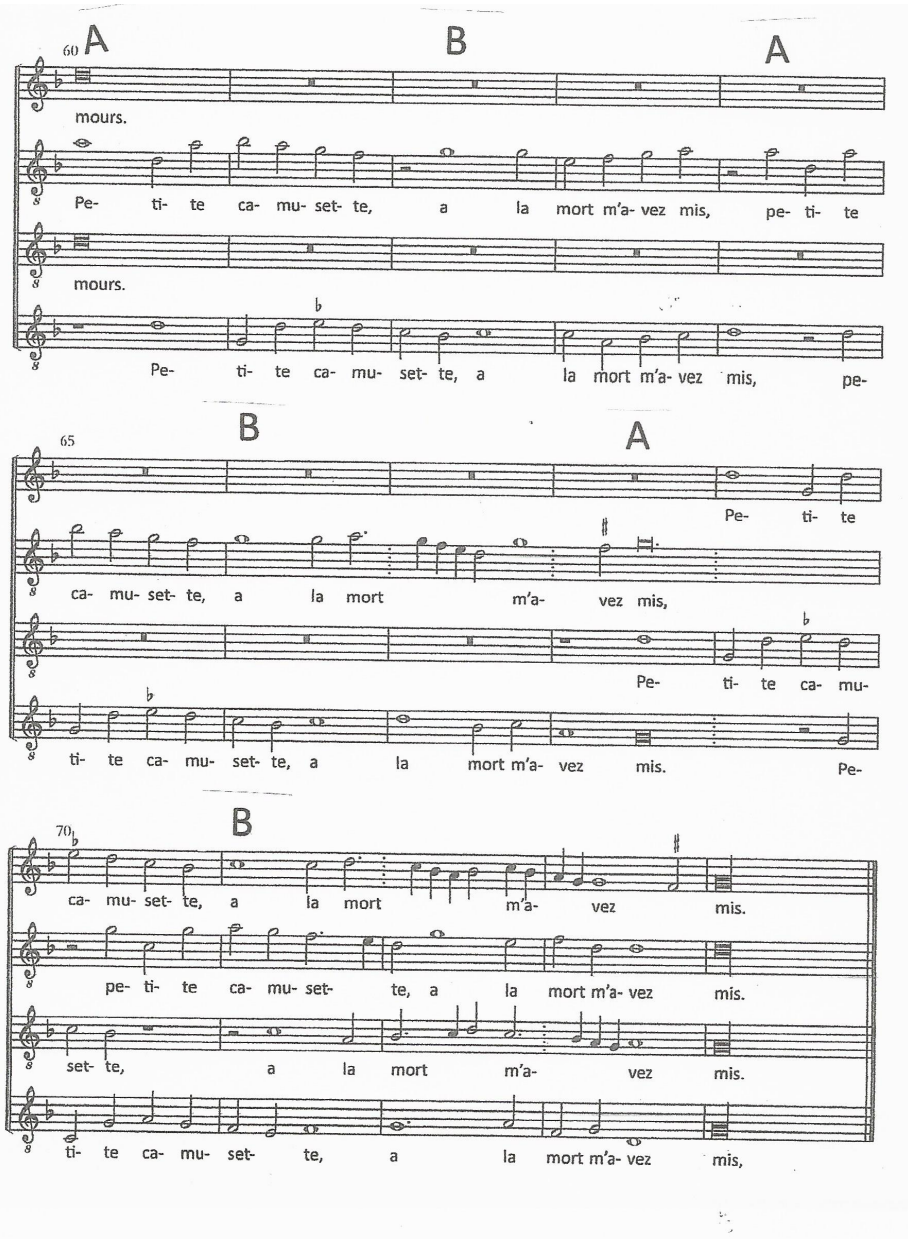
Pierre Moulu: Petite Camusette
Textunterlegung: Jaap van Benthem




15
ri- on s'en vont au bois jo- ly, s'en vont
bois jo- ly, au bois jo- ly, jo -
vont au bois jo- ly, jo- ly, s'en
s'en vont au bois jo- ly, s'en vont
20
au bois jo - ly.
ly. Son pe- re luy de- man- de, luy
vont au bois jo- ly.
au bois jo- ly. Son pe- re luy de- man- de,
25
de- man - de: "Qu'a- vez vous?" Son pe- re
Son pe- re luy de- man-de, son pe- re luy de- man- de: "Qu'a-
son pe- re luy de- man- de: "Qu'a- vez vous?",


30
Son pe- re luy de- man-de, son pe- re luy de- man-
luy de- man-de, son pe- re luy de- man- de: "Qu'a- vez, qu'a-
vez vous?"
de- man- de: "Qu'a- vez vous?"
A
B
35
de: "Qu'a- vez vous?"
vez vous?" "...a la mort m'a- vez mis,
"Pe- ti- te ca- mu- set- te, a la mort m'a- vez
"Pe- ti- te ca- mu- set- te, a la mort m'a-
A
B
40
"Pe- ti- te ca- mu- set- te, a la mort
pe- ti- te ca- mu- set- te, a
mis, pe- ti- te ca- mu- set- te, a la mort
vez mis, pe- ti- te ca- mu- set- te, a la


C
45
m'a- vez mis." Ils s'en vont bras a bras,
la mort m'a- vez mis." Ils s'en vont bras a bras, ils s'en vont bras
m'a- vez mis." Ils, ils s'en vont
mort m'a- vez mis." Ils s'en vont bras a bras, bras
D
50
bras a bras se sont en- dor- mis. Ain - si di - ront les
a bras, ils se sont en- dor- mis. Ain - si di - ront les
bras a bras, ils se sont en- dor- mis. Ain - si di - ront les
a bras, ils se sont en- dor- mis. Ain - si di - ront les
55
gens: voi - ci loy - aulx a -
gens: voi - ci loy - aulx a - mours.
gens: voi - ci loy - aulx a - mours, loy - aulx a -
gens: voi - ci loy-aulx a - mours, loy - aulx a - mours.


60
A
B
A
mours.
Pe- ti- te ca- mu- set- te, a la mort m'a- vez mis, pe- ti- te
mours.
Pe- ti- te ca- mu- set- te, a la mort m'a- vez mis, pe-
65
B
A
Pe- ti- te
ca- mu- set- te, a la mort m'a- vez mis,
Pe- ti- te ca- mu-
ti- te ca- mu- set- te, a la mort m'a- vez mis. Pe-
70
B
ca- mu- set- te, a la mort m'a- vez mis.
pe- ti- te ca- mu- set- te, a la mort m'a- vez mis.
set- te, a la mort m'a- vez mis.
ti- te ca- mu- set- te, a la mort m'a- vez mis,

Paul Kolb

Reconstructing (and) the Composer's Voice[1]

Florence, Biblioteca del conservatorio di musica, MS Basevi 2442 (hereafter Florence 2442), sometimes called the »Strozzi Chansonnier«, is an incomplete set of partbooks containing fifty-five French songs. Howard Mayer Brown, who wrote a series of articles on the manuscript, believed the partbooks to have been copied in Florence around 1527.[2] More recently, scholars including David Fallows, following Joshua Rifkin and others, have tended to assume that the date of copying is earlier, perhaps around 1510 to 1515, and that it was copied in France, or at least the scribe was French.[3] Many of the songs have concordances in Ottaviano Petrucci's *Canti* series or elsewhere, but the unica require reconstruction, thanks to the missing bassus partbook. The composers represented in the partbooks include Josquin des Prez, Ninot le Petit, Antoine Bruhier, Loyset Compere,

1 I would like to thank Wolfgang Fuhrmann, Klaus Pietschmann, and Immanuel Ott for generously inviting me to present at the workshop in Mainz; the vocal ensemble under the direction of Christian Rohrbach for performing my examples there; and especially the contributors to the reconstruction workshop in Salzburg, mentioned in full below, who have made this article possible.

2 Howard Mayer Brown, »Chansons for the Pleasure of a Florentine Patrician: Florence, Biblioteca del Conservatorio di Musica, MS Basevi 2442,« *Aspects of Medieval and Renaissance Music: A Birthday Offering to Gustave Reese*, ed. Jan LaRue (New York, 1966), pp. 56–66. See also id., »The Music of the Strozzi Chansonnier (Florence, Biblioteca del Conservatorio di Musica, MS Basevi 2442),« *Acta Musicologica* 40/2 (1968), pp. 115–129; and id., »Words and Music in Early 16th-Century Chansons: Text Underlay in Florence, Biblioteca del Conservatorio, Ms Basevi 2442,« *Formen und Probleme der Überlieferung mehrstimmiger Musik im Zeitalter Josquins Desprez*, ed. Ludwig Finscher (Munich, 1981), pp. 97–141.

3 See Joshua Rifkin's response to Brown at Brown, »Words and Music« (cf. fn. 2), p. 122. Rifkin's take was summarized in *Census-Catalogue of Manuscript Sources of Polyphonic Music 1400–1550, compiled by the University of Illinois Musicological Archives for Renaissance Manuscript Studies*. Renaissance Manuscript Studies 1 (Neuhausen/Stuttgart, 1979–88), vol. 1, p. 236. See also Lawrence F. Bernstein, »Notes on the Origin of the Parisian Chanson,« *The Journal of Musicology* 1 (1982), pp. 275–326, at 286–87 n. 28; Louise Litterick, »Out of the Shadows: The Double Canon *En l'ombre d'ung buissonnet*,« *Instruments, Ensembles, and Repertory, 1300–1600: Essays in Honour of Keith Polk*, ed. Timothy J. McGee and Stewart Carter (Turnhout, 2013), pp. 263–98, at 268–75; Richard Wexler, *Antoine Bruhier: Life and Works of a Renaissance Papal Composer* (Turnhout, 2014), pp. 49–68; David Fallows, »Gaspar and Japart: The Secular Works, with Particular Reference to Basevi 2442 and a Word about Fridolin Sicher,« and Carlo Bosi, »Caught in the Web of Texts: The Chanson Family *Bon vin / Bon temps* and the Disputed Identity of ›Gaspart‹,« both in *Gaspar van Weerbeke: New Perspectives on his Life and Music*, ed. Andrea Lindmayr-Brandl and Paul Kolb (Turnhout), pp. 243–54 and 255–80, respectively; and the introduction to Gaspar van Weerbeke, *Collected Works*, vol. 5: *Settings of liturgical texts, songs, and instrumental works*. Corpus Mensurabilis Musicae 106/V, ed. Paul Kolb and Agnese Pavanello in collaboration with Andrea Lindmayr-Brandl (American Institute of Musicology, forthcoming).

Antoine Brumel, and Pierre de la Rue.[4] There are also three compositions ascribed to »Gaspart.« The compositions are generally grouped by attribution, and the three »Gaspart« songs proceed one after the other as numbers 48 through 50.

»Gaspart« has most frequently been taken to mean Gaspar van Weerbeke, a Flemish composer active mostly in Milan and Rome from the 1470s to the 1510s.[5] Allan Atlas argued that »Gaspar« with a »j« or »g« at the beginning and an »e« or »t« at the end could not refer to the composer Jean Japart.[6] David Fallows, by contrast, suggested that a French scribe could have confused Gaspar with Japart, and the attribution could therefore refer to either figure.[7] Others have suggested that it might refer to other, minor musicians such as »Jaspar du Sanchoy,« a *petit vicaire* at Cambrai, »Jaspare,« *sangmeester* at Bergen-op-Zoom, and »Gasparo di Fiamengo,« a singer at the papal chapel.[8] As one of the editors of the Gaspar van Weerbeke edition, and specifically responsible for these songs, I argued that »potential confusion on the part of the scribe is no reason to disregard *prima facie* an attribution (such as ›Gaspart‹) which by all accounts appears to point to Weerbeke.«[9] Even so, Gaspar's other songs and instrumental works do not provide a clear compositional context in which to consider these pieces stylistically. Of the six such works with attributions to »Gaspar« or similar, three have conflicting attributions.[10] The three songs in Florence 2442 represent fully half of the composer's potential song output and are thus essential for understanding Gaspar's non-sacred compositional activity.

The first of these three songs, *Vray dieu quel paine m'esse*, is also transmitted in three Florentine chansonniers from the 1490s and in Petrucci's *Canti C* (Venice, 1503; RISM 1504[3]), among others. In addition to the »Gaspart« attribution in Florence 2442, it was attributed to Compere in *Canti C*.[11] As to which of these

4 For an index of compositions including a somewhat outdated list of concordances, see Brown, »Music of the Strozzi Chansonnier« (cf. fn. 2), pp. 124–26.

5 On Gaspar, see especially Gerhard Croll and Andrea Lindmayr-Brandl, »Weerbeke, Gaspar van,« *Grove Music Online* (last updated 2012), and the contributions to Gaspar van Weerbeke: New Perspectives, ed. Lindmayr-Brandl and Kolb (cf. fn. 3).

6 Jean Japart, *The Collected Works*. Masters and Monuments of the Renaissance 6, ed. Allan Atlas (New York, 2012), xxii–xxiii, xxxvi.

7 Fallows, »Gaspar and Japart« (cf. fn. 3). Carlo Bosi argues against this possibility; see »*Bon vin / Bon temps*« (cf. fn. 3).

8 Litterick, »Out of the Shadows« (cf. fn. 3), p. 273 n. 32, and Bosi, »*Bon vin / Bon temps*« (cf. fn. 3).

9 Introduction to Weerbeke, Collected Works, vol. 5 (cf. fn. 3). In the introduction I discussed further the various spellings of the song attributions, including »Gaspart.« See the notes to each individual piece for further comments on authorship.

10 The other three are *La Stangetta*, also attributed to Isaac and Obrecht; *O Venus bant*, also attributed to Josquin; and *Sans regretz*. See Weerbeke, Collected Works, vol. 5 (cf. fn. 3).

11 The third attribution, to »Matheus Pipalare« in the somewhat later CH-SGs, MS. 530, is generally dismissed as resulting from scribal confusion.

could be correct, Allan Atlas has favored Gaspar, but Fallows has recently suggested that both Gaspar and Compere are plausible.[12] Like Fallows I am unwilling to come down firmly on either side. To quote from my forthcoming edition: »[s]tylistically there is much to recommend Weerbeke's authorship […,] but there are no characteristics that unambiguously point to Weerbeke.«[13]

For the second and third of these songs, *Bon temps / Adieu mes amours* and *Que fait le cocu au bois*, no concordances survive. The question of authorship thus depends exclusively on how one interprets the »Gaspart« attribution and whether one considers that conclusion stylistically credible. Following his assumption of scribal confusion, Fallows tentatively suggested that these two compositions may have been composed by Japart.[14] But, assuming the attribution is not quite so ambiguous, I remain largely convinced that the composer was in fact Gaspar van Weerbeke. If these pieces date from around the end of the fifteenth century, one need not look for a later »Gaspar.«[15] As to the famous mention of a »dauphin« in *Bon temps*, Jeannette DiBernardo Jones has recently argued for other reasons that Gaspar spent some time in France in 1498 and 1499, and this could have provided a context for the composition of the song.[16]

Still, these two songs are difficult to judge stylistically, not least due to the missing bass part. Reconstruction of the bass at least allows them to be sung in a contrapuntally complete form. Yet in both songs there is no obvious »right answer« to reconstruction, and the potential solutions will inevitably owe a great deal to the specific contrapuntal/harmonic/melodic/textual insights of its author. Or, is it possible to get closer to the composer himself, to reconstruct a voice that is not just musically plausible, but that could have been composed by Gaspar?

**

As it survives in Florence 2442, *Bon temps* is a quodlibet, with the top two voices taking their text from the *Bon temps / Bon vin* family of texts.[17] The *Bon temps* melody is found in the altus alone. The superius also sounds like it could be quoting a different song melody, but if so it remains unknown. The tenor begins with the melody and text of the famous song, *Adieu mes amours*. After quoting the beginning of the text of several other songs, the voices come together to sing

12 Allan Atlas, *The Cappella Giulia Chansonnier (Rome, Biblioteca Apostolica Vaticana, C. G. XIII. 27)* (Brooklyn, 1975), pp. 196–97, and Fallows, »Gaspar and Japart« (cf. fn. 3).
13 Weerbeke, Collected Works, vol. 5 (cf. fn. 3), commentary to *Vray dieu*.
14 Fallows, »Gaspar and Japart« (cf. fn. 3).
15 As did Bosi in »*Bon vin / Bon temps*« (cf. fn. 3).
16 Jones, »Gaspar van Weerbeke and France: The Poetic Witness of Guillaume Crétin,« Gaspar van Weerbeke: New Perspectives, ed. Lindmayr-Brandl and Kolb (cf. fn. 3).
17 The texts and melodies associated with them are described in Bosi, »*Bon vin / Bon temps*« (cf. fn. 3).

related bits of text for »le dauffin«, all ending with: »Sonnez, chantez soir et matin, sonnez la bien venue de monsigneur le dauffin.«[18]

For a workshop in Salzburg in the summer of 2017, eight participants, myself included, submitted solutions for both songs in advance.[19] The final versions to be published in the Gaspar edition will draw on insights from all of the submitted solutions.[20] One of the most creative, interesting, and effective reconstructions was that of *Bon temps* by Jaap van Benthem (see Example 1). Van Benthem approached his reconstruction as a composer and scholar particularly attuned to the ways of fifteenth- and sixteenth-century composition. Seeing a quodlibet, he treated it as a composer around 1500 might have done: integrate song incipits into a text, and compose a compelling line of counterpoint. The new text for his bass reconstruction is comprised of incipits from various Josquin songs. It does not quote the melodies of these songs, but that is not a problem: most of the song texts in the original three voices are not given with their original melody.[21]

My own approach to this same piece was less creative and more focused on specific contrapuntal possibilities. Seeing a handful of related, composite texts in the other voices, I selected phrases from them to create a composite text for the bass. (Almost all of the other reconstructions came up with similar textual solutions.) Musically, I was not concerned to create something interesting, but rather to come up with something that fits into Gaspar's sound world. Having spent years working specifically on Gaspar's music, this is something I am uniquely qualified to judge. Still, my insights into Gaspar's style are colored by my own musical skills and obsessions, which probably skew towards counterpoint.[22]

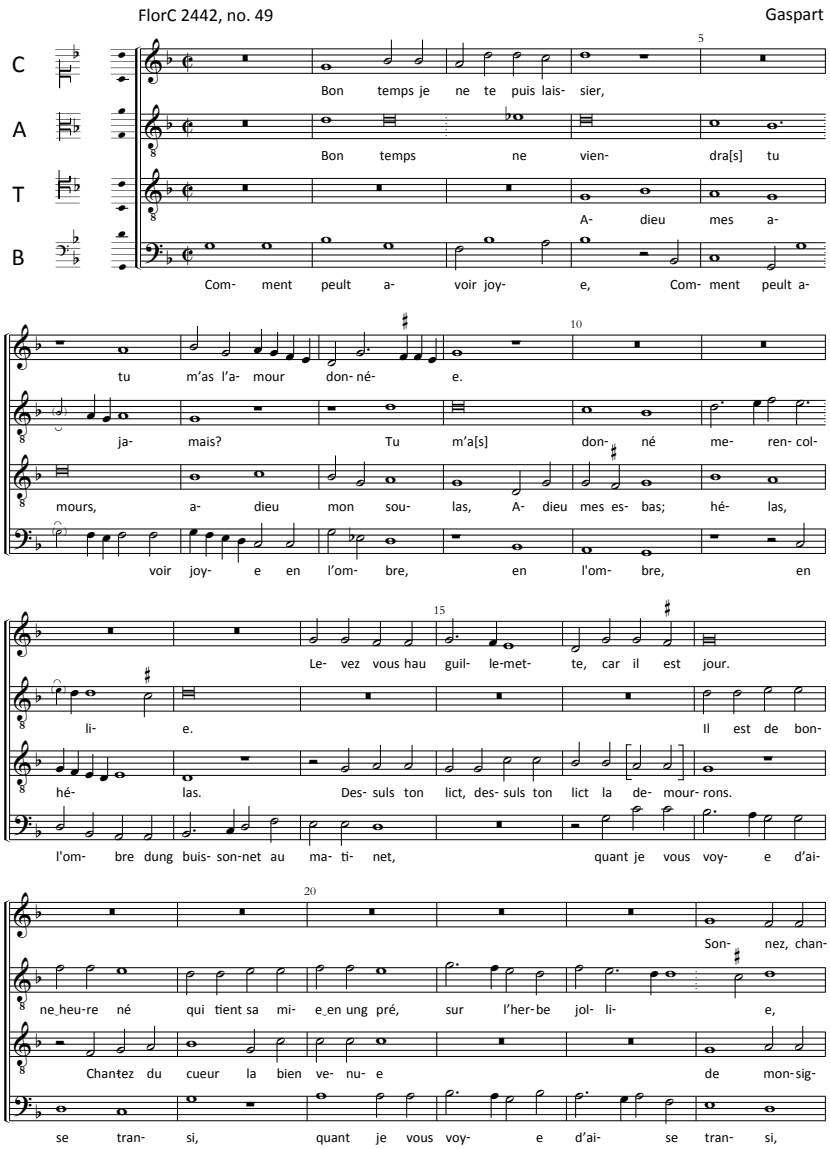
18 See Brown, »Chansons for the Pleasure of a Florentine Patrician« (cf. fn. 2), pp. 64–65, esp. n. 23.

19 This was on the final day of the conference »Gaspar van Weerbeke: Works and Contexts,« convened by Andrea Lindmayr-Brandl, Agnese Pavanello, and myself, and hosted by the Department of Musicology and Dance Studies at the University of Salzburg, June 29 to July 1, 2017. The eight participants who submitted solutions were Martin Eybl, Richard Freedman, Matthew Hall, Oliver Korte, Jaap van Benthem, Philip Weller, Magnus Williamson, and myself; other conference participants gave valuable insights during the workshop. I thank them all for their contributions, and in particular Eybl, Korte, Van Benthem, Weller, and Williamson for allowing me to discuss their solutions here. Length prevents me from discussing the particular insights of each solution in greater detail, but some of them may later be published online on the websites of the Gaspar Project and Corpus Mensurabilis Musicae (http://www.gaspar-van-weerbeke.sbg.ac.at/ and http://www.corpusmusicae.com/cmm/cmm_cc106.htm).

20 See Weerbeke, Collected Works, vol. 5 (cf. fn. 3). In this article, »my solution« refers to that which I composed for the Salzburg workshop, not that which I have since then put together for the edition.

21 As an alternative, Carlo Bosi (»*Bon vin / Bon temps*« [cf. fn. 3]) has suggested that the text of a different Josquin song, *Faulte d'argent*, might fit more appropriately in this textual context. But the melody of that song also does not fit obviously into the bass here.

22 To review Gaspar's compositional style, the first four volumes of his complete works have been published; see Gaspar van Weerbeke, *Collected Works*. Corpus Mensurabilis Musicae 106,



Example 1. Beginning of *Bon temps*, reconstructed by Jaap van Benthem.

ed. Gerhard Croll, Eric F. Fiedler, Andrea Lindmayr-Brandl, Agnese Pavanello, and Paul Kolb (American Institute of Musicology, 1998–present). The fifth and final volume, cited above and containing the works in question, is forthcoming.

The musicological discipline has often been preoccupied with the authorship of pieces, and in many cases (as with the two songs under discussion here) a definitive answer may never be forthcoming. But the reconstruction enterprise has only rarely and generally superficially considered how one might or should take authorship into consideration when putting together performable versions of compositions that survive incomplete. In the handful of articles on the reconstruction process, internal compositional characteristics are invariably the primary concern.[23] Analysis of a specific composer's style in order to inform the reconstruction tends to focus on considerations of voice range.[24]

Unlike much of the repertoire previously submitted to the reconstructive process, our two songs have a seemingly endless amount of potential solutions. All eight submitted versions were substantially different; indeed, it was often more surprising when two versions had the same or a similar solution to a specific passage. To put this another way, there were few sections or phrases where the internal clues gave a more or less definitive answer. To reconstruct these examples in particular, then, one has to weigh competing priorities, from internal musical considerations – counterpoint, voice leading, texture, text, and text underlay – to external musical considerations, in particular a specific composer's musical style.

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23 In Irving Godt, »The Restoration of Josquin's *Ave mundi spes Maria*, and Some Observations on Restoration,« *Tijdschrift van de Vereniging voor Nederlandse Muziekgeschiedenis* 26/2 (1976), pp. 53–83, the discussion of whether the composition fits Josquin's style follows the completion of the »restoration« (p. 71). Likewise in Julie Cumming, »Composing Imitative Counterpoint Around a Cantus Firmus: Two Motets by Heinrich Isaac,« *Journal of Musicology* 28 (2011), pp. 231–88, reconstructions based mainly on internal compositional characteristics are then used as the basis for discussion of Isaac's compositional style. *The Lost Voices Project*, directed by Richard Freedman and Philippe Vendrix (http://digitalduchemin.org/), produced numerous reconstructions of mid-sixteenth-century French songs. Alongside this, it published an extensive thesaurus of contrapuntal devices to help define the musical style of the repertory, but this is not composer-specific.

24 David Burn proposed a seven-step reconstruction process in »Reconstructing Senfl's Fragmentary Motets,« *Senfl-Studien* 2, ed. Stefan Gasch and Sonja Tröster (Tutzing, 2013), pp. 525–55. His fifth step involves comparing the (by now mostly complete) reconstruction with similar pieces by the same composer (pp. 546–47). Oliver Korte starts with a more extensive overview of a Brumel's voice ranges to determine that of the missing voice, but thoughts on the composer's style are largely left to the end; see »Reconstructing Antoine Brumel: How to Bring the Chanson ›Dieu te gart, bergere‹ Back to Life,« *Journal of the Alamire Foundation* 8/1 (2016), pp. 165–79. Exceptionally, Theodor Dumitrescu, in »Reconstructing and Repositioning Regis's *Ave Maria … virgo serena*,« *Early Music* 37 (2009), pp. 73–88, makes reconstruction decisions with frequent reference to what he considers characteristic of Regis's style.

Four examples from these two songs, as reconstructed in multiple ways, will serve to demonstrate some of these competing priorities. The examples were chosen because the solutions are interesting, and while some reconstructions were arguably better than others, there is rarely a solution which is obviously the best.

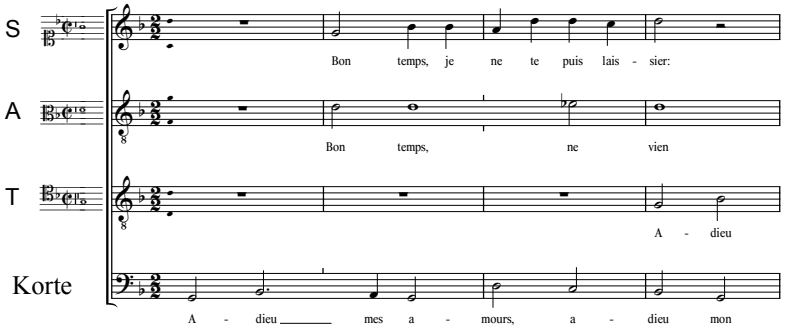
The first example is at the first four measures of *Bon temps*, which present an unusual contrapuntal challenge. The bass has to enter alone in the first measure, and thereafter provides accompaniment to the cadence in the superius and altus, which has a notated *e*-flat. (See the solutions alongside each other in Example 2.) Van Benthem's characteristically elegant solution has the bass in parallel tenths with the superius. The counterpoint works nicely, and the musical line is perfectly formed (see above in Example 1). Oliver Korte has parallel tenths with the altus, which is also elegant. It incorporates offset parallel octaves with the superius, but, as he says, these sort of parallels are not found infrequently. He also incorporated the melody of *Adieu mes amours* in the opening (Example 2a). Philip Weller had a similar solution to Korte, with a similar citation of *Adieu mes amours*, but he avoids the somewhat anomalous parallels by approaching the c from the b-flat below (Example 2b). This clever solution is unfortunately well out of the bounds of Gaspar's usual bass range.[25]

My own, rather unsatisfactory solution embraced an accented diminished fifth between tenor and bass in the second half of the third measure (Example 2c). On the other hand, I avoided the accented sixth with a *b*-flat in the bass at the downbeat of the second measure. I prioritized having a *g* in the bass here, as strong octaves at the openings of pieces are generally characteristic of Gaspar. Accented sixths which do not resolve in stepwise motion to the octave are correspondingly rare. There was nevertheless a way around the preceding accented diminished fifth, and this can be found in Magnus Williamson's reconstruction (Example 2d). But in Martin Eybl's elegant solution, this problem is circumvented entirely with rests (Example 2e).

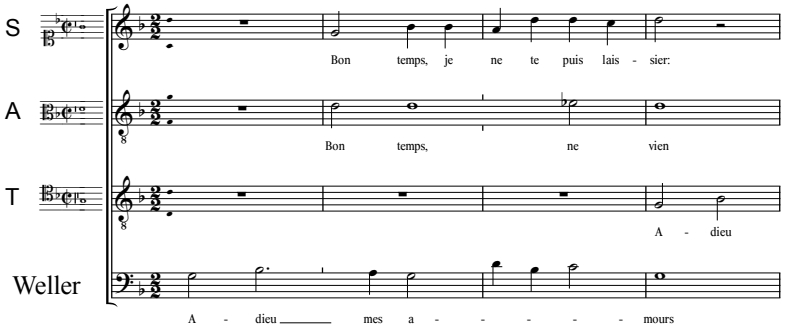
In the middle of the song (measures 11–26), one has to decide where to place the musical phrases in the bass (see Example 3). It is only contrapuntally necessary at measure 13 (probably), at measure 20 (due to the fourth), and at measures 21 to 22. The three solutions presented here are totally different, although none of the solutions are particularly satisfactory at measure 20. Van Benthem has the bass enter at the end of measure 11, easily covering the contrapuntal gap at measure 13 (see above in Example 1). His bass voice remains largely out-of-sync with the phrases in the other voices, thus overlapping at their cadences. His final phrase enters at measure 20, immediately providing contrapuntal support for the

25 This was pointed out by Korte at the workshop in Salzburg, who instead now recommends a solution an octave lower.

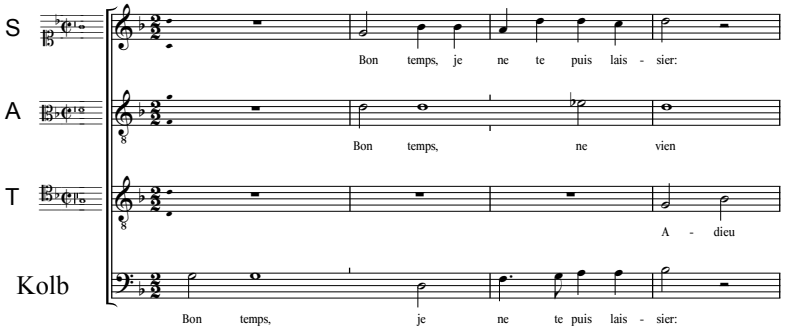
a)


S
A
T
Korte
Bon temps, je ne te puis lais - sier:
Bon temps, ne vien
A - dieu
A - dieu mes a - mours, a - dieu mon

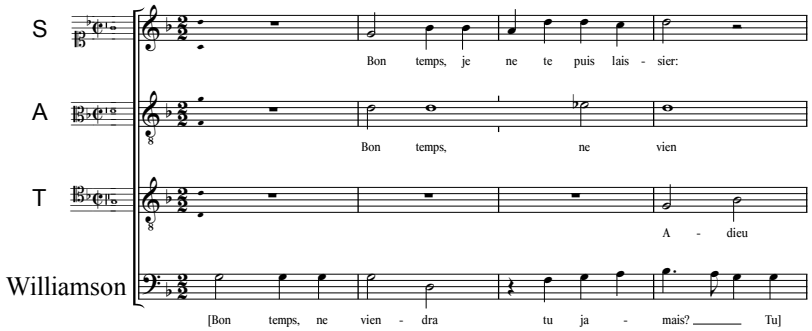
b)


S
A
T
Weller
Bon temps, je ne te puis lais - sier:
Bon temps, ne vien
A - dieu
A - dieu mes a - - - - - mours

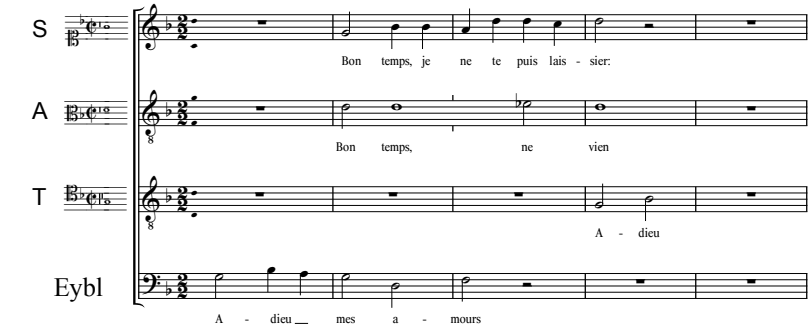
c)


S
A
T
Kolb
Bon temps, je ne te puis lais - sier:
Bon temps, ne vien
A - dieu
Bon temps, je ne te puis lais - sier:

d)

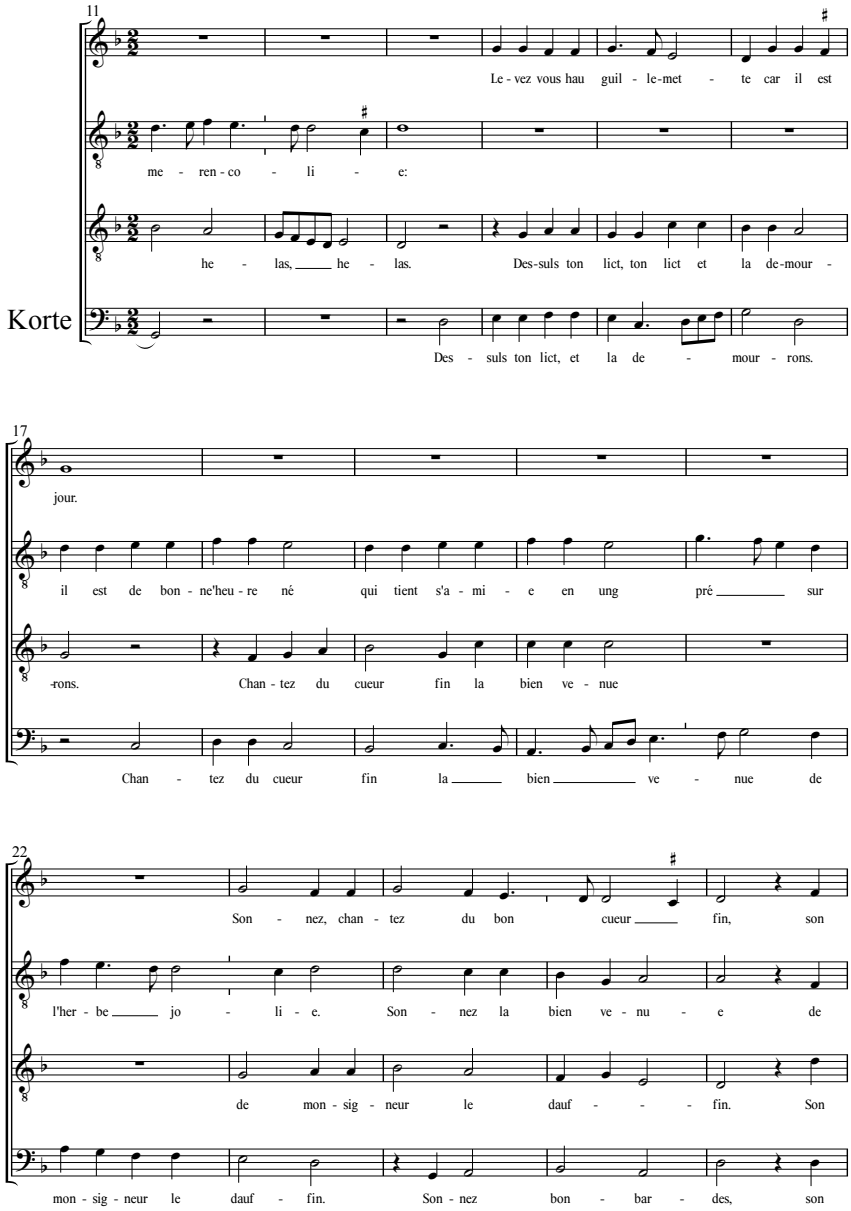


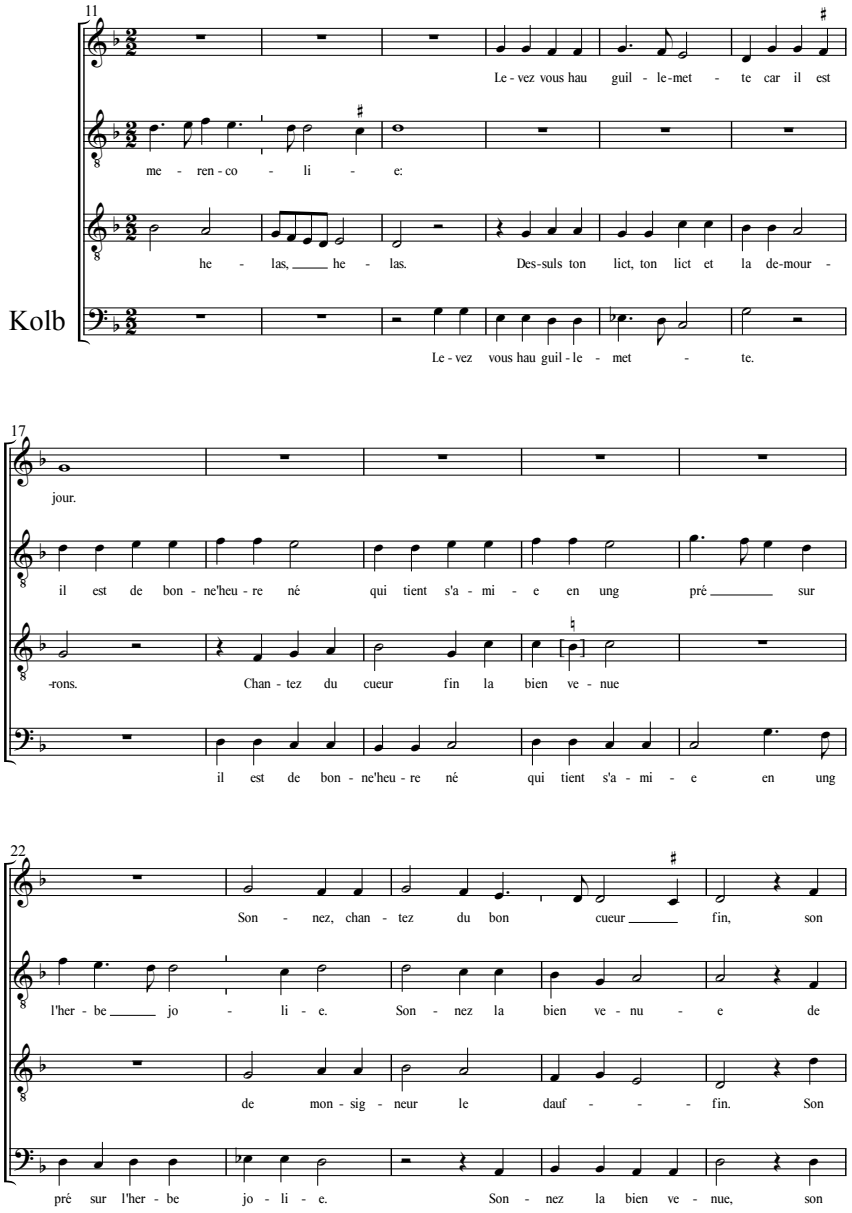
e)



Example 2. Opening of *Bon temps*, reconstructed by (a) Oliver Korte, (b) Philip Weller, (c) myself, (d) Magnus Williamson, and (e) Martin Eybl.

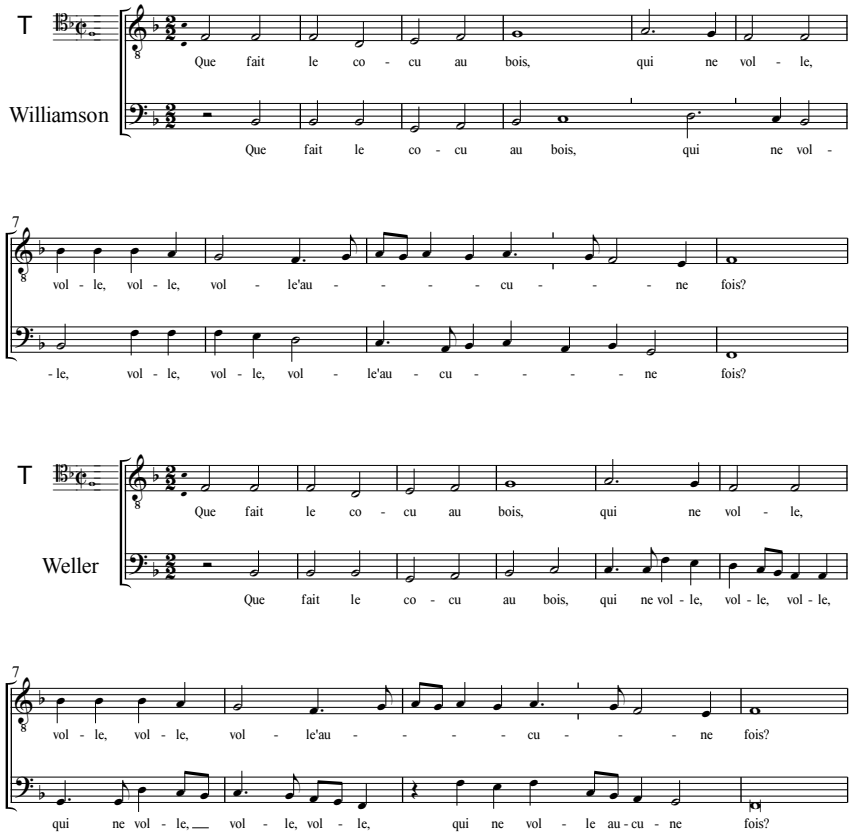
fourth and forming a duet with the altus in 21 and 22. Korte's phrases, like mine, are more closely aligned with those of the existing voices (Example 3a). His bass enters at the gap in measure 13. Measures 20 to 22 are covered by a much longer phrase. To get around the tenor at measure 20, I cheated and changed its final note, pretending that there was a cadence there that is not in the source (Example 3b) – thereby breaking the first rule of reconstruction! Otherwise the phrases in my bass line cover most of the same measures as in Korte's solution. At measure 18 I incorporated some inverted counterpoint. Given that this is not typical of Gaspar, I probably should have avoided this.


11
Le - vez vous hau guil - le-met - te car il est
me - ren - co - li - e:
he - las, he - las. Des-suls ton lict, ton lict et la de-mour -
Korte
Des - suls ton lict, et la de - mour - rons.
17
jour.
il est de bon - ne'heu - re né qui tient s'a - mi - e en ung prè sur
-rons. Chan - tez du cueur fin la bien ve - nue
Chan - tez du cueur fin la bien ve - nue de
22
Son - nez, chan - tez du bon cueur fin, son
l'her - be jo - li - e. Son - nez la bien ve - nu - e de
de mon - sig - neur le dauf - - - fin. Son
mon - sig - neur le dauf - fin. Son - nez bon - bar - des, son



Example 3. *Bon temps*, mm. 11–26, reconstructed by (a) Oliver Korte and (b) myself.

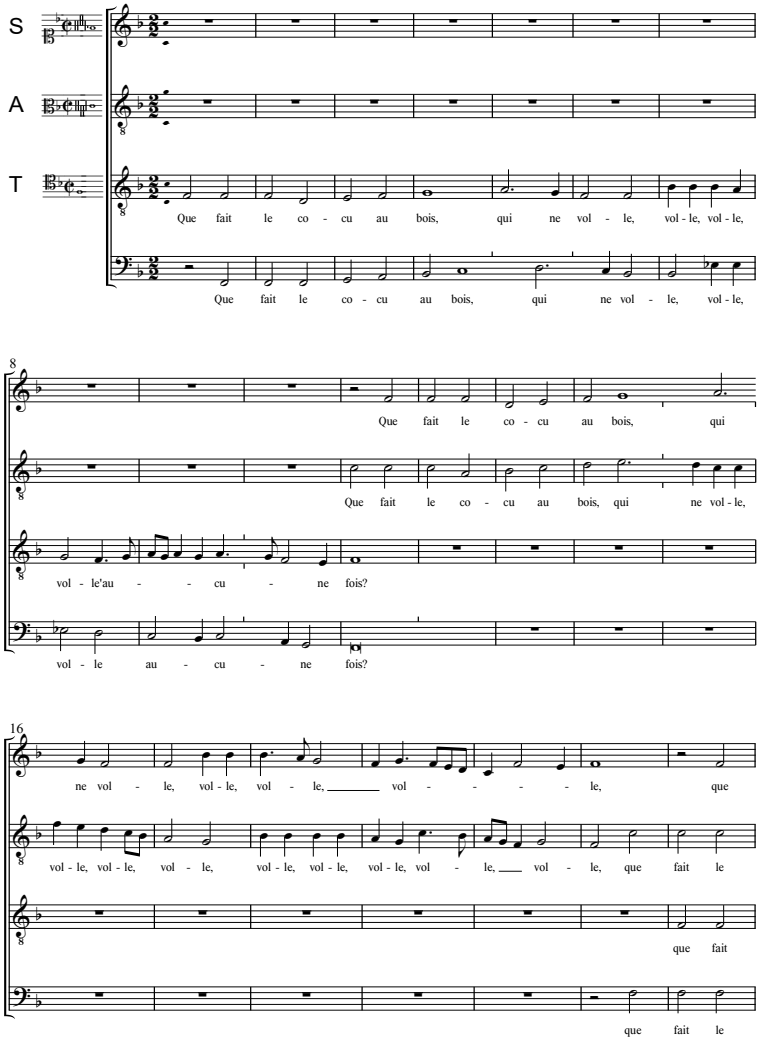
Structurally, *Que fait le cocu* bears few similarities to *Bon temps*. The song has no apparent quotations of pre-existing music or text. It begins with long imitative duos, first between the tenor and bass, and then between the superius and altus.[26] The tenor in the first duo is almost identical to the superius in the second, but whereas the tenor precedes the bass, the superius follows the altus. The bass in the first duo therefore cannot simply reproduce the altus in the second. The imitation which works best at the opening is at the fifth below, offset by one semibreve. Williamson carried this imitation through a full six measures (Example 4a), whereas Weller's imitation lasted only four measures (Example 4b).

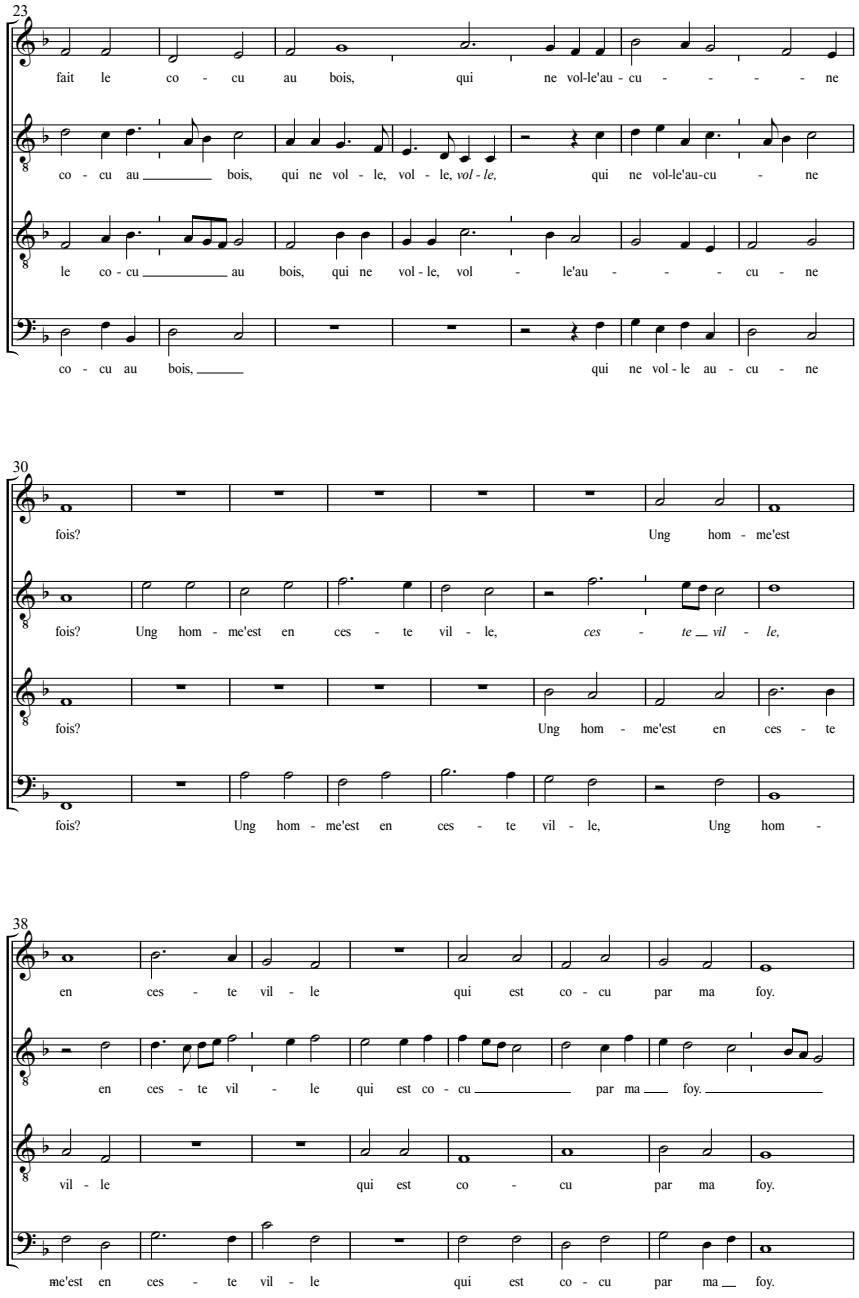


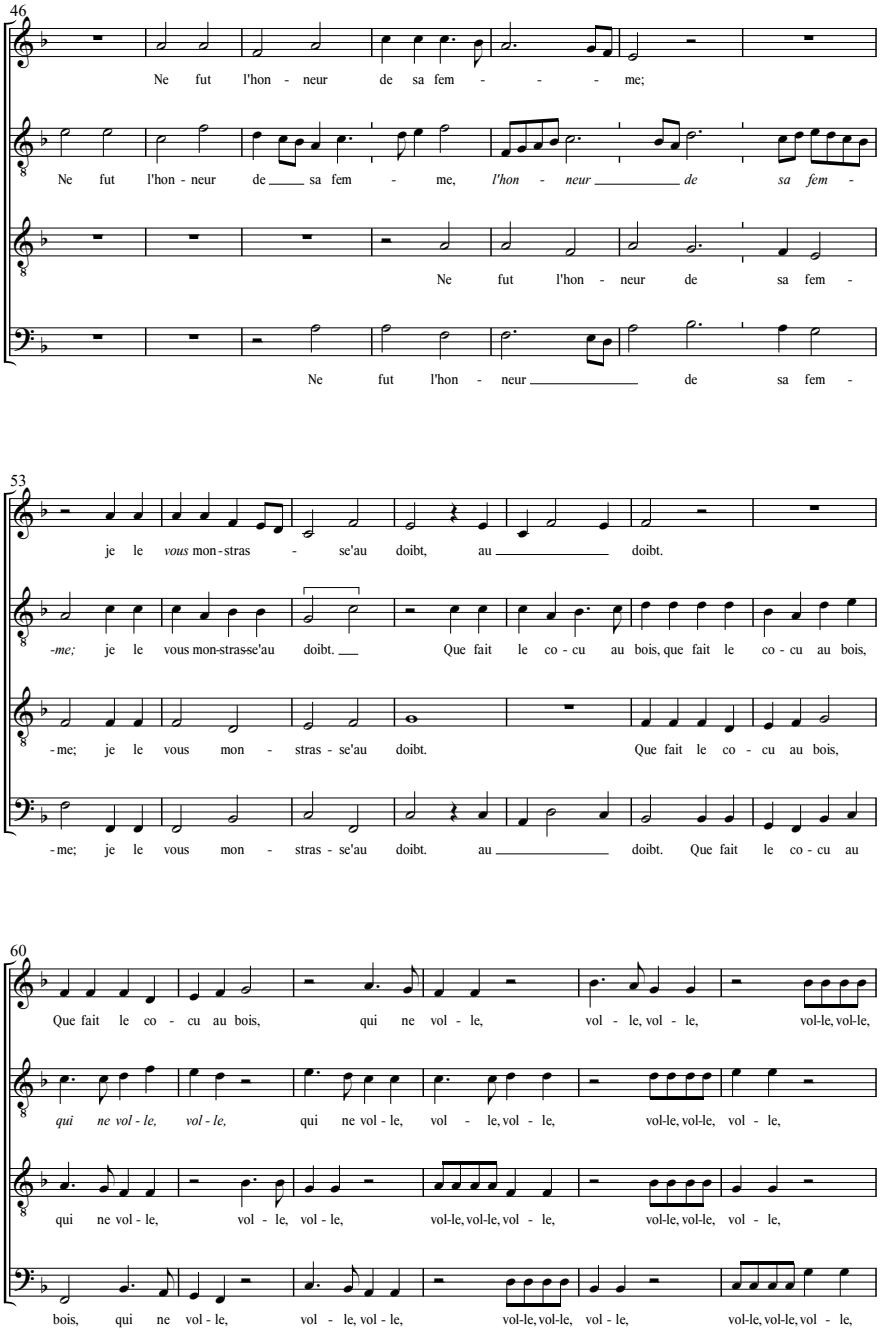
Example 4. *Que fait le cocu*, mm. 1–11, reconstructed by (a) Magnus Williamson and (b) Philip Weller.

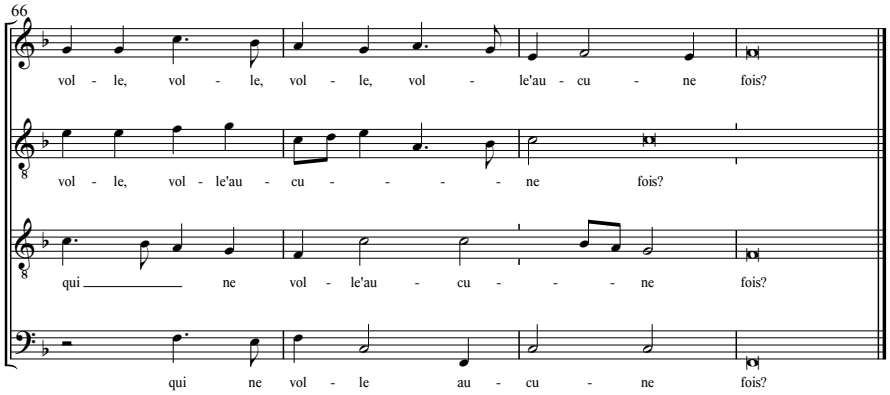
26 It is hypothetically possible that the second duo was actually a trio with the bass, as in Van Benthem's reconstruction. But the superius/altus duo as it survives is already contrapuntally complete.

Almost all of the solutions incorporated this imitation from the beginning, breaking off at various points. This opening struck me as very unusual for Gaspar. Among Gaspar's music which begins with an imitative duet, the imitation is almost always at the unison or octave. In non-imitative duets at the opening, the voices almost always begin at the octave. I was unhappy both with the somewhat unusual imitation but also with the strong *b*-flat in a piece with a dominant *f* tonality. Of course, while it's easy to say that this is unusual, it is impossible to say that Gaspar would not have done this. In any case, my solution begins at the octave, before quickly joining the expected imitation at the fifth below (see Example 5).




23
fait le co - cu au bois, qui ne vol-le'au - cu - - - - - ne
co - cu au bois, qui ne vol - le, vol - le, vol - le, qui ne vol-le'au-cu - ne
le co - cu au bois, qui ne vol - le, vol - le'au - - - cu - ne
co - cu au bois, qui ne vol - le au - cu - ne
30
fois? Ung hom - me'est
fois? Ung hom - me'est en ces - te vil - le, ces - te vil - le,
fois? Ung hom - me'est en ces - te
fois? Ung hom - me'est en ces - te vil - le, Ung hom -
38
en ces - te vil - le qui est co - cu par ma foy.
en ces - te vil - le qui est co - cu par ma foy.
vil - le qui est co - cu par ma foy.
me'est en ces - te vil - le qui est co - cu par ma foy.


46
Ne fut l'hon - neur de sa fem - - - me;
Ne fut l'hon - neur de sa fem - me, l'hon - neur de sa fem -
Ne fut l'hon - neur de sa fem -
Ne fut l'hon - neur de sa fem -
53
je le vous mon - stras - se'au doibt, au doibt.
-me; je le vous mon - stras - se'au doibt. Que fait le co - cu au bois, que fait le co - cu au bois,
- me; je le vous mon - stras - se'au doibt. Que fait le co - cu au bois,
- me; je le vous mon - stras - se'au doibt. au doibt. Que fait le co - cu au
60
Que fait le co - cu au bois, qui ne vol - le, vol - le, vol - le, vol-le, vol-le,
qui ne vol - le, vol - le, qui ne vol - le, vol - le, vol - le, vol-le, vol-le, vol - le,
qui ne vol - le, vol - le, vol - le, vol-le, vol-le, vol - le, vol-le, vol-le, vol - le,
bois, qui ne vol - le, vol - le, vol - le, vol-le, vol-le, vol - le, vol-le, vol-le, vol - le,

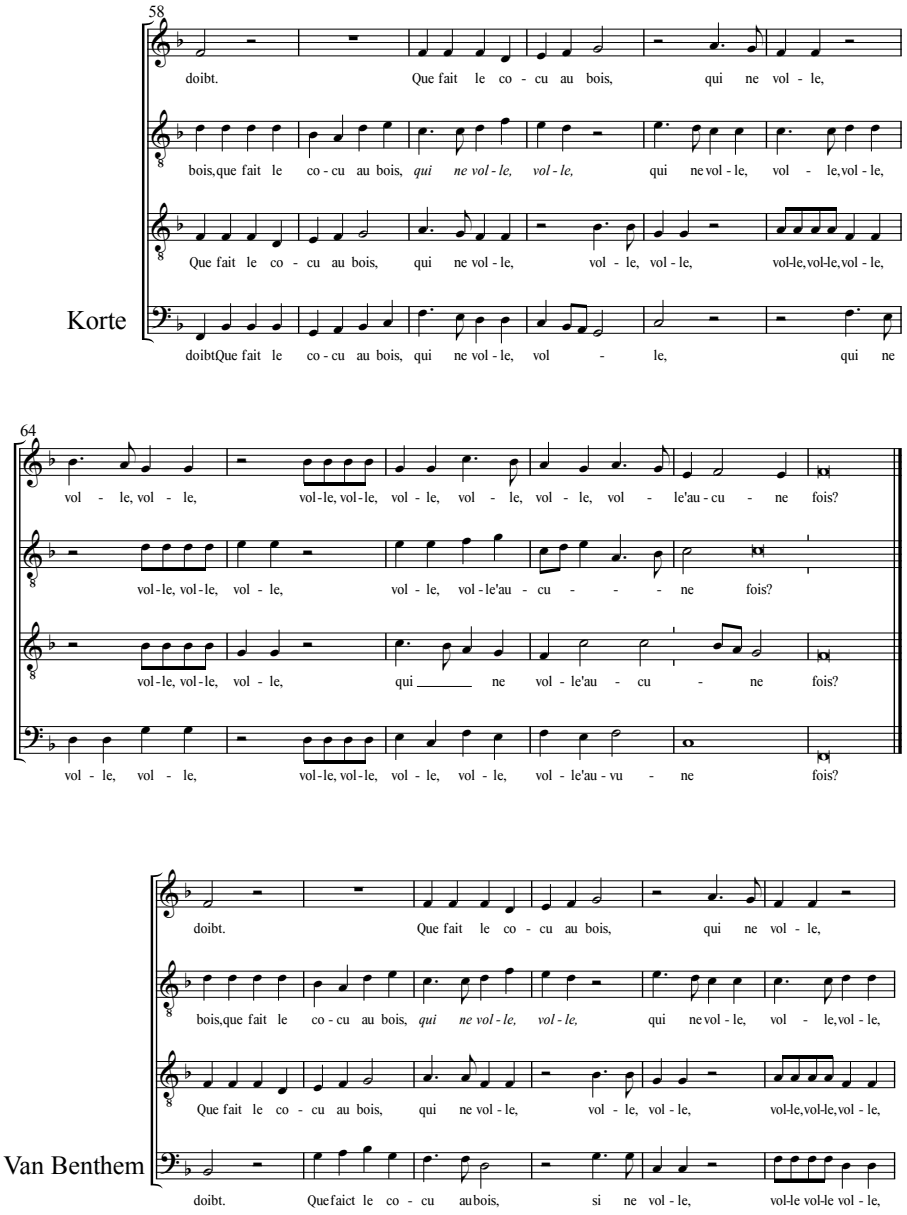


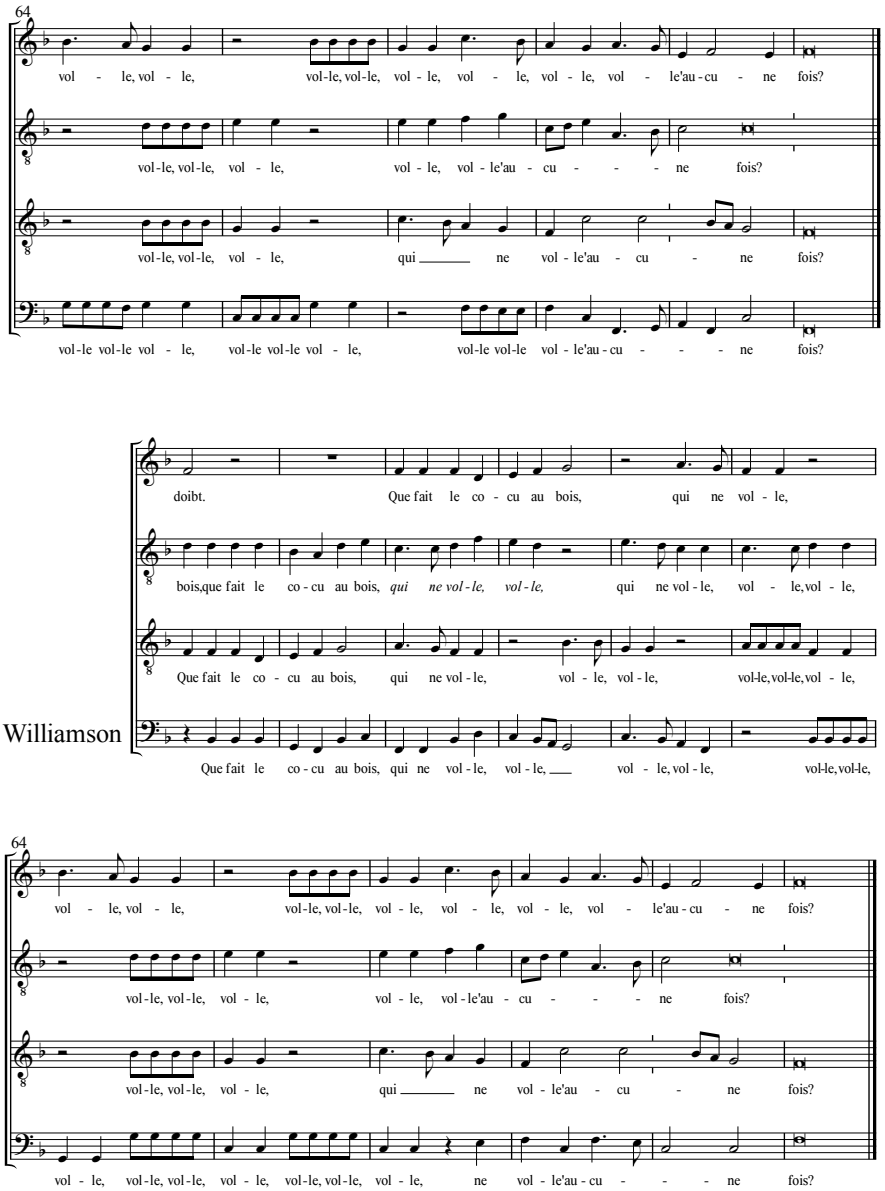
Example 5. *Que fait le cocu*, reconstructed by myself.

The final example is at the end of this song, measures 58 to 65.[27] Even more so than the other examples, this section demonstrated the wide variety of possibilities for reconstruction. The three existing voices have short phrases broken up by rests with the text »si ne volle« and »volle volle volle.« The voices occasionally sing the same text simultaneously in pairs, but on the whole this section exhibits (if I may) Gaspardian irregularity. Without the bass, the contrapuntal texture is very thin between measures 60 and 65, but the bass is never unambiguously necessary. Korte's solution is the most musically dense, with longer phrases in the bass (Example 6a). Van Benthem has the bass mostly aligned with the tenor (Example 6b). Williamson's solution (Example 6c) and my own (Example 5) have some surprising similarities, including the bass in tenths with the altus in measures 58 and 59. Despite the similarities, my bass line is mostly independent of the other voices and covers the overlaps.

⁎⁎

27 My initial transcription, which was the basis for the reconstructions, had a small mistake: the second note in the tenor of measure 60 is an *a*, not a *g*. Van Benthem corrected this in his reconstruction, and Korte later pointed the mistake out to me. I leave the reconstructions as they were initially submitted.


58
doibt. Que fait le co - cu au bois, qui ne vol - le,
bois,que fait le co - cu au bois, qui ne vol - le, vol - le, qui ne vol - le, vol - le,vol - le,
Que fait le co - cu au bois, qui ne vol - le, vol - le, vol - le, vol-le,vol-le,vol - le,
Korte
doibtQue fait le co - cu au bois, qui ne vol - le, vol - le, qui ne
64
vol - le, vol - le, vol-le, vol-le, vol - le, vol - le, vol - le, vol - le'au - cu - ne fois?
vol-le, vol-le, vol - le, vol - le, vol-le'au - cu - - - ne fois?
vol-le, vol-le, vol - le, qui ne vol - le'au - cu - ne fois?
vol - le, vol - le, vol-le, vol-le, vol - le, vol - le, vol - le'au - vu - ne fois?
doibt. Que fait le co - cu au bois, qui ne vol - le,
bois,que fait le co - cu au bois, qui ne vol - le, vol - le, qui ne vol - le, vol - le,vol - le,
Que fait le co - cu au bois, qui ne vol - le, vol - le, vol - le, vol-le,vol-le,vol - le,
Van Benthem
doibt. Que faict le co - cu au bois, si ne vol - le, vol-le vol-le vol - le,



Example 6. *Que fait le cocu*, mm. 58–65, reconstructed by (a) Oliver Korte, (b) Jaap van Benthem, and (c) Magnus Williamson.

Sometimes in reconstruction, it feels like we can get very close to the original. In these cases, I fear we are still grasping in the dark. Gaspar's songs are so difficult because of the lack of internal clues such as pervasive imitation or a unified way of dealing with text. I might see this as further evidence of Gaspar's authorship; but whatever the case may be, trying to compose like a specific composer challenges us to address questions of style.

But individual style is difficult to assess. Some considerations are easy to confirm by paging through the edition; other claims would be more easily »proven« using analytical software such as the Josquin Research Project.[28] Both the edition and the software are limited by the quantity and quality of the surviving sources: there can be no absolutely definitive statements about a composer's style. Complicating the picture further, the three »Gaspart« songs in Florence 2442 are the only four-voice songs potentially by Gaspar. This makes it difficult to know where to look for external clues. One might convincingly argue that it would be better to model these reconstructions on similar types of pieces by any contemporary composer, rather than on different types of pieces by the same composer – though these approaches are not mutually exclusive.

While my claims about what Gaspar would or would not have done as a composer are at a minimum debatable, I nevertheless consider this process a useful exercise as part of an ongoing discussion on musical style. And, while using the Josquin Research Project has helped to dispel certain illusions that I once had, much insightful recent work on musical style appears to have been done without the aid of computer-based analysis – work that could only be done by spending a *lot* of time reading, singing, or playing through the music.[29] That my conception of Gaspar's style derives substantially from his masses and motets is not necessarily a problem: while some structural procedures (for example) might be found only in masses or multipartite motets, the sorts of qualities I have mentioned here need not to be limited to a specific genre. And if Gaspar devoted the majority of his compositional career to sacred music, one might expect to find a similar compositional voice in the songs. The evidence of the three surviving voices indeed speaks to this point.

Where the authorship is at least somewhat questionable, another potential pitfall emerges. For, having composed bass lines in the style of Gaspar van Weerbeke,

28 Jesse Rodin, project director; http://josquin.stanford.edu/. Unfortunately, as of February 2020, only three motets by Gaspar have been incorporated into the project website. See also his contribution in this volume.

29 For Gaspar, I would highlight especially Jesse Rodin, *Josquin's Rome* (Oxford, 2012), pp. 134–63, and Fabrice Fitch, »›Under the Radar‹ or ›Caught in the Crossfire‹? The Music of Gaspar van Weerbeke and its Reception History,« Gaspar van Weerbeke: New Perspectives, ed. Lindmayr-Brandl and Kolb (cf. fn. 3).

I may have accidentally »Gaspar-ized« two songs which were actually composed by Jean Japart or some other Gaspar. Now, about to appear in a printed edition with their Gaspardian bass, it could be even more difficult to dislodge the attribution. On this point, though, I am comfortable enough with the attribution to take this risk and confident that musicologists can judge these questions for themselves without giving undue consideration to the reconstructed bass line. In the meantime, the reconstructions will hopefully provide an impulse for research and analysis and an adequate starting point for performers.

Philippe Canguilhem

Zur Rekonstruktion improvisierter Mehrstimmigkeit der Renaissance am Fall der *si placet*-Praxis*

Nachdem Juan Martin de Riscos das Amt des *maestro di capilla* an der Kathedrale von Jaén in Andalusien von 1598 an bis zu seinem Tod bekleidet hatte, war die dortige Stelle im Jahr 1637 zunächst vakant. Um das Kapitel im Zuge der anstehenden Neubesetzung zu unterstützen, bat man den erst kurz zuvor als Organist der Kathedrale eingestellten, in Spanien weithin bekannten Francisco Correa de Arrauxo darum, eine Abhandlung über die Art des Verfahrens zu verfassen, das die Bewerber durchlaufen sollten. In dem daraufhin entstandenen Dokument beschreibt Correa zunächst die zu jener Zeit gängige Vorgehensweise an spanischen Kathedralen im Detail und ergänzt diese um eigene Vorschläge zur Modifizierung des Verfahrens. Es ist daher ein eindrückliches Zeugnis für die Ansprüche, die gegen Ende der Renaissance an die Kapellmeister von Kathedralen gestellt wurden.[1]

Correa beginnt mit der Beschreibung dreier Fertigkeiten, deren Beherrschung für einen guten Kapellmeister unabdingbar war und daher unter Beweis gestellt werden sollte. Sie umfassen

1. das Extempore-Singen des Kontrapunkts (*Echar contrapunto de repente*)
2. das Improvisieren einer dritten, vierten und fünften Stimme (*Echar terceras, quartas y quintas vozes*)
3. Expertise im Bereich der Musiktheorie (*Estar bien en las téoricas de todas las materias musicales*).

Das Beherrschen dieser Fähigkeiten war nach Correas Auffassung notwendig für die Erfüllung der drei Hauptaufgaben des Kapellmeisters, die darin bestanden

1. das Musizieren am Pult anzuleiten (*Regir bien el fascitol*)
2. in lateinischer wie auch in spanischer Sprache zu komponieren (*Componer latín y romance*)
3. zu unterrichten (*Enseñar*)[2]

* Übersetzung von Chantal Köppl (Universität Mainz).

1 Correas Parecer wurde in Dionisio Preciado, »Un documento nuevo del gran organista andaluz Francisco Correa de Araújo (1584–1654)«, in: *Codice* 5 (1990), S. 43–48 veröffentlicht. Preciado datiert in seinem Beitrag ferner den Tod Correas auf Januar 1637 und korrigiert damit das fälschliche Todesjahr 1643, das sich in der älteren Forschungsliteratur gelegentlich findet. Zu Correas Werdegang in Jaén vgl. Robert Stevenson, »Francisco Correa de Arauxo. New light on his career«, in: *Revista Musical Chilena* 103 (1968), S. 9–42.

2 Preciado, »Un documento nuevo« (wie Anm. 1), S. 46.

Der einleitende Teil seines Berichts wirft eine Reihe von Fragen auf. Das aus heutiger Perspektive offensichtlichste Problem stellt die Tatsache dar, dass vom *maestro de capilla* zwar erwartet wurde, in lateinischer wie in spanischer Sprache zu komponieren, die Befähigung dazu jedoch offensichtlich anhand einer Reihe von Kontrapunktübungen, in Form von Improvisationen, festgestellt werden sollte.

»Echar contrapunto de repente« – das wörtlich übersetzt «den Kontapunkt ex tempore hinwerfen» bedeutet – war vom 15. bis in das 18. Jahrhundert hinein weit verbreitete Praxis und in ganz Europa tagtägliche Realität für die Sänger, die den Chören von Kathedralen, Kollegiatskirchen oder den Kapellen von Fürstenhäusern angehörten. In Spanien unter dem Begriff «contrapunto» bekannt, unterschieden Theoretiker wie auch Praktiker ihn deutlich von dem der «composición».[3] In anderen europäischen Ländern, etwa in Frankreich, nannte man die Praxis «chanter sur le livre», «descant» in England, «sortisatio» in Deutschland und «contrappunto alla mente» in Italien und umfasste eine Gruppe von Sängern, die sich um das Pult versammelte: Ein Teil der Gruppe sang die Choralmelodie, wie sie in dem vor ihnen aufgeschlagenen Choralbuch notiert war, während einer der Sänger dafür zuständig war, eine zweite Melodielinie hinzuzufügen, woraus ein spontanes Duett anstelle des einstimmigen Gesanges entstand. Gelegentlich entschieden sich auch zwei, drei oder sogar mehr Sänger dazu, eine eigene, andere Melodie über den von der Gruppe getragenen Choral zu singen und ließen damit einen polyphonen Satz zu drei, vier oder mehr Stimmen entstehen.[4]

Einige Lehrmethoden und Traktate der Renaissance erwähnen dieses Verfahren und enthalten teilweise Passagen, in denen manche der Techniken beschrieben sind, die beim «Singen über dem Buch» Anwendung fanden. Die ausführlichste aus jener Zeit erhaltene Abhandlung stellt ein gegen Mitte des 16. Jahrhunderts geschriebener Traktat des portugiesischen Sängers und Komponisten Vicente Lusitano dar. Er ist fast ausschließlich dem *contrapunto* gewidmet und enthält über 200 Musikbeispiele, die helfen nachzuvollziehen, wie die Sänger improvisieren sollten.[5]

3 Zur Unterscheidung von contrapunto und composición in Spanien im 16. Jahrhundert siehe Giuseppe Fiorentino, »*Con ayuda de nuestro señor*: Teaching Improvised Counterpoint in Sixteenth-Century Spain«, in: *New Perspectives on Early Music in Spain*, hrsg. von Tess Knighton und Emilio Ros-Fábregas, Kassel 2015, S. 356–379.

4 Siehe zur Praxis des *Cantare super Librum* meine Monographie *L'improvisation polyphonique à la Renaissance*, Paris 2015 und die weiterführende Literatur.

5 Für eine moderne Ausgabe des Traktates mitsamt transkribierter Musikbeispiele siehe Philippe Canguilhem (Hrsg.), *Chanter sur le livre à la Renaissance. Les traités de contrepoint de Vicente Lusitano*, Turnhout 2013.

Das erste Kapitel lehrt, wie einem Choral eine weitere Stimme hinzuzufügen ist, und zwar zuerst im strengen ›Note gegen Note‹-Kontrapunkt und dann in freier Form. Sobald der Sänger die Grundlagen des freien Kontrapunkts beherrschte, unterrichtete man ihn im Singen in Begleitung: Das zweite Kapitel erläutert, wie zwei, drei und sogar vier Sänger gemeinsam über eine Choralmelodie improvisieren können, während das dritte und vierte Kapitel zum Einzelstudium und zu besonders komplexen, als *abilidades* bezeichneten Übungen zurückkehrt. Diese verschiedenen Fertigkeiten werden in zwei unterschiedliche Kategorien eingeteilt: Im dritten Kapitel erläutert Lusitano, wie ein Kanon unisono, mit dem Abstand einer Quarte, einer Quinte und sogar einer kleinen Sekunde »in Echtzeit« über dem Choral aufzubauen ist, und schließlich ist das letzte Kapitel der Improvisation mehrerer *abilidades* über mensurierte Musik gewidmet.

Es fällt auf, dass alle von Lusitano in dessen Traktat beschriebenen Übungen noch 70 Jahre später in Francisco Correas Abhandlung anzutreffen sind. Das zeigt eindeutig, dass der improvisierte Kontrapunkt zu den wesentlichen musikalischen Fähigkeiten gehörte, die ein kundiger Musiker in der Renaissance zu beherrschen hatte, weshalb auch ein beträchtlicher Teil der im 16. Jahrhundert erklungenen Musik nie zu Papier gebracht, sondern vielmehr von Sängern, die ex tempore «über dem Buch» sangen, realisiert worden sein dürfte.

Um deren Klanglichkeit zu rekonstruieren, bietet es sich an, den Anweisungen jener Traktate zu folgen, die sich, wie etwa Lusitanos Handschrift, dieser Praxis widmen. Im vorliegenden Aufsatz soll das Hauptaugenmerk auf einer bestimmten, nämlich der zweiten von Correa besprochenen Übung liegen, in der die Bewerber dazu aufgefordert sind, eine dritte, vierte und fünfte Stimme über einen bestehenden, mehrstimmigen Satz zu improvisieren.

Seinen ausführlichen Überblick über die verschiedenen, dieser Kategorie angehörigen Übungen beginnt Correa mit der Erläuterung, wie eine dritte Stimme ex tempore zu einem bestehenden Duett kreiert werden kann:

> » – Die dritte Stimme kann auf zwei verschiedene Arten zu einem *duo* gesungen werden: darüber oder darunter. – Wird die untere Stimme des *duo* um eine Oktave höher gesungen, soll die dritte Stimme als Bariton (*bajete*) improvisiert werden, der beide Stimmen abdeckt.«[6]

Von den drei Übungen, die Correa vorschlägt, erscheint diese dritte heute durchaus ungewöhnlich. Sie könnte auf die damalige Situation zurückzuführen sein,

6 »Tercera voz sobre un duo como esta puntado en dos maneras: una es por encima y otra por abajo. Item, tercera vos, trocando las vozes, que es cantando la baja octava arriba de como esta puntada, echarle un bajete que las cubra«. Preciado, »Un documento nuevo« (wie Anm. 1), S. 47.

in der einigen Kapellmeistern Männerstimmen im Chor fehlten und sie daher auf Kinderstimmen angewiesen waren, um mehrstimmig singen zu können. Die Transposition der unteren Stimme eines Duetts um eine Oktave nach oben und das Hinzufügen einer Bassstimme hätte ein Terzett entstehen lassen, dessen beide obere Stimmen von Kindern gesungen wurden.

Die Tatsache, dass diese Übung in der darauffolgenden Aufgabenserie wiederholt und dort als »wesentlichst« (*esencialisima*) beschrieben wird, scheint diese These zu unterstützen:

> »Die vierte Stimme, das ist die wesentlichste Fähigkeit: Einem *tercio* soll eine vierte, fehlende Stimme hinzugefügt werden. Item, wenn die tiefste Stimme um eine Oktave erhöht ist: Das ist die wichtigste Übung, die gemeistert werden muss. – Item, bei einem *cuatro*, verdecke den Bass und improvisiere ihn.«[7]

Wenn auch Correa die Improvisation einer vierten Stimme zu einem bestehenden Terzett als die wesentlichste Fähigkeit bezeichnet, schließt der spanische Organist nicht an dieser Stelle, sondern fordert eine letzte »notwendige« Reihe von Übungen:

> »Die fünfte Stimme. Singe eine fünfte Stimme zu einem notierten *cuatro*. Item, wenn der Bass um eine Oktave erhöht ist. Diese sind zwei beeindruckende Fähigkeiten, die nur wenige beherrschen, und dann wirkt es fast, als brüsteten sie sich damit.« [8]

Und Correa beendet dieses Kapitel: «Es können noch weitere Übungen verlangt werden, doch dienen sie vielmehr der Prahlerei, wie etwa das Improvisieren einer sechsten, siebten oder sogar einer achten Stimme: Korrekt ausgeführt, stellt dies eine erstaunliche Fähigkeit dar. Dennoch sind diese Fertigkeiten nicht notwendig.»[9]

Zu einem bestehenden polyphonen Satz eine weitere Stimme hinzuzufügen, stellte in der Renaissance ein gängiges, kontrapunktisches Verfahren dar, das auch durch notierte Musikquellen gut belegt ist. Die meisten Fälle betreffen dreistim-

7 »Cuarta voz, y esta es la habilidad esencialisima. Item, se ha de echar cuarta voz sobre un tercio, como el esta puntado, echandole la voz que le falta. Item cuarta voz, cantando octava arriba la voz mas baja del tercio, y esta es la mas necesaria y la que se ha de hacer mejor. Item, a un cuatro, tapanle el bajo y que lo eche«.

8 »Quinta voz. Echar quinta voz sobre un cuatro como el esta puntado. Item, que el bajo se diga octaba arriba, y de este modo se le eche quinta boz. Estas dos son grandes habilidades, y pocos las hacen bien, y casi es ostentativa«.

9 »Otras hay de mayor ostentacion, que es echar sexta y septima y aun octava voz, y si hace limpiamente, es cosa prodigiosa. No son necesarias«.

mige Stücke, die in den Quellen gelegentlich mit einer optionalen vierten Stimme erscheinen, die mit *si placet* gekennzeichnet ist, einem Hinweis darauf, dass jene vierte Stimme zu einem späteren Zeitpunkt, nachdem die ursprünglich dreistimmige Komposition fertiggestellt war, entstanden ist. Von wenigen Ausnahmen abgesehen, sind für diese hinzugekommenen Stimmen keinerlei Zuschreibungen erhalten, ein Umstand, auf den am Ende dieses Aufsatzes noch einzugehen sein wird.

Diese für das 15. Jahrhundert umfassend belegte Praxis findet die ganze Renaissance hindurch Verwendung und ist heute als »*si placet*-Komponieren« bekannt. Der Definition von Stephanie Schlagel zufolge umfasst diese besondere Form der kompositorischen Bearbeitung (»special category of compositional reworking«) die Erschaffung neuer Stimmen, die zu einer darüber hinaus unverändert bleibenden Komposition hinzutreten (»the creation of newly composed voices that are added to an original composition, which otherwise remains unaltered«).[10] Bislang wurde die *si placet*-Tradition als Kompositionspraxis und ihre vielfach erhaltenen Belege als ihr genuines »Repertoire« verstanden.[11] Francisco Correas Abhandlung bezeugt jedoch, dass die besten Musiker die hinzukommende Stimme unmittelbar singen, das heißt improvisieren sollten. In der Tat sprechen die zeitgenössischen Theoretiker diesbezüglich nie vom Komponieren, sondern von einer spezifisch mündlichen Improvisationsmethode.

Wie war es möglich, spontan eine neue Stimme zu einem mehrstimmigen Satz zu singen? Welchen Schwierigkeiten stand man dabei gegenüber? In welchem Maße können die erhaltenen Beispiele von *si placet*-Stimmen helfen, den Improvisationsstil ihrer Autoren zu rekonstruieren? Diese Fragen sind, zumal im Rahmen eines kurzen Aufsatzes, nicht leicht zu beantworten. In den folgenden Abschnitten werden dazu die theoretischen Schriften, die sich mit dieser Praxis befassen, konsultiert, da hieran ein erster Schritt auf dem Weg zum Verständnis dessen festzumachen ist, was ich »*si placet*-Singen« nennen will.

Das *si placet*-Singen wird von zwei Theoretikern der Renaissance im Detail behandelt: von dem bereits genannten Vicente Lusitano sowie von Gioseffo Zarlino. Lusitano erläutert zu Beginn anhand des *Et resurrexit* aus dem Credo von Nicolas Gomberts *Missa Philomena* als Beispiel für die Regeln und Anweisungen, wie einem Duett eine dritte Stimme hinzuzufügen sei. Zu einem Duett eine Mittelstimme zu erzeugen, ist Lusitano zufolge «schwierig, wird bei richtiger Ausführung aber geschätzt». Damit dies gelinge, erklärt er, solle man sich auf den Bass konzentrieren, zugleich die andere Stimme prüfen, dabei Sexten über dem Bass vermeiden, wohl aber Oktaven, Quinten und Terzen abwechseln. Dies

10 Stephanie P. Schlagel, *Si placet Parts for Motets by Josquin and His Contemporaries*, Madison 2006, S. ix.

11 Siehe die oben angeführte Ausgabe von Schlagel sowie Stephen Self, *The si placet repertoire of 1480–1530*, Madison 1996.

könne nur mit einem schnellen und guten Gehör sowie Kompositionserfahrung funktionieren.[12]

Noch etwas schwieriger sei es hingegen, wenn die Stimme unter dem Satz ergänzt wird. In seinen eigenen Worten: «Die zweite Möglichkeit besteht darin, eine tiefe zu zwei hohen Stimmen zu singen, was über zwei Stimmen schwierig und sehr lobenswert ist. Wenn dies aber über drei Stimmen gelingt, erreichen wir den Höhepunkt der Fähigkeiten, da es in der Musikpraxis keine herausragendere Fertigkeit gibt als diese.«[13] Lusitano fährt mit einigen technischen Ratschlägen bezüglich der Ergänzung einer tiefen Stimme zu einem Duett fort: Der Sänger solle bei dieser Übung den Sopran oder die höchste Stimme anvisieren und, sofern es ihm beliebt, hauptsächlich parallele Dezimen darunter singen. Noch besser sei es aber, wenn er durch Aufgreifen melodischer Motive auch die übrigen Stimmen imitieren könne.[14]

Wie noch zu sehen sein wird, sind diese grundlegenden Empfehlungen – vornehmlich auf den Bass zu achten, wenn eine Mittelstimme ergänzt wird und auf den Sopran zu achten, wenn eine tiefe Stimme hinzutritt – äußerst informativ für uns, stellen sie nach meiner Kenntnis die einzige erhaltene, technische Bemerkung dazu dar, wie eine dritte Stimme zu einem Duett hinzugefügt werden kann.[15]

Vor diesem Hintergrund ist seine Besprechung des nächsten Schrittes noch aufschlussreicher. Zu der Beschreibung, wie eine vierte Stimme einem Terzett hinzuzufügen sei, zieht Lusitano ein anderes Musikbeispiel heran, das dreistimmige *Crucifixus* aus Gomberts *Missa Philomena*. Die ersten Erläuterungen befassen

12 Canguilhem (Hrsg.), Chanter sur le livre à la Renaissance (wie Anm. 5), S. 283: »echando sobre la boz mas baxa con oyo en la segunda y sus terminos y guar- dandose que no eche muchas sextas, o quasi ninguna, mas continuando las octavas, quintas, terçeras y sus conpuestas, haran dulçe conçento. La qual abilidad proçede del mucho uso de la conpostura y viveza de oydo, con las quales se junta la grande destreza sobre una boz.«

13 Ebda.: »La segunda manera es echar un contrabaxo a bozes altas, la qual hecha sobre dos bozes es mucho y muy de loar. Mas si sobre tres se haze bien, es el fin de todas las abilidades, y no ay major en la musica pratica.«

14 Ebda.: »Para lo qual nota que la boz que se echa sienpre deve mirar al tiple o a la boz mas alta, y usar de muchas dezenas con ella, excepto si alguna otra boz se subiere en alto del tiple, ca entonçes a la mas alta se mirara como en la primera manera a la mas baxa. Mas es de notar que si se echa sobre dos la boz baxa puede sienpre hazer dezenas, exçepto si las dos bozes hazen muchas sextas, ca entonçes de otras species deve usar, y esto por que haziendo en tal parte dezenas seran con la segunda boz quintas.« Und S. 286: »Si la boz que es echada de inproviso pudiere buenamente ymitar a las otras, develo de hazer; y si no, deve tomar algun paso, el qual deve replicar algunas vezes, segun que se mostro en las boxes arriba puestas sobre el duo, por que esta es la meior manera para cantar con graçia de inproviso.«

15 Die beiden von Lusitano angebrachten Beispiele (die dritten Stimmen zu *Et resurrexit* und *Crucifixus*) sind entweder in originaler Schlüsselung in Canguilhem (Hrsg.), Chanter sur le livre à la Renaissance (wie Anm. 5), S. 283–289 verfügbar oder stehen in moderner Schlüsselung auf der Webseite *RICERCAR* des *Centre d'Études Supérieures de la Renaissance* an der Universität von Tours zum Download bereit: http://josquin.cesr.univ-tours.fr/lusitano/collections/show/5 (Beispiele 72, 73 and 74).

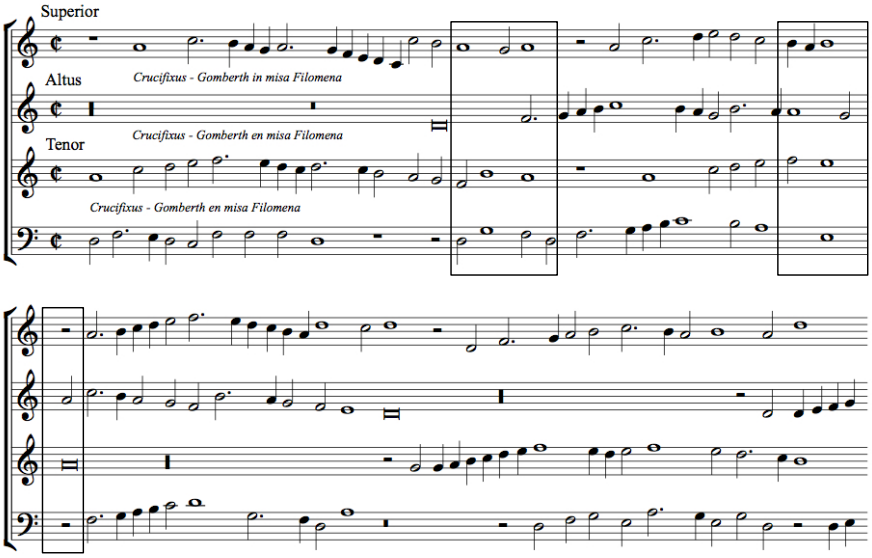
sich damit, wie eine Mittelstimme zu dem Terzett zu improvisieren sei. Zudem gibt Lusitano verschiedene Ratschläge zur Beschaffenheit der zusätzlichen Stimme, handele es sich nun um einen Sopran, Alt oder Tenor. Schließlich kommt er darauf zurück, wie eine Bassstimme zu einem präexistenten Terzett gesungen werden könne, und damit zu jener Technik, die Francisco Correa noch fast ein Jahrhundert später als *esencialisima* für einen Kapellmeister und als das höchste Geschick in der ausübenden Musik erachtete.[16] Lusitanos Leser wird allerdings enttäuscht, da der Verfasser zugeben muss, dass aufgrund der extremen Schwierigkeit dieser Aufgabe keine technische Anweisungen dazu geben werden können:

> »Wenn aber die vierte Stimme als Bass gesungen wird, kann kein weiterer Ratschlag gegeben werden, als auf die übrigen drei Stimmen zu achten und das Gehör anzustrengen, um deren Motive zu imitieren und auf die Kadenzen zu hören, da sich die Kadenzbildung mit einer ergänzenden Bassstimme zu drei ausgeführten Stimmen schwierig gestaltet. Daher zeige ich hieran anschließend, wie man eine hohe und eine tiefe Stimme zu einem Terzett hinzufügt.«[17]

Die Schwierigkeit dieser Übung liegt darin begründet, dass in einem notierten Terzett alle für den Bass charakteristischen Melodie- und Kadenzwendungen durch die aufgeschriebene, tiefe Stimme übernommen werden und es sich aus diesem Grund schwierig gestaltet, eine passende Melodielinie für den zusätzlichen Bass zu finden. Das von Lusitano dafür ausgewählte Beispiel (Beispiel 1) zeigt, wie er mit verschiedenen solcher Fälle (siehe Hervorhebungen) umgeht: Die erste, phrygische Kadenz auf *A* wird durch Einfügen eines *G* im Bass zur plagalen Kadenz in *D* umgewandelt; in der zweiten – perfekten – Kadenz auf *A* wird die dritte Stimme verdoppelt und »verschwindet« dann, um ein Unisono oder parallele Oktaven zu vermeiden; die darauffolgende, perfekte Kadenz auf *D* wird, da sie ursprünglich für zwei Stimmen notiert ist, durch die Bassstimme vervollständigt; die Kadenz des Tenors auf *F* im letzten System wird zur plagalen Kadenz auf *D* umgeformt; und schließlich wird die letzte perfekte Kadenz zu einer plagalen Kadenz umfunktioniert, indem eine Bassbewegung von *B* zu *G* ergänzt wird, die den *D*-Schlussakord zum vorletzten Akkord über *G* werden lässt, . Durch diese Ergänzung zögert Lusitano die urspüngliche Kadenz um eine Semibrevis hinaus.

16 Siehe Anm. 13.

17 »Mas, si la quarta parte se echa en baxo, aqui no ay otro aviso que dar, sino que la quarta parte deve ser avisado de guardar a todas las tres y aver grande oydo para los pasos que pueden responder y a las clausulas, por que son muy dificultosas las clausulas del baxo echado sobre tres partes conçertadas, y por esto brevemente se pondra el modo como se echara una quarta boz en alto y en baxo.«



Notenbeispiel 1. Nicolas Gombert, *Missa Philomena*, »Crucifixus«, mit hinzugefügter vierter Stimme im Bass von Vicente Lusitano (Kadenzen hervorgehoben).

Trotz des hohen Wertes, der Lusitanos Anleitungen und Musikbeispiele auszeichnet, ist er nicht der einzige, der sich dieses Gegenstandes im 16. Jahrhundert annimmt, denn weniger als zehn Jahre später widmet Gioseffo Zarlino der *si placet*-Praktik im dritten, mit *L'arte del contrapunto* betitelten Teil seiner *Istitutioni harmoniche* ein ganzes Kapitel. Angesichts von Zarlinos Reputation und der Rezeption seines theoretischen Werks in den Jahrzehnten zuvor überrascht seine Auseinandersetzung mit Improvisationstechniken vielleicht zunächst, wurde seine Kontrapunktlehre doch in enger Verbindung zur Verschriftlichung gesehen. Der Titel des untersuchten Kapitels, »Quel che si dè osservare, quando si volesse fare una terza parte alla sproveduta sopra due altre proposte« (Was zu beachten ist, wenn man eine dritte Stimme ohne Vorbereitung zu zwei bestehenden Stimmen singen will), lässt allerdings keinen Zweifel an dem Improvisationscharakter dieser Praxis.[18]

In der Tat betont Zarlino die Probleme, die sich durch eben diese Spontaneität ergeben. Seiner Meinung nach müssten jene, die diese Übung meistern wollen,

18 Gioseffo Zarlino, *Le istitutioni harmoniche*, Venedig 1558, Kapitel 64: *Quel che si dè osservare, quando si volesse fare una terza parte alla sproveduta sopra due altre proposte*. Englische Übersetzung: Gioseffo Zarlino, *The Art of Counterpoint*, hrsg. von Guy A. Marco and Claude V. Palisca, New Haven und London 1968.

ihre zusätzliche Stimme durch gründliche Betrachtung des bestehenden Duetts sorgfältig im Voraus vorbereiten:

> »Er sollte die Passagen und Modulationen der beiden vorgegebenen Stimmen solange studieren, bis er vollends begreift, wie der Kontrapunkt aufgebaut ist. Erst dann ist er dazu in der Lage, eine Stimme seiner Wahl fehlerfrei hinzuzufügen.«[19]

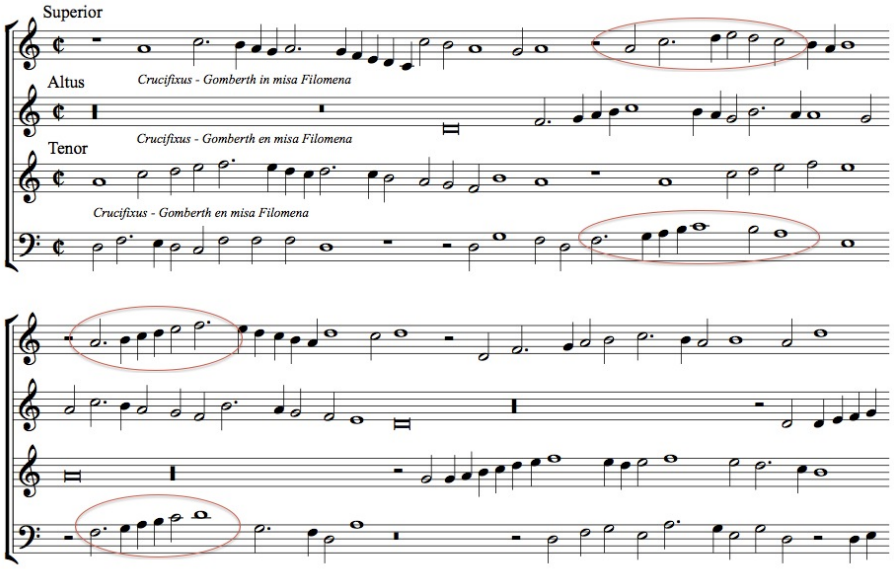
In den nachfolgenden Erläuterungen entfernt sich Zarlino in zwei wesentlichen Punkten von Lusitano. Zum einen verzichtet Zarlino auf technische Ratschläge, etwa zu der Abfolge von Intervallen oder den melodischen Stil, den die hinzukommende Stimme übernehmen sollte, und verfolgt stattdessen eine allgemeine Diskussion über die Methode, mithilfe derer es gelingen kann, ein Duett um eine dritte Stimme zu ergänzen. Auch diese Methode unterscheidet sich deutlich von Lusitanos Vorschlägen. Zarlino zufolge »genügt (entgegen der Auffassung vieler Ungelehrter) die Betrachtung einer Stimme allein nicht, um den Kontrapunkt zu bestimmen, der mit der dritten Stimme hinzutreten soll«,[20] wohingegen Lusitano seinem Leser dazu rät, entweder die tiefere oder die höhere Stimme anzusehen.

Zum anderen differieren Zarlinos und Lusitanos Auffassungen bezüglich eines von Lusitano empfohlenen Verfahrens, nämlich der Möglichkeit, parallele Dezimen zu einer der beiden Duettstimmen zu singen. Zarlino steht dieser Praxis höchst kritisch gegenüber und bezeichnet solche Musiker, die Dezimparallelen zu einer Stimme des polyhphonen Satzes ausführten und damit die Zuhörer mit einer Fähigkeit zu beeindrucken beabsichtigten, über die sie gar nicht verfügten, als anmaßend und arrogant. »Sie versuchen damit diejenigen, die so dumm sind wie sie selbst, glauben zu machen, sie könnten Wunder wirken.«[21]

19 The Art of Counterpoint, S. 221; Istitutioni harmoniche, S. 258: »Debbe con diligenza por mente alli passaggi, et alle modulationi che fanno insieme le due parti proposte, acciò possa comprendere in che maniera il loro contrapunto sia ordinato, et possa dipoi aggiungere senza alcuno errore quella parte, che lui vuole.«

20 The Art of Counterpoint, S. 221 f.; Le istitutioni harmoniche, S. 258: »perché non è sufficiente (come si avisano molti che non sanno) una parte sola a mostrare il contrapunto che si hà da aggiungere nella terza parte.«

21 The Art of Counterpoint, S. 221; Le istitutioni harmoniche, S. 258: »ho udito alcuni, non dirò sciocchi, ma presuntuosi affatto et arroganti, che per dare ad intendere che sono in ciò molto valorosi et sufficienti […] danno ad intendere alli sciocchi, come sono loro, e che non intendeno più oltra, che fanno miracoli.«



Notenbeispiel 2. Nicolas Gombert, *Missa Philomena*, »Crucifixus«, mit hinzugefügter vierter Stimme im Bass von Vicente Lusitano (Dezimen hervorgehoben).

Doch zurück zu Lusitanos Musikbeispiel (Notenbeispiel 2): Obwohl hier parallel unter dem Sopran geführte Dezimen präsent sind, kann sein *si placet*-Bass bei Weitem nicht unter diesem Gesichtspunkt allein betrachtet werden. Daran wird ersichtlich, dass Lusitano sich nicht darauf hätte beschränken können, zur Erzeugung der vierten Stimme nur den Sopran von Gomberts *Crucifixus* zu berücksichtigen. Das *si placet*-Singen war deshalb eine derart schwierige Aufgabe, weil es die auf der Chorbuchseite verteilten Stimmen nahezu unmöglich machten, deren kontrapunktische Zusammenhänge untereinander zu erfassen. Zarlinos Musikbeispiele (Abbildung 1) zeigen in ihrer ursprünglichen Disposition die beiden Stimmen von Josquins *Per illud Ave prolatum,* eine neben der anderen, auf der Seite getrennt voneinander. Er brachte sie folglich nicht einmal in die Form eines »quasi-score« oder »pseudo-score«, wie Jessie Ann Owens die Anordnung bezeichnet, in der die Stimmen in einer Reihe untereinander, jedoch ohne Taktstriche und vertikale Angleichung positioniert sind.[22]

22 Siehe Jessie Ann Owens, *Composers at Work*, New York und Oxford 1997, S. 34–38.

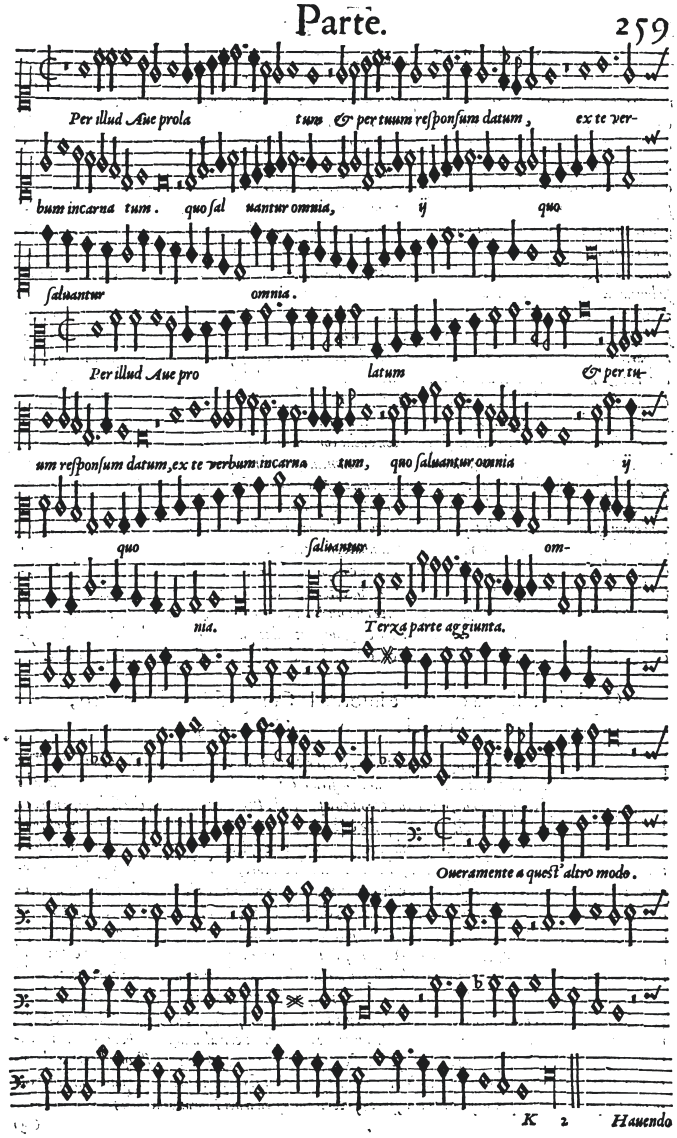


Abbildung 1. Gioseffo Zarlino, *Le istitutioni harmoniche*, Venedig 1558, S. 259: Josquin duo *Per illud Ave prolatum* mit zwei verschiedenen von Zarlino hinzugefügten dritten Stimmen.

Das erklärt auch, warum die Improvisation einer dritten Stimme als Fertigkeit erfahrener Musiker galt und auch für die besten unter ihnen immer wieder eine Herausforderung darstellte. Davon zeugt eine von Lodovico Zacconi in der zweiten Ausgabe seiner 1622 veröffentlichten *Prattica di musica* übermittelte Anekdote, in der Zacconi in einem Abschnitt des Traktates davon berichtet, dass Zarlinos hochverehrter Lehrer, Adrian Willaert, folgende Übung mit seinen Schülern praktizierte:

> »Ich erinnere mich daran, wie mir Gioseffo Zarlino eines Tages davon berichtete, dass sein Meister Adriano, wenn er die dritte Stimme über ein Duett improvisiert hatte, es häufig noch ein zweites Mal tat und sagte: ›Diesmal habe ich es gut gemacht, nicht aber beim ersten Mal‹. Damit wollte er demonstrieren, dass man bei der Improvisation nicht dasselbe tut, wie wenn man einen Stift in der Hand hätte, weil man nicht voraussehen und überlegen könne, was man singt.«[23]

Sicherlich sah sich Zarlino aufgrund dieser Schwierigkeit dazu angeregt, das *si placet*-Singen auf die dritte und keine weitere Stimme zu begrenzen, und tatsächlich präsentiert er sein Musikbeispiel, Josquins Duett, mit zwei unterschiedlichen dritten Stimmen, einer Stimme in der Mitte und einer unterhalb des Duetts.[24] Verschmähte er 1558 noch jene, die willens waren, eine zusätzliche Stimme zu einem mehr als zweistimmigen Satz zu singen und beschrieb sie missachtend als arrogant und anmaßend, relativierte er seine Aussage in einem letzten Satz, den er am Ende des Kapitels der 31 Jahre später im Jahre 1589 erschienenen letzten Ausgabe seines Traktates hinzufügte:

> »Was ich über das Hinzufügen einer Stimme zu zweien gesagt habe, ist ebenso auf den Fall von drei oder gar vier Stimmen zu übertragen. Es ist zwar eine anspruchsvolle, doch keine unlösbare Aufgabe und es stimmt, dass die Schwierigkeit für denjenigen, der eine Stimme hinzufügen möchte, zunimmt, je größer die Stimmenzahl des vorliegenden Satzes ist. Drei Dinge sind [dafür] notwendig: ein gutes Gedächtnis, konstantes Üben und ein gutes Gehör, um die übrigen Stimmen des Satzes, zu dem die Stimme

23 Lodovico Zacconi, *Prattica di musica seconda parte*, Venedig 1622, S. 153 f.: »Ed insimil proposito raccontò che il signor Adriano suo maestro nel far ch'egli facea una terza parte sopra un duo alla mente, fatto che ve l'havea una volta, bene spesso ve lo rifacea di nuovo e poi dicea: ›adesso io l'ho fatta bene, e non la prima volta‹. Volendo in questo mostrare ch'all'improviso l'huom alle volte vi fa cose che non si farebbono quando che si havesse la penna in mano, o che l'huom meglio le potesse antevedere e considerare.«

24 Siehe Schlagel, Si Placet Parts (wie Anm. 10), S. 152–154 für eine moderne Ausgabe von Zarlinos zu Josquins Duett hinzugefügten Stimmen.

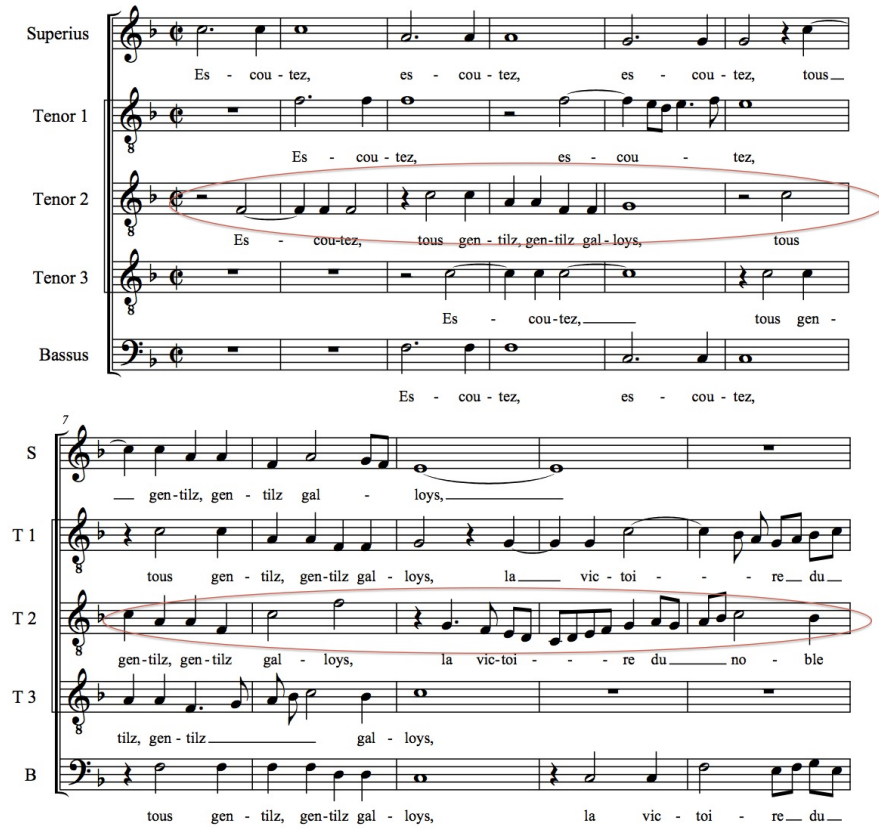
hinzutreten soll, schnell erfassen zu können. Ohne diese Dinge ist nichts oder nur wenig auszurichten.«[25]

Stand Zarlino 1558 also denjenigen, die versuchten, über ein Terzett oder Quartett zu improvisieren, noch kritisch gegenüber, war dies gegen Ende seines Lebens nicht mehr der Fall. Doch womit ist diese Entwicklung zu erklären? Möglicherweise wurde der Sinneswandel durch die Ausbreitung dieser Praxis ausgelöst, die das *si placet*-Singen in der zweiten Hälfte des 16. Jahrhunderts erlebte und dazu führte, dass die besten Musiker ihre Techniken weiter verbesserten. Die eigene Anschauung solcher Musiker könnte Zarlino davon überzeugt haben, diese Praxis für erwähnenswert zu befinden. Diese historische Argumentation steht wiederum in Widerspruch zu den Schriftquellen der *si placet*-Stimmen, die nämlich nach 1530 aus Handschriften und Drucken verschwinden. Zeichnet man eine Linie zwischen Zarlinos Meinungsänderung und dem, was Francisco Correa zuletzt 1637 niederschrieb, scheint es, dass die Praxis, eine Stimme über schriftlich fixierte, mehrstimmige Musik zu improvisieren, sich am Ende des 16. Jahrhunderts großer Beliebtheit erfreute.

Selbstverständlich müssen auf diese erste Annäherung an das *si placet*-Singen und die damit in Verbindung stehenden Fragen weiterführende Nachforschungen folgen, von denen eines der anzugehenden Probleme die performative Seite dieses Verfahrens betreffen sollte. In der Tat dürfen die Musikbeispiele von Lusitano oder auch jene von Zarlino nicht als Kompositionen, sondern müssen als Improvisationen angesehen werden. Dieser Umstand verändert unsere Sicht auf die dabei entstandene Mehrstimmigkeit: Während der Ausführung wird man nämlich nicht auf den Satz als Ganzen, sondern viel eher auf die eine hinzukommende Stimme achten und darauf, wie sie sich in das Gesamtgefüge integriert oder aus ihm heraussticht. Aus diesem Grund ist das *si placet*-Singen weniger als Hommage an das ursprüngliche Werk denn als Vorwand für die Demonstration der eigenen kontrapunktischen Fähigkeiten zu verstehen.

Betrachtet man die große Zahl von schriftlich tradierten *si placet*-Stimmen nicht als Kompositionen im engeren Sinne, sondern als Zeugnis einer Aufführungspraxis, wird man auch erkennen, dass sich in den überlieferten stilistischen Unterschieden im Grunde Fertigkeiten in der Ausführung spiegeln. Dass sie

25 Dieser Zusatz erscheint am Ende des gleichen Kapitels in Gioseffo Zarlino, *Tutte le opere*, Venedig 1589, S. 336: »Et quello c›hò detto dell›aggiungere una parte a due, si può anco intendere, quando se ne volesse aggiungere una a tre, et anco a quattro. Percioché non è cosa impossibile, se ben è difficile. È ben vero, che quanto più sarà il numero delle parti, tanto più difficultà apporterà a colui, che vorrà aggiungere cotale parte. Ma bisogna sopra il tutto tre cose: buona memoria, e lunga essercitatione, e buon occhio per potere raccogliere con prestezza le parti della cantilena, sopra le quali s›havrà da aggiungere cotal parte. Senza le quali cose, nulla o poco almeno si farebbe.«



Notenbeispiel 3. Clément Janequin, *La bataille*, mit von Philippe Verdelot hinzugefügter fünfter Stimme.

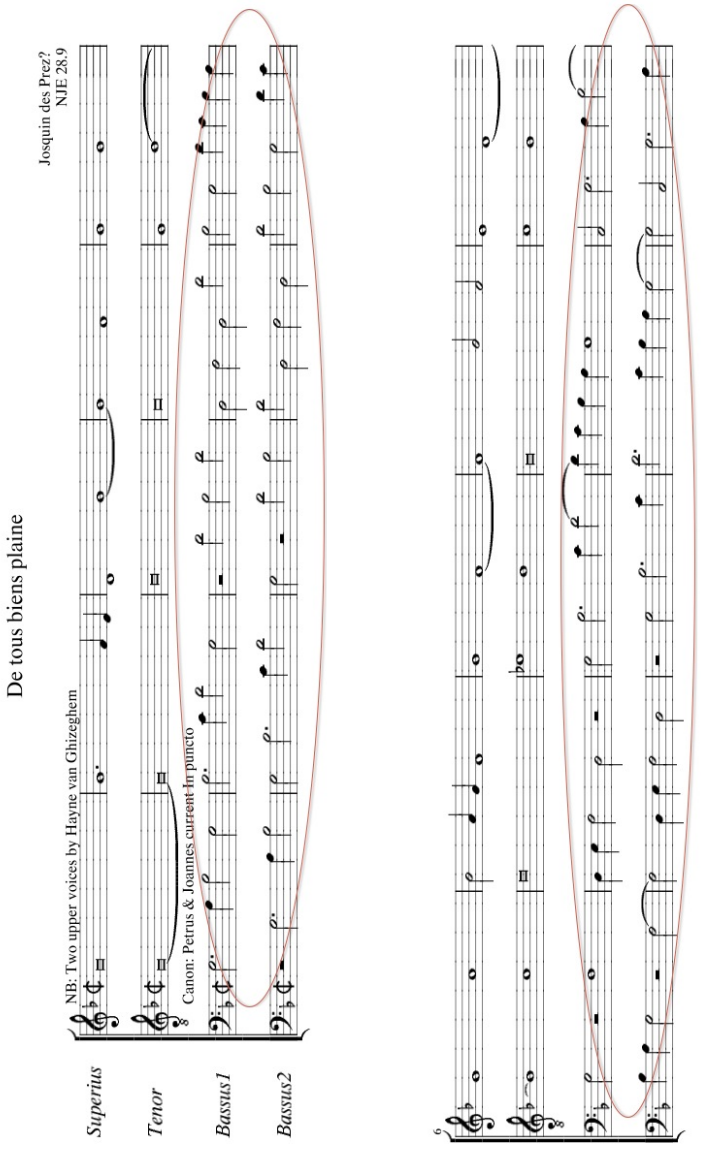
weniger Kompositionen als vielmehr Relikte des Improvisationsstils eines Sängers darstellen, könnte zum einen erklären, weshalb das Repertoire zu größten Teilen ohne Zuschreibung überliefert ist. Zum anderen wird auch die stilistische Vielfalt verständlich, die die in den Schriftquellen erhaltenen *si placet*-Stimmen kennzeichnet: Einige von ihnen versuchen, durch Imitation der melodischen Motive Bestandteil des polyphonen Satzes zu werden und diesen auszubauen, wie etwa in Bidons sechster Stimme zu Josquins *Miserere* oder auch der fünften Stimme von Verdelot zu Janequins *La bataille* (Notenbeispiel 3) zu sehen ist.[26]

26 Bidons sechste Stimme zu Josquins Miserere ist in Schlagel, Si Placet Parts (wie Anm. 10), S. 22–62 zu finden. Zu Bidon und mehrstimmiger Improvisation siehe Canguilhem, L'improvisation polyphonique (wie Anm. 4), S. 209–212.

In anderen Fällen erwecken die hinzugefügten Stimmen hingegen den Anschein, als seien sie dazu bestimmt gewesen, die Virtuosität des Sängers hervorzuheben, wie der über zwei Oktaven reichende Ambitus in *Huc me sidereo* oder die Konstruktion eines Minimenkanons, der etwa in der bekannten, Josquin zugeschriebenen Version von *De tous bien plaine* anzutreffen ist, suggerieren (Notenbeispiel 4).[27]

In beiden Fällen gewähren die Beispiele von notierten *si placet*-Stimmen einen faszinierenden Einblick in eine Fertigkeit, die die besten Musiker des 15. bis 17. Jahrhunderts besaßen. In Verbindung mit den Traktaten und anderen Belegen, wie etwa Correas *Parecer,* kann die Betrachtung dieser Aufzeichnungen einen Schlüssel zum Verständnis einer der bemerkenswertesten Praktiken polyphonen Improvisierens in der Renaissance bieten.

27 *Huc me sidereo*, gelegentlich Josquin zugeschrieben, ist mit der anonymen sechsten Stimme ediert in Schlagel, Si Placet Parts (wie Anm. 10), S. 3–21. Zu Kanones als gebräuchliche Improvisationstechniken siehe Canguilhem, L'improvisation polyphonique (wie Anm. 4), S. 217–220 sowie die weiterführende Literatur.



Notenbeispiel 4. Hayne van Ghizeghem, *De tous biens plaine* mit hinzugefügtem Kanon von Josquin Desprez.