
**BEFORE OBSOLESCENCE:
CULTURAL ROLES OF
COMBINATION KEYBOARDS IN
EUROPE, 1490–1892**

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ABSTRACT

Combination keyboards are hybrid musical instruments incorporating two or more autonomous components within a single object. These component instruments may be played separately or coupled from a keyboard interface. Such instruments include claviorgans (pipe and plucked-string combinations), bowed keyboards, mother-and-child virginals, and *vis-à-vis* keyboards. Documentary evidence from the period ca. 1490–1750 indicates that this now seldom-heard species of keyboard instrument enjoyed a position of relative popularity amongst Europe’s ruling classes being representative of both the esteemed social status of their owners, as well as that of mechanical and creative experimentation. From the mid-eighteenth century through to the end of the nineteenth century combination keyboards were continually ‘reinvented’ and sporadic (and generally unsuccessful) attempts were made to commodify them throughout the nineteenth century.

This thesis addresses the disparity between the marginalised representation of combination keyboards in our present-day historiography of early music, and their prevalence throughout Europe during the late-fifteenth to nineteenth centuries. In light of a diminutive number of extant instruments and an absence of known repertoire specifically for combination keyboards this research seeks to determine the broader historical cultural roles embodied by these instruments.

Approaching the approximately four-hundred-year history of combination keyboards in Europe in a chronological fashion, this study investigates their status as objects of cultural capital from a critical organological perspective, engaging with historical sources and contemporary analyses of extant instruments in a case study format. Each case study presented in this thesis examines combination keyboards as they existed in their historical contexts, and investigates the impact of changing socio-political factors on the perceptions of these instruments’ cultural roles.

PREFACE

DECLARATION

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This is to certify that:

- (i) the thesis comprises only my original work towards the Master of Music (Musicology/Ethnomusicology);
- (ii) due acknowledgment has been made in the text to all other material used;
- (iii) the thesis is fewer than 50,000 words in length, exclusive of tables, maps, bibliographies and appendices

Signature:

Name: Elly Miranda Langford

Date: 20 August 2019

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NOTE ON LANGUAGE CONVENTIONS

This thesis draws on documents and inventories from across Europe during the sixteenth to nineteenth centuries. Many of the quotes used from these documents are English translations of the language in which they were originally published. Translations taken from other publications (such as scholarly articles or books) are referenced, and where available, the original language quotation has been included in the footnotes. Instances where English translations are my own, are also indicated in the footnotes, and the original text is also included. Sources in Tudor English (mostly appearing in Chapter One) are quoted as they originally appear, with the exception of words that do not appear in present-day English, which are italicised, with their modern-day translation appearing in-text, in square brackets: [].¹

¹ This follows the convention set out in Wilson Barry, “The Keyboard Instruments of King Henry VIII”, *The Organ Yearbook* 13 (1982): 31-44, who also provides discussion on the appropriate interpretation of Tudor English sources, and common language-based misunderstandings that arise in modern scholarship.

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INTRODUCTION

OVERVIEW

In light of the relative scarcity of modern-day interest in combination keyboards—which has remained a constant since the obsolescence of these instruments toward the end of the nineteenth century—this thesis sets out to determine the roles that these instruments played as cultural objects in the early modern and industrial periods. The approach that I take in this research draws directly from the principles of critical organology. This perspective looks beyond the explicitly musical function of combination keyboards to consider their historical roles as objects of visual art, cultural capital, and results of mechanical innovation and experimentation. This invites a broader investigation of the various contexts in which combination keyboards existed, and takes into account the influence of social and political factors on perceptions of and practices involving musical instruments.

This thesis is structured in three main parts, each addressing a pivotal aspect of the various cultural roles and perceptions of combination keyboards throughout the sixteenth to nineteenth centuries. Chapter One looks at the origins of the claviorgan's popularity following its adoption by the Spanish court and its dissemination to other courts across Europe during the sixteenth century. In this part of the study, I examine the factors that facilitated the spread of combination keyboards throughout Europe, in addition to the cultural meanings that these instruments were imbued with as a result of their inclusion in musical and other cultural practices specific to the ruling classes during the early modern period. This chapter draws on documented examples from the royal courts of Spain, England, and the ducal courts of Florence that involve the use of claviorgans (both directly and more subtly) to further a political message or agenda, including instances of diplomatic gift-exchange, patronage of instrument builders, and the use of instrumental music performance to convey ideals of individual and institutional power.

Chapter Two considers the influence of early modern materialist philosophy inspired by the works of Diderot, La Mettrie, and Engramelle. In this chapter I explore the seventeenth and eighteenth century's heightened preoccupation with intellectual discovery and the motivations behind the construction of technically complex and intricately decorated combination keyboards. Here, the practice (popular amongst the ruling classes and wealthy

intelligentsia) of assembling cabinet collections—or *Wunderkammern*—and the frequent inclusion of combination keyboards in these collections is examined with the aim of determining the extent to which these instruments were sought after for their musical function or their perceived status as ‘curiosities’ or *objets d’art*.

The socio-political influence behind the establishment of private cabinet collections (namely, the differentiation between social classes) and the acquisition of combination keyboards within this context is further highlighted through a comparative analysis of other types of musical and mechanical ‘curiosities’—musical automata—that captured the imagination of the public during the mid-to-late eighteenth century. Comparing the reception of these automata to that of combination instruments whose construction had been supported financially through the patronage model, assists in contextualising these instruments by presenting them as one part of a wider culture of technological experimentation.

Chapter Three identifies the ‘second wave’ of combination keyboards in Europe, characterised by significant redesigns, incorporating new keyboard technologies and instrument manufacturing practices. Broader social and political changes occurring from the end of the eighteenth century, such as the French Revolution and the growth of consumerism in the middle classes are examined as non-musical influences on the trajectory of musical instrument design, construction, and commercialisation during the period ca.1841–92. In this chapter, I investigate the circumstances of the failure of combination keyboards to succeed as commodities in the emergent musical instrument ‘market’, and examine possible organological, financial, and social causes that led to their obsolescence at the end of the nineteenth century.

RESEARCH OBJECTIVES, SCOPE, AND SIGNIFICANCE OF THE PROJECT

Whilst acknowledging the predominantly musical function of these instruments (used in both solo and ensemble settings), this study focuses on the broader aesthetic, social, and political functions of combination keyboards. I analyse them as objects of cultural capital that could be interpreted as representations of their owners’ social status and cultural influence. By engaging with combination keyboards as cultural objects rather than exclusively ‘musical’ instruments—which carries connotations of an explicitly defined

purpose—it is possible to investigate a species of historical keyboard instrument for which no known repertoire, and sparse physical evidence survives. Drawing on a wide range of non-musical sources (including inventories, court records, exhibition catalogues, and advertisements) as well as contemporary analyses of extant instruments, this research sets out to illuminate the cultural and social significance of combination keyboards in their historical contexts by determining the following:

1. The role of combination keyboards (particularly the claviorgan) in the royal courts of sixteenth- and seventeenth-century Europe, and the extent to which the musical culture of the courts shaped the perceived meaning of these instruments, effectively positioning them as instruments ‘belonging’ to a particular social and cultural context;
2. The significance of combination keyboards as mechanical objects, representative of technological innovation in areas of musical instrument design and construction, and the reasons behind their inclusion in seventeenth- and eighteenth-century cabinet collections;
3. The extent of the relationship between changing social and political structures in industrial Europe and the declining popularity (both culturally and commercially) of combination keyboards, despite widespread efforts to redesign, or ‘reinvent’ them using newly invented technologies and instrument manufacture processes.

This study encompasses the approximately four-hundred year period in which combination keyboard instruments were constructed and used throughout Europe, starting with the first recorded appearances of claviorgans in the royal courts of Spain in the 1490s, and concluding in the wake of attempts to re-invent and commercialise these instruments throughout the nineteenth century. Engaging with such a large time span facilitates the examination of this species of keyboard instrument in a variety of contexts, and also allows for an investigation of the influence that changing social customs and political structures in Europe had on the development of these roles. Through this research, I do not intend to investigate why combination keyboards currently exist on the margins of musicological and organological scholarship, nor is this an attempt to document all known instances of the ownership or use of these instruments. Rather, this study is concerned with combination keyboards in their historical contexts, and is focused on uncovering the roles of these instruments and their significance within past societies and cultural practices.

Existing research concerning combination keyboards (which will be discussed in depth below in the Literature Review) provides a small selection of organological analyses, or ‘cultural biographies’ of extant instruments, detailing the individual history of the instrument, providing physical measurements and commentary on the materials used in its construction, but often not focusing on how the instrument itself fits into a larger musical or cultural context. Notable research concentrating on the musical roles and significance of combination keyboards in the early modern period has only emerged in the 2010s, exemplified by Eleanor Smith’s work on the history of the claviorgan, the most commonly occurring variant of this instrument species.

As such, this thesis serves to build on the foundations laid out in this work, and offer a comprehensive investigation of the larger-scale influences (social, political, and cultural) that shaped the design, construction, use, and general perceptions of combination keyboards in sixteenth- to nineteenth-century Europe. By focusing on the broader cultural functions and meanings of combination keyboards, whilst also acknowledging the relationship between these roles and the inherently musical function of these instruments, this research approaches an under-examined species of historical keyboard instrument from a perspective that takes into account the complexities of cultural objects.

LITERATURE REVIEW

TERMINOLOGY FOR THE IDENTIFICATION AND CLASSIFICATION OF COMBINATION KEYBOARDS

Throughout their almost four-hundred-year history, combination keyboard instruments have been identified, described, and categorised using a broad range of largely non-standardised terminology. Brought about by the wide-ranging historical and geographical scope of their existence throughout late fifteenth- to nineteenth-century Europe, this terminology reflects the regional languages, and conceptions of musical instrument categorisation (the precursor to modern organology) that shaped the musical contexts in which combination keyboards existed.

There exists a selection of key texts from the sixteenth and seventeenth centuries that may be considered part of the foundations of modern organology, and thus responsible for our present-day conceptions of musical instruments—both historical and modern—and their taxonomical classification. Amongst these, the works of Sebastian Virdung (c. 1465–c.

1512), Gioseffo Zarlino (1517–90), Michael Praetorius (1571–1621), and Marin Mersenne (1588–1648) are described by Margaret Kartomi as the “most innovating instrument taxonomists, [conducting] relatively complex investigations into instruments.”¹ Both Virdung and Praetorius engaged in the “systematic categorisation” of musical instruments, giving rise to the concept of ‘instrument families’, which persists in the modern-day classification of instruments.² Virdung’s *Musica getutscht und außgezogen* (1511) includes diagrams of the instruments he classifies, accompanied by their names—including the ‘clavichord’, ‘virginal’, and ‘clavicimbalum’ (thought to be a harpsichord)—providing indisputable examples of terminology used in the early sixteenth century.³

More relevant, however, in terms of the present study, is Praetorius’ use of the term *claviorganum*.⁴ Praetorius uses this term in *Syntagma musicum* (1619) to refer to an instrument where “pipes are sounded by air from the bellows, and strings are plucked with quills [when a keyboard is played].”⁵ As Eleanor Smith notes, this “quasi-Latin” term is still often used interchangeably with the English term ‘claviorgan’ (which Smith uses in her own work, a convention that I follow in this thesis), a sign of what she believes is a need for a “new nomenclature [relating to types of combination instruments]”, which “[uses] the accepted nomenclature for types of keyboard instruments, as well as distinguishing between instruments where the two parts can be played together from a single keyboard, from those that have a separate keyboard for the two parts.”⁶

Smith’s new nomenclature for the accurate identification of various types of combination instruments aims to cover all possible variations of—to borrow Praetorius’ terms—*omnivoca* and *univoca* instruments.⁷ Smith first distinguishes between instruments of different sizes (“chamber instrument, as opposed to [a] larger church organ”), before establishing the instrument’s status as a combination of instruments (that can either be

¹ Margaret Kartomi, *On Concepts and Classifications of Musical Instruments* (Chicago: University of Chicago Press, 1990), 149.

² John Tresch and Emily Dolan, “Toward a New Organology: Instruments of Music and Science”, *Osiris* 28.1 (2013): 281.

³ Sebastian Virdung, *Musica getutscht: A treatise on musical instruments (1511)*, trans. Beth Bullard (Cambridge: University Press, 1993), 109.

⁴ Michael Praetorius, *Syntagma musicum: De Organographia (1619)*, trans. David Z. Crookes (Oxford: Clarendon Press, 1986), 5, 67.

⁵ *Ibid.*, 24.

⁶ Eleanor Smith, “The History and Use of the Claviorgan” (PhD Dissertation, University of Edinburgh, 2013), 34.

⁷ *Omnivoca* instruments: “All voices ... [including] organ, positive, regal, and enlarged two-, three-, and four-string harpsichords”; *Univoca* instruments: “One voice ... melodic instruments that can only create a single part.” Definitions from Michael Praetorius, *Syntagma musicum III*, trans. Jeffrey Kite-Powell (New York: Oxford University Press, 2004), 129–130.

played from a shared keyboard, or from separate keyboards within a single entity), or separate instruments (that are not classified as combinations).⁸

Within this classification structure, the term ‘claviorgan’ is used as an umbrella term for any keyboard instrument that is a combination instrument, or, for any combination instrument “whose specific construction cannot be ascertained from the historical sources.”⁹ Likewise, a chamber organ (including variations such as “harmoniums, regals, and later electric organs”) combined with another instrument, controlled from a shared keyboard, is classed as an “organised-*x*” (e.g. organised-harpsichord), and a combination featuring a keyboard for each component instrument is classed as an “organ-*x*” (e.g. organ-clavichord).¹⁰ This system for distinguishing between different types of combination keyboards is the most straightforward, yet sufficiently comprehensive, to date, and aligns with other approaches to combination keyboard nomenclature still in use today, avoiding further confusion.¹¹ Smith discusses the relatively scant number of options available when attempting to identify a combination instrument, and contrasts her system to the “more complicated than necessary” numerical identification system proposed—but not adopted in wider organological practice—by Wilson Barry in 1984.¹²

There are, however, still some historical combination keyboards that “do not easily fit into any category of claviorgan”, such as the “instrument combining regal and octave spinet in the form of a gaming board [from 1587]” and an instrument comprised of seven components by Michele Todini in the mid-seventeenth century.¹³ Such instruments appear to be unique exceptions, rather than reflections of a shortcoming of Smith’s system. This is also supported in the literature concerning these instruments individually, as there are no indications towards a widely-accepted terminology for describing them.

⁸ Smith, “History and Use of the Claviorgan”, 35.

⁹ Ibid., 34.

¹⁰ Ibid., 35.

¹¹ For instance, Smith’s use of the term ‘organised-*x*’, aligns with the French term for combined instruments featuring an organ: ‘*x-organisé(e)*’.

¹² Smith, “History and Use of the Claviorgan”, 32-33.

¹³ Ibid., 36-37. Smith refers to the seven-component instrument as the *Galleria Armonica*, although it should be noted that this is the name of the entire collection of experimental instruments of music and mathematics that Todini created, and this particular instrument is the *Macchina maggiore* (Greater Machine).

MARGINALISATION OF COMBINATION KEYBOARDS THROUGH SELECTIVE HISTORIOGRAPHY IN THE TWENTIETH AND TWENTY-FIRST CENTURIES

‘Traditional’ Organology and Critical Organology

Classification is needed, then, partly in order to grasp, remember, and teach others the diversity of species. It results from the desire to simplify and understand ... The security proffered by a classification scheme helps us to comprehend an intimidatingly large or profound body of knowledge. We feel that we are more able to control the items contained in the scheme and to use them with confidence.¹⁴

Margaret Kartomi, 1999.

Discussing the purpose of classification systems in the study of musical instruments (including both Western and non-Western instruments), Kartomi explores the relationship between these instruments and those who interact with them, as represented through the musicological discipline of organology. The ‘traditional’ organology that Kartomi refers to aligns closely with the founding principles of the discipline, promoted in the late nineteenth- and early twentieth-century works of Victor-Charles Mahillon (1893), Francis Galpin (1910), and Erich von Hornbostel and Curt Sachs (1914).¹⁵ Hornbostel and Sachs’ “Classification of Musical Instruments” (“Systematik der Musikinstrumente: Ein Versuch,” 1914) is one of the more enduring of these early twentieth-century works, and has had a significant impact on the development of organology over the course of the twentieth century. Prefacing their 1961 translation of “Classification of Musical Instruments”, Anthony Baines and Klaus Wachsmann note that “no other system of classification is more frequently quoted, nor has any later system been able to supplant it.”¹⁶

The Hornbostel-Sachs system is founded on the principle of Mahillon’s “four-class system” of classification—in which “subdivisions [figuring] importantly among European instruments ... assumed an unwarrantably prominent place”—and uses the Dewey

¹⁴ Kartomi, *On Concepts and Classifications*, 3.

¹⁵ Victor-Charles Mahillon, *Catalogue descriptive & analytique du Musée instrumental du Conservatoire royal de Bruxelles*, (Brussels: T. Lombaerts, 1893); Francis W. Galpin, *Old English Instruments of Music: Their History and Character* (1910), Fourth Edition, rev. Thurston Dart (London: Methuen & Co., 1965); Erich M. von Hornbostel & Curt Sachs, “Systematik der Musikinstrumente: Ein Versuch”, *Zeitschrift für Ethnologie* 4.5, (1914): 553-590.

¹⁶ Erich M. von Hornbostel, and Curt Sachs, “Classification of Musical Instruments: Translated from the Original German by Anthony Baines and Klaus P. Wachsmann”, *The Galpin Society Journal* 14 (1961): 3-29.

numerical system to indicate each categorised instrument's class and relevant subdivisions.¹⁷ Dividing instruments by their means of sound production, and basing subdivisions “only on those features which can be identified from the visible form of the instrument”, Hornbostel and Sachs consider “museum curators ... field workers and ethnologists” as the intended users of their system, and as such, claim to have “carried the subdivisions as far as seemed important for the observation of cultural history.”¹⁸ In this attempt to apply a numerical system to differentiate between types of musical instrument based on their physical sound production traits, and indicate their cultural functions, the limitations of Hornbostel and Sachs' classifications emerge. The given specifications for instruments, categorised according to their sound production (e.g. pianoforte: 314.122-4-8; harpsichord: 314.122-6-8) are relatively easy to follow when one is familiar with the system—314.122 denotes a chordophone with a resonator box, and “8 represents the keyboard, 4 the hammer-playing action, and 6 the plectrum playing-action”¹⁹—yet there is no specification for indicating an instrument's cultural functions.

This failure of the most prevalent system of modern instrument classification to account for the cultural roles of musical instruments within the same framework as their physical characteristics and sound production mechanisms is indicative of the “divide ... between the study of music (musicology) and the study of instruments (organology).”²⁰ In their exploration of a ‘new’ organology, Emily Dolan and John Tresch consider this divide to be an “artificial” construct emerging in the early twentieth century, to render organology unable to account for the social, ethical, and cultural aspects of musical instruments. This critical comparison of organology and its broader parent-discipline, musicology, forms part of a new discourse surrounding the study of musical instruments: critical organology.

First appearing in publication in 2008, the term ‘critical organology’ was used to describe a new approach to the study of musical instruments, which was concerned not only with the physical or sound production characteristics of instruments, but also their cultural, social, and political roles, and how they—as man-made objects—fit into the concept of material culture.²¹ As Maria Sonevsky explains, critical organology differs from

¹⁷ von Hornbostel and Sachs, “Classification of Musical Instruments”, 7.

¹⁸ Ibid., 8, 10.

¹⁹ Ibid., 11.

²⁰ Tresch and Dolan, “Toward a New Musicology”, 278.

²¹ The term ‘critical organology’ is currently the most widely used for this new approach to the study of musical instruments, having been used at an American Musical Instrument Society roundtable discussion in November, 2013, documented in Emily Dolan & Jessica Wood, “Perspectives on Critical Organology”, *The Newsletter of the American Society of Musical Instruments* 43.1 (2014): 14–16. Alternative terms that have been used in reference to critical organology include ‘musicology of interfaces’, in Emily Dolan, “Toward a

“contemporary ethnomusicological approaches ... [emphasising] the object’s use value” by focusing instead on the “political and therefore, social value” of the object, as embodied in its “exchangeability.”²²

The concept of exchangeability being representative of an object’s social and political value is adopted directly from Arjun Appadurai’s *The Social Life of Things: Commodities in Cultural Perspective*. In the introduction to the 1986 edition, Appadurai posits that by “focusing on the things that are exchanged rather than simply on the forms or functions of exchange, makes it possible to argue that what creates the link between exchange and value is *politics*.”²³ This idea is later expounded upon in a later chapter by Christopher Bayley, who, while not discussing musical objects, does illustrate the differences between a ‘social history’ and a ‘cultural biography’ of an object, two ideas that are highly applicable to the cultural study of musical instruments:

Cultural biography ... is appropriate to specific things, as they move through different hands, contexts, and uses ... When we look at classes or types of thing, however, it is important to look longer-term shifts and larger-scale dynamics that transcend the biographies of particular members of that class or type.²⁴

Musical Historiography of Combination Keyboard Instruments, 1990 to the Present Day

The influence of critical organology can be seen across an increasing portion of twenty-first century literature on the history of Western musical instruments. Within the context of the early music revival, there are two distinct bodies of publications concerning the social history of early keyboard instruments, and the cultural biographies of individual instruments, considered to be of particular historical, cultural, or organographic importance.

Musicology of Interfaces”, *Keyboard Perspectives: Yearbook of the Westfield Center for Historical Keyboard Studies* 5 (2012): 1–12, and ‘New Organology’, in Dolan & Tresch, “Toward a New Musicology”, 278–298.

²² Maria Sonevytsky, “The Accordion and Ethnic Whiteness: Toward a New Critical Organology”, *The World of Music* 50.3 (2008): 103.

²³ Arjun Appadurai, “Introduction: Commodities and the Politics of Value”, *The Social Life of Things: Commodities in Cultural Perspective*, ed. Arjun Appadurai (Cambridge: Cambridge University Press, 1986), 3.

²⁴ Christopher Bayley, “The Origins of Swadeshi: Cloth and Indian society 1700–1930”, *The Social Life of Things: Commodities in Cultural Perspective*, ed. Arjun Appadurai (Cambridge: Cambridge University Press, 1986), 34.

Amongst the first group of these publications—those on the social history of types, or classes, of keyboard instruments—the focus lies on Dolan and Woods’ more ‘dominantly asserted’ instruments, and explores their roles within the political behaviours and cultural practices of their historical contexts.²⁵ The second group of publications—concerning the cultural biographies and material characteristics of individual instruments—is where the majority of literature on combination keyboards is located, with extant instruments, and select non-extant examples (recorded in court inventories) attracting the largest focus. Literature focusing solely on early modern combination keyboards is grouped by the geographical locations where evidence for these instruments (including claviorgans, mother-and-child virginals, and unique, experimental combinations) has been found, particularly England, Spain, Italy, France, and the Central European countries of Germany, Austria, and the Netherlands.

England, Sixteenth and Seventeenth Centuries

Malcolm Rose’s work on combination keyboards in England during the sixteenth century focuses entirely on one instrument, the extant 1578 Lodewijk Theewes claviorgan. Rose traces the cultural biography of the Theewes claviorgan, examining organological and documentary evidence to reveal the past owners of the instrument, and map its movement between noble residences and chapels throughout the period 1578–1593. This investigation gave rise to the discovery that the Theewes claviorgan was likely familiar to composers such as Thomas Tallis (c.1505–85) and William Byrd (1539/40–1623), and was possibly associated with music-making in the presence of Elizabeth I.²⁶

Unlike his 2002 article detailing the organographical characteristics of the Theewes claviorgan—the compass, physical dimensions, materials, and decoration of the instrument are all examined²⁷—Rose’s 2004 article offers a glimpse of what could be considered a ‘critical’ organological exploration of the instrument’s significance within the musical culture of sixteenth-century England. Aside from the discovery of evidence positioning the

²⁵ Select examples of this include Beryl Kenyon de Pascual’s “Clavicordios and Clavichords in 16th century Spain”, *Early Music* 20.4 (1992): 611–630; Eleanor Selfridge-Field’s “The Invention of the Fortepiano as Intellectual History”, *Early Music* 33.1 (2005): 81–94; Patrizio Barbieri’s “Harpsichords and Spinets in Late Baroque Rome”, *Early Music* 40.1 (2012): 55–72; and Tess Knighton’s “Instruments, Instrumentalists and Instrumental Music: Traditions and Transitions”, *Companion to Music in the Age of the Catholic Monarchs*, ed. Tess Knighton (Leiden: Brill, 2017), 97–144.

²⁶ Malcolm Rose, “The History and Significance of the Lodewijk Theewes Claviorgan”, *Early Music* 32.4 (2004): 581, 585.

²⁷ Malcolm Rose, “Further on the Lodewijk Theewes Harpsichord”, *The Galpin Society Journal* 55 (2002): 279–309.

instrument within the presence of prominent composers and royalty, Rose also draws some conclusions as to what kind of music the Theewes claviorgan was used for (“to accompany the Catholic Mass in the Organ Room at Farningham ... the idea of combining the organ with the harpsichord ... [creating] an all-round instrument for domestic music-making”²⁸), and the possible political implications of such a purpose, given the “inconvenience and even danger of holding on to the [Catholic] religion” during the Elizabethan era.²⁹

Despite a general lack of literature exploring the broader cultural roles of combination keyboards throughout the early modern period, Eleanor Smith provides a rare contribution to this area. Expanding on a stand-alone article by Stephen Wessel in 1977, Smith examines the prevalence of claviorgans in sixteenth- and seventeenth-century England, and addresses this type of instrument’s “[relegation] to a side note in history”, due mostly to “the relative paucity of surviving instruments, and their previously-supposed position as oddities or novelties.”³⁰

From Smith’s article alone (for there are no other publications at this stage, which address the broader cultural or social history of combination keyboards in England), the historical social and political contexts of claviorgans are reconstructed. Smith positions claviorgans primarily within the cultural practice of royal and noble patronage of the arts, citing inventories from the Palace of Greenwich and Westminster during the reign of Henry VIII, and of patrons such as Thomas Dudley (1576–1653) and Sir Robert Cecil (1563–1612).

Spain and Italy, Sixteenth to Eighteenth Centuries

References to combination keyboards (mostly claviorgans) in both Spain and Italy appear most frequently in literature examining inventories of the royal courts and households of the sixteenth to eighteenth centuries. Andreas Beurmann introduces the “only surviving *vis-à-vis* harpsichord”—a 1691 instrument attributed to Roque Blasco—in a broader discussion of the rarity of surviving Spanish keyboard instruments.³¹ The discovery of this *vis-à-vis* harpsichord (comprised of two harpsichords in the same case, facing each other, with separate manuals allowing the component instruments to be played individually or in tandem) extends the history of this particular type of combination keyboard back an

²⁸ Rose, “History and Significance”, 588.

²⁹ Ibid., 586.

³⁰ Eleanor Smith, “The English Claviorgan in the Sixteenth and Seventeenth Centuries”, *The Galpin Society Journal* 68 (2015): 21.

³¹ Andreas Beurmann, “Iberian Discoveries: Six Spanish 17th century Harpsichords”, *Early Music* 27.2 (1999): 200.

additional eighty-six years (from German builder, Johann Andreas Stein, in 1777), as well as positioning this variant within the canon of Iberian musical instruments.³²

Vis-à-vis combinations in Italy during this period are referred to in Patrizio Barbieri's examination of harpsichords and spinets of seventeenth- and eighteenth-century Rome, which, like Beurmann's discovery of the 1691 Blasco, also reveals that such instruments existed well before Stein's late eighteenth century iterations.³³ Barbieri briefly discusses three *vis-à-vis* instruments, categorised as "unusual harpsichords: those with more than three registers, or one keyboard", that belonged to Italian princes and a Cardinal, respectively, in the mid-seventeenth century.³⁴

Barbieri suggests that the first of these *vis-à-vis* instruments—a "large harpsichord, table shaped, which can be played on two sides"—is possibly the earliest known of its kind, appearing in a 1649 inventory of Prince Pompeo Colonna.³⁵ The next mention of a *vis-à-vis* harpsichord, this time "for playing in three persons" (suggesting three component instruments) appears in 1666, in the inventory of Prince Chigi.³⁶ The third instrument Barbieri makes note of is an instrument belonging to Cardinal Virginio Orsini in 1676—"a small harpsichord with a spinet attached, with case"—which is likely more closely related to the design of the mother-and-child virginal, with a detachable octave-pitched instrument (the spinet component in this case), as opposed to the *vis-à-vis* instruments whose physical structure demands multiple performers.³⁷

Both Beurmann's and Barbieri's articles provide insight into some of the more 'obscure' types of combination keyboards that existed in Spain and Italy during the sixteenth and seventeenth centuries, and shared—despite the geographical separation of these two regions—common design elements that appear later, in other parts of Europe. However, the roles that such instruments played within their native contexts are not specifically addressed, and any discussion of the roles of keyboard instruments within the context of noble courts is kept broad, encompassing all kinds of keyboard designs, not just combination instruments.

³² Stein's *vis-à-vis* instruments, as well as some of his other experimental combinations, are discussed further in varying detail in Laurence Libin, "Progress, Adaptation, and the Evolution of Musical Instruments", *Journal of the American Musical Instrument Society* 26 (2000): 187-213; and Michael Latcham, "Franz Jakob Spath and the 'Tangentenflügel', an Eighteenth Century Tradition", *The Galpin Society Journal* 57 (2004): 150-170.

³³ Barbieri, "Harpsichords and Spinets", 60.

³⁴ *Ibid.*, 58.

³⁵ *Ibid.*, 60.

³⁶ 'Un cimbalo con sua cassa tinta a colori di noce profilata di oro, con suoi piedi torniti da sonare in tre persone' trans. Barbieri, "Harpsichords and Spinets", 60.

³⁷ Barbieri, "Harpsichords and Spinets", 60.

Beryl Kenyon de Pascual provides a more specialised discussion of the roles of combination keyboard instruments at the Spanish court, suggesting that claviorgans in particular were likely considered the “most valuable stringed keyboard instrument[s],” given as “costly gifts” made of expensive materials, or designed to imitate novelty shapes (“miniature instruments combined with a sewing box, small writing desk, gaming board”).³⁸ Similarly to Beurmann, de Pascual does not focus exclusively on combination keyboards, but rather mentions them in passing, along with other types of keyboard instruments present in the Spanish court during the sixteenth and seventeenth centuries. This does, however, enable a comparison of the roles of combination keyboards and other more mainstream specimens (e.g. harpsichord, clavichord). The perception of court-owned combination keyboards as novelties and “decorative objects for a cabinet of curiosities” is presented in direct contrast to the predominantly musical (performative) function of their single-instrument counterparts.

The role of combination keyboards, to communicate—through their function and material value—their owners’ social status is further discussed by Tess Knighton in “Instruments, Instrumental Music and Instrumentalists: Traditions and Transitions”. Knighton examines the “impulses behind the employment of instrumentalists” in the Catholic courts of sixteenth-century Europe (of which Italy and Spain are prominent examples), identifying the growth of this practice with the continued perception of instrumental music as a “sonic symbol of princely presence ... an indicator of ... education, refinement, and discernment”.³⁹

Knighton also discusses inventories that reveal distinctive patterns of royal ownership of musical instruments, amongst which keyboards (and a small number of combination keyboards) are a consistent feature. Notably, an inventory compiled in 1535 of the chambers of Prince Juan (1478–97)—the son of Spanish monarchs Isabella I of Castile (1451–1504) and Ferdinand II of Aragon (1452–1516)—records the presence of “a claviorgan, and organs, and harpsichord, and a clavichord, and bowed and plucked vihuelas ... on all of which he knew how to place his hands.”⁴⁰ This specific reference to a member of the Spanish royal family possessing the ability to play the various instruments that he owned (which is but one of several similar references made in inventories of the same period, indicating that this was not uncommon practice) supports Knighton’s reiteration of the

³⁸ de Pascual, “Clavicordios and Clavichords”, 620. According to de Pascual, “Philip II’s most valuable stringed keyboard instrument was a small triangular *clavicordio*, in the form of a *claviórgano* ... only 62.5cm long.” (ibid.).

³⁹ Knighton, “Instruments, Instrumental Music, and Instrumentalists”, 99.

⁴⁰ Ibid., 104. Translated from Gonzalo Fernández de Oviedo, *Libro de la camara real* (1535).

modern understanding that noble individuals were increasingly involved in music-making, alongside the professional musicians under their employ.⁴¹

Knighton's discussion of claviorgans and their ownership throughout the Catholic courts of sixteenth-century Europe is, to date, one of the most comprehensive accounts of this type of combination keyboard instrument. Unlike most other twentieth- and twenty-first-century publications that mention combination keyboards, Knighton's focus lies primarily on the types of people who owned these instruments, and the possible role that such instruments could have played in the musical life of the courts.⁴² Knighton ascribes the popularity of combination keyboards—most particularly the claviorgan—in the courts of Spain, and subsequently Italy and France, to the complexity of its technology, which she describes as a “technological tour de force rapidly percolat[ing] through the courts of the higher echelons of society.”⁴³

Central Europe, Seventeenth and Eighteenth Centuries

Whilst there are known (and in some cases, extant) examples of claviorgans from the German-speaking lands and surrounding areas pre-dating the seventeenth century—such as the three extant claviorgans (1590, 1593, 1598) by Laurentius Hauslaib, and an organised virginal (1564–69) attributed to Servatius Rorif—the majority of literature mentioning combination keyboards in this part of the world addresses instruments and builders of the seventeenth and eighteenth centuries. Following the spread of Italian keyboard instruments throughout Europe (in particular, the Netherlands, the German-speaking lands, and France) during the sixteenth century, and the establishment of Central Europe as a stronghold for “craftsmanship ... [and] specialised skills”, there burgeoned, at the start of the seventeenth century, a strong “instrument-making trade.”⁴⁴

⁴¹ The concept of noble music-making was formally discussed as early as the sixteenth century, in Baldesar Castiglione's *Il Libro del Cortegiano* (Book of the Courtier) (Venice: Aldine Press, 1528).

⁴² Knighton acknowledges the sizeable gap in modern-day understandings of how music was used in court, and which instruments were used for specific purposes or events, noting that simple descriptions of instrumental music at events such as weddings are still considered ‘intriguing’, “Instruments, Instrumental Music and Instrumentalists”, 142.

⁴³ *Ibid.*, 134–135.

⁴⁴ Gabriele Rossi-Rognoni discusses the spread of Italian musical instruments and the influence this had on instrument building throughout Europe in the sixteenth century in “Italian Musical Instruments in Europe: The Dynamics of an Exodus”, *Marvels of Beauty and Sound: Italian Baroque Musical Instruments*, ed. Franca Falletti, Renato Meucci, and Gabriele Rossi-Rognoni (Florence: Giunti Editore, 2007), 49–59. The rise of specialised craftsmanship and the establishment of the Central European instrument-making trade is discussed by Gerard I.E. Turner in “The Cabinet of Experimental Philosophy”, *The Origins of Museums: The Cabinet of Curiosities in Sixteenth- and Seventeenth-Century Europe*, ed. Oliver Impey, Arthur Macgregor (Thirsk: House of Stratus, 2001), 300.

One of the names closely associated with Central European keyboard instrument building in the seventeenth century is that of the Ruckers family (Ioannes, Andreas I, and Andreas II were active during this time).⁴⁵ The Ruckers family were responsible for the construction of a variant of combination keyboard known as the mother-and-child virginal, often also referred to as a double virginal:

A virginal in which a removeable smaller octave virginal was housed ...
 [that] could play not only independently but also together, and in fact, the
 [octave virginal] could be placed on top of the virginal ... Could be played
 with both sounding at once by one performer ... or separately with a
 performer at each of the two individual instruments.⁴⁶

While organological analyses of extant Ruckers mother-and-child virginals have revealed much about the design and construction practices specific to this variant of combination keyboard (identifiable as such due to the presence of two component instruments that may be played separately or together within a single entity), there is little contemporary work published exploring the cultural roles of these instruments.⁴⁷ However, these analyses and organological ‘discoveries’—as they are called by Grant O’Brien and Augusto Bonza—offer insights into these instruments which allow inferences to be drawn as to the function of certain aesthetic or extra-musical characteristics.⁴⁸

Augusto Bonza’s discovery and organological analysis of the only known extant “child flap” belonging to a mother-and-child-virginal by Ioannes Ruckers (ca. 1600), housed in the Collection of Musical Instruments of the Castello Sforzesco, Milan, not only allows for the display of a complete instrument, and also begins to shape suggestions as to the ways in which the physical structure of the instrument shaped viewers’ perceptions of it. Bonza and O’Brien observe that the function of such a small part of the instrument’s physical structure—a part not directly linked to the instrument’s musical function—is to “close the

⁴⁵ Ioannes Ruckers (1578–1642), Andreas Ruckers I ‘The Elder’ (1579–1645), Andreas Ruckers II ‘The Younger’ (1607–1667).

⁴⁶ Francesco Nocerino, “Evidence for Italian Mother-and-Child Virginals: An Important Document Signed by Onofrio Guarracino”, *The Galpin Society Journal* 53 (2000): 319.

⁴⁷ Scholarly publications exploring the cultural role of mother-and-child virginals in the sixteenth and seventeenth centuries are limited, and the most comprehensive source I have found is that by John Koster: “The Mother and Child Virginal and its Place in the Keyboard Instrument Culture of the Sixteenth and Seventeenth Centuries”, *Brussels Museum of Musical Instruments Bulletin*, 7.1-2 (1977): 78-96, in which this type of instrument is summarised as an “exercise of technical ingenuity” (87).

⁴⁸ Augusto Bonza and Grant O’Brien, “The ‘H Ruckers’ Double Virginal in Milan. Two Important New Discoveries”, *The Galpin Society Journal* 52 (1999): 314–323.

space where the child virginal is normally stored ... to hide it from view when not in use.”⁴⁹ However, the reasons for why this may have been the case are not the focus of the article, and there is no further mention of what this particular ‘discovery’ may tell us about the instrument’s significance, or role.

Similarly, Francesco Nocerino discusses the potential uses of mother-and-child virginals in a performance context. Specifically noting that one such instrument present in Italy, described in a 1676 document by Onofrio Guarracino, was built in the ‘Flemish style’ (it is unknown where the instrument was actually constructed), Nocerino explains that this type of instrument was “built and in common use in the Low Countries”, and makes the assumption that they were “employed for the execution of repertories, written for two instruments, and therefore two performers, as well as for the ‘echo’ effects, where the two instruments used in combination would have been able to emphasise this particular characteristic.”⁵⁰

The above two examples (Bonza and O’Brien, and Nocerino) are indicative of the ‘traditional’ organological approach to writing about historical keyboard instruments, particularly those that do not have any clear ties to a particular composer, repertoire, or performer, as is the case with the majority of known combination keyboards. The paucity of publications engaging with combination keyboards from Central Europe highlights a distinct gap in our present understanding of who owned such instruments, and in what contexts they may have been used. The most promising piece of scholarship leaning towards this direction appears much earlier than the majority of literature examined in this review, dating from 1977. In this article, John Koster examines the physical and structural characteristics of the mother-and-child virginal, and through an analysis of three extant examples (two by the Ruckers family, one by Lodewijk Grouwels), he draws the conclusion that this particular type of instrument had an “important place in the oeuvre of the Ruckers ... [of] roughly eighty surviving instruments ... fifteen percent ... consisted of double virginals.”⁵¹

Also mentioned in literature exploring keyboard instruments in seventeenth- and eighteenth-century Central Europe are the 1781 claviorgan and *vis-à-vis* instruments of Johann Andreas Stein (1728–92), and the *Tangentenflügel* combinations of Franz Jakob Spath (1714–86). Robin Blanton’s 2012 PhD dissertation examines the perception of Stein’s 1781 claviorgan not only as a musical instrument, but also as a “work of art”—a classification

⁴⁹ Bonza and O’Brien, “The ‘H. Ruckers’ Double Virginal”, 315.

⁵⁰ Nocerino, “Evidence for Italian Mother-and-Child Virginals”, 320.

⁵¹ Koster, “The Mother and Child Virginal, 87.

designated to the instrument by the historian (and friend of Stein's), Paul von Stetten the Younger, in 1788—highlighting a particular instance where an instrument builder was considered a “*Künstler*”, or artist producing “work of particular merit”, in addition to being a practitioner of the “mechanical arts.”⁵² This dissertation exists as a rare example of an organological investigation of a combination keyboard that incorporates a cultural focus, as promoted within critical organology, and the outcomes of this particular research—regarding new insights into the way instrument builders were perceived—highlight the contributions to instrument scholarship that may arise from adopting this perspective.

Michael Latham provides detailed descriptions of the disposition of Stein's two surviving *vis-à-vis* piano-harpsichord combinations (from 1777 and 1783), suggesting that these instruments were “clearly intended to provide the player with many timbres.”⁵³ Latham's description of these instruments matches that of the 1691 Blasco *vis-à-vis* harpsichord, however he portrays Stein's use of a hammer action (piano) alongside the quilled action of the harpsichord component as the salient ‘experimental’ feature of the instrument, rather than its unconventional structure. Stein's other piano-harpsichord combination, the *Poly-Tono-Clavichordium* (1767), is described in a similar manner, detailing how it might be played (“made for just one player ... the stops were the same [as the harpsichord end of the later 1777 *vis-à-vis*] and all of them, including the piano, could be played from the third, lower manual”) and that it was, in effect, an experiment in keyboard instrument timbre.⁵⁴

Latham refers to another type of ‘experimental’ keyboard, the *Tangentenflügel*, which features a tangent-action, like that of the clavichord, rather than more traditional forms of piano or harpsichord action. Like Stein's *vis-à-vis* instruments, the *Tangentenflügel* “offered the player a considerable number of different timbres” and its invention is attributed to the South German instrument builder Franz Jakob Spath, in the 1750s, although tangent action itself was not a new development.⁵⁵ Latham identifies Spath's 1751 *Tangentenflügel*, presented to the Elector of Bonn (presumably Clemens August of Bavaria), as a significant example of this instrument type, as it bears the possibility of having “combined a tangent action with a harpsichord action”, as well as a “small, single-rank organ ... to imitate the ‘proper flute’.”⁵⁶ Despite the depth with which the technical characteristics and timbral

⁵² Robin Blanton, “Johann Andreas Stein's 1781 Claviorganum and the Construction of Art in Eighteenth-Century Augsburg” (PhD Dissertation, University of Gothenburg, 2012), 5–6.

⁵³ Latham, “Franz Jakob Spath and the Tangentenflügel”, 160.

⁵⁴ Ibid., 160.

⁵⁵ Ibid., 150, 169.

⁵⁶ Ibid., 163, 166.

capabilities of both the *vis-à-vis* harpsichord-piano and the *Tangentenflügel*-combinations are described, there is still a dearth of publications examining the roles that such instruments might have played, or if any composers wrote with them in mind.

CULTURAL PERCEPTIONS OF COMBINATION KEYBOARD INSTRUMENTS

[The instrument] ... is both a work of art and an object of curiosity.⁵⁷

Graham Sadler, 1989.

Graham Sadler's comment on the 1591 claviorgan by Josua Pockh is reflective of an attitude towards combination keyboards frequently appearing in publications of the twentieth and twenty-first centuries. This short description, separated from any specific organological details of the instrument, communicates two fundamental concepts that shape modern-day perceptions of early modern combination instruments: first, that they—like many other types of keyboard instrument from the same period—may be considered 'works of art' (*objets d'art*); and second, it frames their status as objects of 'curiosity'.

Literature engaging with the history of keyboard instruments (both combination and singular) from a range of perspectives—including organology, cultural history, and art history—is connected by a thematic agreement as to the significance of these instruments' visual appearance and decoration. Modern organological analyses of combination instruments, such as the Laurentius Hauslaib claviorgans (1590s), Michele Todini's Golden Harpsichord and Greater Machine (1650–90), and Ioannes Ruckers' mother-and-child virginal (ca. 1600), devote significant time to the description and discussion of the instruments' visual aesthetics.⁵⁸ In the case of Bonza and O'Brien's analysis of the Ruckers mother-and-child, this focus on the visual characteristics of the instrument serves to further the acknowledged pre-existing body of knowledge regarding the Ruckers family's instrument decoration practices.⁵⁹

⁵⁷ Graham Sadler, "Short Notices", *Early Music* 17.3 (1989): 475.

⁵⁸ Romà Escalas Llimona, "Claviorgans Attributed to Laurentius Hauslaib in New York, Moscow and Barcelona", *Music in Art* 27,1-2 (2002): 87-100; Emmanuel Winternitz, "The Golden Harpsichord and Todini's Galleria Armonica", *The Metropolitan Museum of Art Bulletin* 4.6 (1956): 149-156; Stewart Pollens, "Michele Todini's Golden Harpsichord: An Examination of the Machine of Galatea and Polyphemos", *Metropolitan Museum Journal* 25 (1990): 33-47; Patrizio Barbieri, "Michele Todini's 'Galleria Armonica': It's Hitherto Unknown History", *Early Music* 30.4 (2002): 565-582; Bonza and O'Brien, "The 'H Ruckers' Double Virginal", 314-323.

⁵⁹ Bonza and O'Brien, "The 'H Ruckers' Double Virginal", 318-323.

Combination Keyboards as Objets D'art

A harpsichord, for instance, could be painted attractively and displayed as an 'objet d'art'; with its method of sound production, it could also be presented as a mechanical device.⁶⁰

The "stylistic disparity" between the musical (functional) and decorative elements of keyboard instruments of the early modern period, made apparent through "painstakingly elaborate decoration ... [materials] used for purely decorative purposes ... adding to the instrument's costly prestige", led, as Flora Dennis states, to "the way an instrument looked [being] not merely a superficial afterthought but ... an intrinsic part of its identity."⁶¹ Current historiographical and organological perceptions of decorated keyboard instruments (of which harpsichords are the most commonly referenced example) as *objets d'art* recognise the importance of their dual function—as visual objects and musical instruments—in both historical and present-day contexts.

Pierre Bourdieu identifies musical instruments (an example of "material objects and media") as a form of cultural capital, existing in an objectified state.⁶² This state, which "presents itself with all the appearances of an autonomous, coherent universe ... [with] its own laws, transcending individual wills," relates to the physicality of an instrument, which is explicitly defined (and limited) by its structural characteristics.⁶³ As Bourdieu notes, the main difference between embodied and objectified cultural capital—where the 'embodied' state refers to the personal accumulation of cultural skills, or means of appropriating cultural capital—is their ability to be transferred as economic capital. In relation to musical instruments, therefore, the instrument itself (the objectified cultural capital) may be transferred as economic capital, through a change in legal ownership, but the ability of an individual to "consume" this capital (e.g. use it to make music) is not similarly transferred, as the consumption of cultural capital remains in the non-transferable, embodied form.⁶⁴

The non-transferable nature of the means required for the consumption of the capital inherent in musical instruments not only attests to the idea that they may be considered a

⁶⁰Ian Woodfield, "The Keyboard Recital in Oriental Diplomacy, 1520-1620", *The Journal of the Royal Musical Association* 115.1 (1990): 33.

⁶¹ Flora Dennis, "Musical Sound and Material Culture", *The Routledge Handbook of Material Culture in Early Modern Europe*, eds. Tara Hamling, Catherine Richardson, and David Gaimster (London: Routledge, 2017), 375.

⁶² Pierre Bourdieu, "The Forms of Capital", *Handbook of Theory and Research for the Sociology of Education*, ed. John G. Richardson (Connecticut: Greenwood Press, 1986), 50.

⁶³ Ibid.

⁶⁴ Ibid., 49-50.

combination of both embodied and objectified cultural capital, but suggests that their performative function is of greater significance than that of their objecthood. This perception is prevalent in ‘traditional’ organological literature addressing historical keyboard instruments (both combination and singular), and is one of the main perspectives that critical organology seeks to reconsider.

Drawing on Steve Waksman’s theory that the musical instrument can exist in five primary ways across both physical and cultural contexts (“as a commodity ... a material object reflective of technological developments and societal preferences ... a visual icon ... a source of knowledge about the mechanics of music ... and as a ‘voice’ ... the sonic manifestation of the physical apparatus”⁶⁵), Sonevtsky offers one such reappraisal of the relationship between the functionality of instruments and contemporary perceptions of value. Sonevtsky proposes that, given the status of musical instruments as both artefacts and sound-producing objects, the “performative act” (deemed necessary for “recreating” the social life of the instrument) should be extended “to include not only the dynamic between performer and audience, but among performer, *instrument*, and audience.”⁶⁶ Here, the instrument, objectified, is reintroduced to the concept (and act) of musical performance, still aligned with the idea that musical instruments are a combination of both embodied and objectified cultural capital, yet shifting the assignation of value to recognise the significance of both forms of capital.

Claudio Paolini argues that the significance of the musical instrument in an objectified state is further highlighted through the application of interdisciplinary approaches to the study of these objects. Integrating approaches from the decorative or applied arts to the “reading” of an instrument involves, Paolini states, “considerations on the relationship between form and function ... and on how the decorative element fits into this system of relationships.”⁶⁷ To consider highly decorative early modern keyboard instruments—particularly combination keyboards, where the form of the instrument frequently obscures, or in some cases, precludes its function—in this way offers a feasible addition to both traditional and critical organological approaches, by fully acknowledging the “importance of the beauty of the musical instrument”, and recognising the importance of

⁶⁵ Steve Waksman, “Reading the Instrument: An Introduction”, *Popular Music and Society* 26 (2003): 251.

⁶⁶ Sonevtsky, “The Accordion and Ethnic Whiteness”, 113. Italicisation for emphasis is my own.

⁶⁷ Claudio Paolini, “Musical Instruments between Decoration, Form and Function: Considerations on beauty”, *Marvels of Beauty and Sound: Italian Baroque Musical Instruments*, ed. Franca Falletti, Renato Meucci, and Gabriele Rossi-Rognoni (Florence: Giunti Editore, 2007), 61.

this design element in contributing to our understanding of the motivations behind instrument itself and the period from which it originated.⁶⁸

The importance that Paolini places on the consideration of historical context when investigating keyboard instruments in which form, function, and decoration are equally prevalent, serves a role similar to the socio-political and cultural focus of critical organology. Whereas critical organology attempts to include the study of an instrument's function or significance within its society and culture of origin, as well as its political implications or the broader cultural perceptions surrounding it, Paolini's suggestion of focusing on the instrument's visual qualities leads to more specific inquiry into the relationship between the arts and musical instruments of the past. The relationship between sixteenth- and seventeenth-century conceptions of art and science—"free, imaginative invention and the quest for the marvellous and the new"⁶⁹—and the design and construction of musical instruments is of particular focus here, and musical instruments are examined as surviving evidence of early modern philosophy, and intellectual and mechanical experimentation.

Combination Keyboards as 'Curiosities' in their Historical Context

The presence of "musical machines ... consistently found in the *Wunderkammern* and curio cabinets of Italian princes during the seventeenth and eighteenth centuries"—including combination keyboards and other inventions incorporating musical function and mechanical innovation—is suggested by Paolini and Renato Meucci as testament to the "wonder" that such instruments inspired in those who encountered them.⁷⁰ The criteria by which an instrument may be judged "a source of wonder" include: the obfuscation of the source of the instrument's sound, a visible musician—the appearance of which is that of an automaton—and, the instrument's ability to reproduce the sounds of instruments from other families.⁷¹

The examples that Paolini provides—Athanasius Kircher's mechanical-hydraulic organ, and Michele Todini's Golden Harpsichord and Greater Machine—all date from the seventeenth century, however, Paolini notes that the "development [of these instruments] should not be ascribed to the limited context of the seventeenth century ... they were part of the symbiotic evolution of arts and physical-mathematical sciences that already

⁶⁸ Paolini, "Between Decoration, Form and Function", 65.

⁶⁹ Ibid., 66.

⁷⁰ Paolini, "Between Decoration, Form and Function", 68; Renato Meucci, "Meraviglie sonore nelle collezioni italiane del Seicento", *Un cembalo in marmo per Francesco II d'Este*, ed. Maria Grazia Bernardini (Modena, 2005), 20.

⁷¹ Paolini, "Between Decoration, Form and Function", 68.

characterised fifteenth and sixteenth century culture.”⁷² In acknowledging the intentional nature of artistic and scientific experimentation during the early modern period in Italy, both Paolini and Meucci establish that the resulting musical instruments (many of which fit the classification for combination keyboards) were, at the time of their construction, already considered to be ‘curiosities’.

Wunderkammern and specialised collections of musical instruments during the sixteenth and seventeenth centuries were not limited to the princes of Italy, with research published during the second half of the twentieth century, and into the twenty-first, investigating similar collections across Europe, such as the collections of Albrecht V, Duke of Bavaria, the Habsburg and Wittelsbach families in the sixteenth century, and Scandinavian royal *Kunstammern* and the Oxford Music School Collection in the seventeenth century.⁷³ Common in the above-mentioned literature is the idea that the close association of combination keyboards with these collections, known for their representations of unusual and rare objects, reinforced the widespread perception of these instruments as ‘curiosities’, as did instances of the construction of experimental ‘one-off’ instruments such as those by Todini.

Furthering this perception of combination keyboards and other instruments representative of heightened innovation or experimentation, was the role and reception of such instruments in the formation of diplomatic relationships between Europe and Asia. Ian Woodfield states that the “giving of gifts or ‘bribes’ ... [was an] immutable fact of life in oriental society that Europeans who travelled to the East in the service of religious or commercial interests had no choice but to accept ... [there was] a need for goods that displayed the best aspects of European artistry, craftsmanship and mechanical ingenuity.”⁷⁴ The giving of musical instruments as gifts was already an established tradition between European courts, examples of which include the arrival of a claviorgan for Prince Philip of Spain from Germany in 1596, and the exchange of musical gifts between Gaston d’Orleans (uncle of Louis XIV) and Spanish collector, Don Vincencio Juan de Lastanosa in the 1630s.⁷⁵

⁷² Paolini, “Between Decoration, Form and Function”, 68.

⁷³ Bruce Robinson, “Preface” (pp. vi-xi), and Mark A. Meadow, “Introduction” (pp. 1-41), *The First Treatise on Museums: Samuel Quicchebergs ‘Inscriptiones’ 1565*, ed. and trans. Mark A. Meadow and Bruce Robinson (Los Angeles: The Getty Research Institute, 2013); Bente Gundestrup, “From the Royal *Kunstammer* to the Modern Museums of Copenhagen”, *The Origins of Museums: The Cabinet of Curiosities in Sixteenth- and Seventeenth-Century Europe*, ed. Oliver Impey, Arthur Macgregor (Thirsk: House of Stratus, 2001), 177-187; Margaret Crum, “Early Lists of the Oxford Music School Collection”, *Music and Letters* 48.1 (1967): 23-24.

⁷⁴ Woodfield, “The Keyboard Recital in Oriental Diplomacy”, 33.

⁷⁵ De Pascual, “Clavicordios and Clavichords”, 617; Ronald Lightbown, “Some Notes on Spanish Baroque Collectors”, in *The Origins of Museums: The Cabinet of Curiosities in Sixteenth- and Seventeenth-Century Europe*, ed. Impey and Macgregor (Thirsk: House of Stratus, 2001), 189-200.

Throughout the “heyday” of the “practice of presenting organs, musical clocks and other automata as diplomatic gifts” from approximately 1580–1615, numerous keyboard instruments, including harpsichords, clavichords, and organs were presented to Middle Eastern and Asian rulers by religious, political, and commercial representatives from Portugal, Germany and England.⁷⁶ Most instruments recorded as being presented in Japan, China, Turkey, India, and parts of the Middle East and North Africa during this time are not readily identifiable as combination instruments (it is worth noting that this practice of gift giving was popular because of the non-prohibitive nature of the costs involved, and combination keyboards were notoriously expensive). However Thomas Dallam’s automated organ-clock (presented in Turkey in 1599 by the Levant Company) and a double virginal (a mother-and-child) presented in Surat, India, in 1615 by the East India Company stand out as examples that go against this trend.⁷⁷

The overall positive reception of Western keyboard instruments—the key to their success as diplomatic tools—is attributed to their being considered a ‘novelty’ in non-European contexts. Both Woodfield and David Irving suggest that the fascination of East Asian courts at demonstrations of such instruments is due to the absence of a comparable equivalent in their native instrumental canon, as Irving notes:

European keyboard instruments were distinct from non-European aerophones and chordophones largely by virtue of the addition of a mechanised device that either plucked the strings or opened their pipes to a wind supply from a set of bellows.⁷⁸

For those offering the gifts, the curiosity with which these instruments were received provided a means by which countries in the West could compete with each other to gain favour with those whom they were establishing trade and other political relations.⁷⁹ According to Irving, the ability of these instruments to “make an impression on non-Europeans” appears to relate to their being “displays of technology, artistry, design, and musicianship”, with, as Woodfield notes, “[no implication that] there was any real degree of musical communication between the Western musician and his Eastern audience.”⁸⁰ In this

⁷⁶ Woodfield, “The Keyboard Recital in Oriental Diplomacy”, 33, 60. Despite being at its most popular during the late sixteenth to early seventeenth century, the practice of presenting instruments as diplomatic gifts continued well into the eighteenth century.

⁷⁷ Woodfield, “The Keyboard Recital in Oriental Diplomacy”, 41–42, 54.

⁷⁸ David Irving, “Comparative Organography in Early Modern Empires”, *Music and Letters*, 90.3 (2009): 394.

⁷⁹ Woodfield, “The Keyboard Recital in Oriental Diplomacy”, 40.

⁸⁰ Irving, “Comparative Organography”, 394; Woodfield, “The Keyboard Recital in Oriental Diplomacy”, 61.

particular context, where keyboard instruments were perceived more as ‘tools’ for achieving a particular social and political outcome, rather than objects inherently bound to the cultural practice of music making, parallels arise with Paolini’s twenty-first century approach to the reading of historical instruments. The indifference of “the promoters” (those offering instruments as diplomatic gifts) to “whether their gift was admired as a work of art, a mechanical contraption, or a musical instrument” reveals both that these instruments incorporate decoration, form, and function, and that the greater significance usually placed on the object’s function is greatly relaxed.⁸¹

Combination Keyboards as ‘Curiosities’ in the Modern Day

Within the contemporary rediscovery of early modern combination keyboards, organological analyses of extant instruments, and investigations of documentary evidence of non-extant examples not only convey historical perceptions of these instruments as ‘curiosities’ or objects of wonder, but contribute to the formation of a similar perception in the present day. Organological publications of the late twentieth and early twenty-first century are, to an extent, characterised by the use of descriptive language that, when used in relation to combination keyboards, depicts them as irregular and unusual objects:

[Josua Pockh’s 1591 claviorgan] ... a veritable hippogriff of an instrument.⁸²

[In the late eighteenth century, the claviorgan] ... followed the bourgeois fate ... to become little more than a mere curiosity.⁸³

[Michele Todini’s ‘Galleria Armonica’] ... a museum of bizarre musical and horological inventions.⁸⁴

Smith recognises that this treatment of combination keyboards in scholarly publications is indicative of, and also contributes to, their “undeserved reputation” as “oddities or novelties on the side of the mainstream tradition.”⁸⁵ Today, extant combination keyboards are far-

⁸¹ Woodfield, “The Keyboard Recital in Oriental Diplomacy”, 61.

⁸² Sadler, “Short Notices”, 475.

⁸³ Giuliana Montanari, “Florentine Claviorgans (1492-1900)”, *The Galpin Society Journal* 58 (2005): 259.

⁸⁴ Stewart Pollens, “Michele Todini’s Golden Harpsichord: An Examination of the Machine of Galatea and Polyphemus”, *Metropolitan Museum Journal* 25 (1990): 33.

⁸⁵ Smith, “The English Claviorgan”, 21.

removed from their original contexts, with many not in a playable condition, and nearly all housed in modern museums or other institutional collections, where the meanings “invested in them” differ greatly from their “cultures of provenance.”⁸⁶ On the surface, there does not appear to be a great difference in the meaning attributed to combination keyboards today—historically, they were considered ‘curiosities’ or marvels, and in the present context they still carry the ‘curiosity’ label—however, the motivations behind past and present perceptions differ significantly.

The organisation of museums during the early modern period and the present day offers the clearest avenue of comparison between these motivations. Samuel Quiccheberg’s 1565 treatise on museums describes a single space (or “close co-locations ... contained institutionally, all housed under the court”⁸⁷), in which objects representative of “practical research ... at the service of the state’s economy, defence, religion, and culture”—yet still appealing to the pleasures and personal tastes of their collector—were displayed to evoke wonder and awe.⁸⁸ The concern for maintaining the personal interest of the collector (often of the nobility), and the early modern belief that “wonder and curiosity [were] part of the armature of rationality”, stands in contrast to modern-day approaches to the curation of collections.⁸⁹

Described by Robertson as “rational” work, the modern-day curation of objects in institutions is “celebrated [for the] ... even-handed unfolding of ideal and certain taxonomies, straightforward categories, facts and figures, maps, and narratives.”⁹⁰ It is not difficult to understand the place that traditional organology and the taxonomical categorisation of musical instruments occupied within this context. In fact the motivations behind Hornbostel and Sachs’ system (previously discussed) are clearly reflected in Robertson’s examination of the mid-nineteenth century shift away from “wonder” as an intellectual tool, in favour of “analysis, critical thinking, research, and ideas.”⁹¹ Such motivating ideas behind modern approaches to curation are echoed by John Armstrong and Alain de Botton, who compare the present day’s “overtly academic” approach to the curation of visual art rather unfavourably to the “transformative, redemptive” approach of the early

⁸⁶ Kevin Dawe, “The Cultural Study of Musical Instruments”, in *The Cultural Study of Music*, ed. Martin Clayton, Trevor Herbert, and Richard Middleton (New York: Routledge, 2003), 277.

⁸⁷ Robertson, “Preface”, *The First Treatise on Museums...*, x.

⁸⁸ Meadows, “Introduction”, *The First Treatise on Museums...*, 5.

⁸⁹ Robertson, “Preface”, viii.

⁹⁰ *Ibid.*, vi.

⁹¹ *Ibid.*

modern period, which enabled the displayed art to “create and sustain emotional order and insight.”⁹²

In addition to the decontextualisation of combination keyboards through the changing approaches to institutional collecting and curating, the establishment of a distinctive canon of early musical instruments, repertoire, and performance practices during the nineteenth century (a result of the burgeoning ‘Early Music Movement’, which endures today) is increasingly considered a key factor contributing to the marginalisation of these instruments. Critical organological literature is one of the most active areas criticising and reconsidering the early music canon as it has recently stood.⁹³ There exists outright refutation of the early music canon’s authority, which challenges musicology as a discipline to consider a broader array of historical narratives, such as Gary Tomlinson’s review of Richard Taruskin’s *The Oxford History of Western Music* (Oxford University Press, 2005): “[there is] an orthodox adherence to the body of knowledge amassed in that century [the twentieth] of musicology ... a certain obdurate confidence ... that this narrative eclipses, and in eclipsing excludes, all others.”⁹⁴

However, critical organologists, such as Dolan, go beyond refutation, examining the ‘why’ of this canon, and offering new questions that will shape future scholarship. Dolan investigates the Western historiography of musical sound, identifying that concepts of ‘sound’ and ‘object’ have been repeatedly separated, marking “different technological periods within music history.”⁹⁵ This, she suggests, is one explanation for the discord between the subject matter of traditional organology and broader musicology. To remedy this, Dolan does not immediately dismiss the idea of ‘the canon’, instead using this familiar construct to invite a change of perspective:

What would it mean to tell a history of music from the perspective of instruments? ... Can we speak of canons of instruments just as we speak of canons of musical works? ... In what ways does musical style follow (or not follow) technological innovation?⁹⁶

Dolan elaborates on this reconsidered perspective through the discussion of fictional literature published during the early nineteenth century. Taking E. T. A. Hoffman’s

⁹² John Armstrong & Alain de Botton, “Methodology”, *Art as Therapy* (New York: Phaidon Press, 2013), 84.

⁹³ By referring to the canon in past tense, I acknowledge the ever-evolving nature of this construct.

⁹⁴ Gary Tomlinson, “Monumental Musicology”, *Journal of the Royal Music Association*, 132.2 (2007): 349.

⁹⁵ Dolan, “Toward a Musicology of Interfaces”, 2.

⁹⁶ *Ibid.*, 3.

Automata (1814) as her example, Dolan considers the historical context of the short story, a time when “instrument builders were producing new instruments ... Chladni’s clavicylinder ... Kauffman’s harmonichord ... and Leppich’s panmelodicon,” to identify and normalise the technological developments dramatised in this literature.⁹⁷ Asserting that the invention of new instruments during this period was “hardly novel for the early nineteenth century,” Dolan notes the periods of “profound musico-technological experimentation” that occurred during the Enlightenment and early Romantic period.⁹⁸ Dolan’s treatment of this particular example engages with the familiar historical timeline used in the early music canon, and indicates that instruments popularly considered (or, perhaps misunderstood) as ‘curiosities’ may be regarded as natural outcomes of common practices—such as technological experimentation—and therefore not as alienated from the canon as previously believed.

METHODOLOGY

I envision a new critical organology that combines the anthropological study of the ‘social life of things’ with approaches from culture theory and philosophy that tend to emphasise the symbolic value of objects with the anthropology of material culture, combined with the extensive ethnomusicological literature that considers musical instruments in specific cultural contexts.⁹⁹

Maria Sonevytsky, 2008.

At its core, critical organology aims to incorporate the approach outlined above into the study of musical instruments whilst maintaining the “material specificity” of traditional organology (in essence, the focus on the physical nature of instruments).¹⁰⁰ Exactly how to achieve this with any form of consistency across musicology and organology is still in a process of evolution, but through recognition and discussion of critical organology as a valid scholarly approach, a broad understanding of this ‘new’ organology is emerging.

⁹⁷ Dolan, “Toward a Musicology of Interfaces”, 5.

⁹⁸ Ibid.

⁹⁹ Sonevytsky, “The Accordion and Ethnic Whiteness”, 102.

¹⁰⁰ Dolan and Wood, “Perspectives on Critical Organology”, 14.

Emily Dolan and Jessica Wood's summary of the proceedings of a 2013 roundtable discussion on critical organology highlights some of the most recent issues regarding musical instrument study that such reconsideration aims to address. Dolan and Wood identify critical organology in its current state as being broken into three thematic divisions: objecthood ("how one defines the boundaries of an instrument"), interface ("how an instrument's physical properties impact the instrumentalist"), and historiography ("how an organological focus can change music history narratives").¹⁰¹ By acknowledging the breadth of thematic issues that critical organology encompasses (chiefly social meanings of instruments' images and sounds, and the varying visibility or invisibility of instruments within musicological discourse) through these divisions, Dolan and Wood shed light on continuing efforts to appropriately define the boundaries and scope of this new approach. Terminology remains a central issue in this discussion, with one outcome of the roundtable being the acknowledgement of the need to further differentiate between the study of instrument description (proposed as 'organography') and the "broader, cultural work, reflecting the disciplinary shift" (proposed as 'organology').¹⁰²

As it currently stands, critical organology may be understood as an instrument-centric approach to musicology, which embraces the theoretical and philosophical aspects of historiography alongside the physical, tangible evidence that is present in a musical instrument. Adopting such an approach in my own research project—which itself is instrument-centric, yet at the same time concerned with cultural perceptions and social practices pertaining to combination instruments—allows me to draw upon historical evidence and scholarly theories (such as those originating in art history) that are not as commonly used in the more quantitative approach of 'traditional' organology. This represents a conscious recognition of the relationship between the objecthood of instruments and early music historiography.

The use of case studies throughout this thesis enables particular historical figures, events, and cultural phenomena to be investigated from a perspective that is wholly inclusive of musical instruments, specifically combination keyboards. Presenting this research through a case study model enables combination keyboards (a hitherto lesser-known aspect of early music history) to be examined in relation to contextual settings that are familiar, and extensively represented within the existing canon of early music.

¹⁰¹ Dolan and Wood, "Perspectives on Critical Organology", 14.

¹⁰² Ibid., 16.

CHAPTER 1: COMBINATION KEYBOARDS IN THE COURTS OF EARLY MODERN EUROPE

OVERVIEW

Music had been an essential part of court life, dating back to the thirteenth century ... In this world, putting on the most spectacular musical performances, and having the latest or most elaborate musical instruments ... was a way of establishing superiority to neighbouring courts.¹

Eleanor Smith, 2015.

Smith's research into the musical history of claviorgans—pipe and stringed keyboard combinations—in early modern Europe positions these instruments firmly within the contextual sphere of royal courts from the sixteenth through to the eighteenth century. From the earliest appearances of claviorgans in select European courts in the 1490s and their “Cambrian explosion” across Europe during the early 1500s, Smith associates this variety of combination keyboard with the public musical practices of court-employed professionals, as well as the more private musical enjoyment (characteristic of the “proficient” amateur) of their patrons.²

In this chapter, I build upon Smith's assertions, and examine the impact that the adoption of the claviorgan at court had on the practice of cultural concepts such as patronage of the arts, and spectacle. In particular, I will explore the idea of claviorgans as cultural capital within the courtly context, and how—as both forms of capital and functioning musical instruments—they were used in establishing and maintaining the social and political power of Europe's royal courts.

As Knighton observes, the proliferation of instruments and instrumentalists at European courts during this time, as well as the increasing significance placed on the practice of patronage, contributed to the growth of a “dynamic that favoured developments in instrumental technologies, skills and repertoires.”³ The work of known makers of

¹ Eleanor Smith, “The Claviorgan: Not for Amateurs! [?]”, *Keyboard Perspectives*, vol. 8 (2015): 135.

² Ibid. In the present study, the distinction between ‘professional’ and ‘amateur’ musicians follows that made by Smith in her article: that the ‘professional’ musician performed most frequently in public (under the employ of the court), and the ‘amateur’ was more often of the nobility, playing for personal enjoyment and social accomplishment.

³ Knighton, “Instruments, Instrumental Music, and Instrumentalists”, 99.

claviorgans, such as Mahoma Mofferiz (fl.1480–1511) in Spain, and Lodewijk Theewes (fl.1555–85) in England, may be closely linked to the guild-dictated standards of stringed keyboard construction. The codification of these standards—which shaped many aspects of instrument construction, from assumptions of quality, to when an apprenticeship was considered fulfilled—and the influence of the courts on this process is of particular importance. From this, it becomes apparent that instruments acquired either through commissions or as gifts were considered valuable for their physical composition as well as their ability to make music.⁴

The culture of acquiring and displaying objects of art and craftsmanship (in the form of cabinet collections, which is examined in Chapter Two) that was prevalent throughout the courts of Europe during the sixteenth and seventeenth centuries is approached in the present study as a factor contributing to the wider proliferation of combination keyboards (particularly claviorgans) beyond Spain, where they are believed to have originated. While contemporary museological scholarship has identified the “exchange of gifts between sovereigns and princes” as a common method used by monarchs to enlarge these collections, I examine here the political implications of inter-court gift exchange, and explore the significance of claviorgans (amongst other musical instruments) having been consistently included in this cultural practice.⁵

The “strategic parallels between gift exchange and more ostensibly ‘economic’ practices” that Arjun Appadurai identifies as a fundamental theme in Bourdieu’s discussion of the forms and exchange of capital, is of particular significance in this part of the chapter, as my analysis of the cultural roles of combination keyboards within the context of Europe’s early modern courts approaches these instruments as manifestations of objectified (and at times, embodied) cultural capital. This allows for combination keyboards to be considered beyond their explicitly musical functions and makes possible an investigation of their broader cultural roles (as representations of royal status or power) within the same contexts that they appeared as musical objects.

Analysis of surviving inventories from the courts and noble households of England, Spain, and Italian duchies forms an important part of this chapter’s investigation. Listing (often posthumously) the possessions of rulers and high-ranking or influential members of the aristocracy, these inventories allow both the geographical and historical spread of

⁴ Koster, “The Mother and Child Virginal”, 136.

⁵ Gundestrup, “From the Royal *Kunstammer*”, 180.

claviorgans to be determined. Whilst, as Renato Meucci notes, inventories do not provide conclusive proof as to the “respective owners’ musical preferences” or indeed exactly how the listed objects were used, these sources provide an enduring record of the existence of these instruments, and in some instances, as I will establish, provide valuable information about the appearance and functionality of the listed items.⁶

THE RISE OF THE CLAVIORGAN AS A COURT INSTRUMENT IN SIXTEENTH– AND SEVENTEENTH–CENTURY EUROPE

INITIAL POPULARITY OF THE CLAVIORGAN AT THE SPANISH COURT, 1479– 1555

While the earliest known reference to the claviorgan dates from between 1459 and 1464, the first recorded association of this type of combination instrument with the royal courts of Europe occurred in 1479 in the form of a contract between the Spanish court of Ferdinand II (1452–1516) and Isabella I (1451–1504), and Mahoma Mofferiz (fl. 1480–1511) who was commissioned to build a new claviorgan.⁷ Mofferiz (often referred to as ‘the Moor of Zaragoza’, in reference to his Arabic heritage⁸), is attributed with the construction of at least six of these instruments throughout the period 1484–1511.⁹

Whether Mofferiz was the inventor of the claviorgan, or simply one of its earliest builders remains unclear (existing scholarship recognises a lack of conclusive evidence), however, his instruments were disseminated throughout the Iberian Peninsula, and to regions “beyond the Pyrenees.”¹⁰ Certainly, the combination of Mofferiz’s ethnicity, along with the claviorgan’s complex technology and the skill required to construct such an

⁶ Renato Meucci, “Musical Instrument Collections in Renaissance and Baroque Italy”, *Marvels of Beauty and Sound: Italian Baroque Musical Instruments*, ed. Franca Falletti et al., (Florence: Giunti Editore, 2007), 29.

⁷ Paulirinus of Prague is believed to have been the first to write about the claviorgan, in *Liber viginti artium* (1459–63), discussed in Smith, “The Claviorgan”, 134. The contract between the Spanish court and Mofferiz is referenced in Terence Charlston & Eleanor Smith, “A Chronological Checklist of Claviorgans and References to Claviorgans”, at <http://www.charlston.co.uk/Claviorgan.htm> (accessed 18/07/19); Romà Escalas Llimona, “Claviorgans Attributed to Laurentius Hauslaib in New York, Moscow and Barcelona”, *Music in Art*, vol. 27 no. 1–2 (2002): 94, and; Knighton, “Instruments, Instrumental Music and Instrumentalists”, 134–35.

⁸ João Pedro D’Alvarengo, “Portugal”, *The Cambridge Companion to the Harpsichord*, ed. Mark Kroll (Cambridge: Cambridge University Press, 2019), 165; Carmen Morte García, “Mahoma Mofferiz, maestro de Zaragoza, constructa de claviórganos para la corte de los Reys Católicos”, *Aragón en la Edad Media*, 14–15 no. 2 (1999): 1115–1124.

⁹ Smith, “The Claviorgan”, 136.

¹⁰ Knighton, “Instruments, Instrumental Music and Instrumentalists”, 135. Knighton theorises that one of Mofferiz’s claviorgans may have accompanied Ferdinand and Isabella’s daughter, Katherine of Aragon, to England in 1500.

instrument, contributed to the “fame”—comparable to the celebration of skilled professional instrumentalists—that he enjoyed during this period.¹¹ As a favoured instrument builder of Ferdinand and Isabella’s court, Mofferiz appears in further records from 1484, 1492, and 1500, for the repair of court-owned keyboard instruments, including “two claviorgans.”¹²

The Spanish court’s appreciation of the technological complexity of the claviorgan was also made evident in more codified ways, such as the Sevillian *ordenanças* (statutes ordered by Ferdinand and Isabella in 1507, published in 1527), and the Granada *ordenanzas* (1528), which set out the guidelines for the “examination of and standards to be maintained” by the *violeros* and *organeros* (stringed and keyboard instrument builders, respectively):¹³

The maker of stringed instruments ... must know how to make instruments of many kinds, including: a claviorgan; harpsichord; clavichord; lute; bowed vihuela...¹⁴

The initial spread of the claviorgan throughout Europe, from the late 1490s through the early years of the sixteenth century—which saw them become a common fixture in England, parts of Italy, and areas of Habsburg-controlled Europe¹⁵—may be attributed in large part, as Knighton suggests, to the marriage of female members of the Spanish royal family into other courts. In particular, the marriages of two of Ferdinand and Isabella’s daughters—Maria (1482–1517), and Katherine (1485–1536)—into the Portuguese and English courts, respectively, saw the transfer of “musicians and instruments ... including the claviorgan” between these courts.¹⁶

At this time in Spain, it was not unusual for female members of the royal family to have ownership of, or influence over musical resources, in the form of a musical ‘household’ or ‘chapel’ that formed a part of the larger institution of courtly music. In the examples discussed below, of the musical patronage of Juana of Castile (1479–1555) and Isabella of Portugal (1503–1539), it becomes apparent that while each of these female monarchs shaped their musical households to the extent that their own preferences were reflected—through the instruments represented, and in some instances, the musicians employed—the overall

¹¹ Knighton, “Instruments, Instrumental Music, and Instrumentalists”, 135.

¹² Knighton, “Instruments, Instrumental Music, and Instrumentalists”, 135; Pedro Calahorra Martínez, “Claviórganos de Mahoma Mofferiz en la corte de los Reyes Católicos”, *Nassare: Revista Aragonesa de Musicología* 9 (1993): 115–118.

¹³ Knighton, “Instruments, Instrumental Music and Instrumentalists”, 109–10; Smith, “The Claviorgan”, 136.

¹⁴ *Ordenanças* 1527, translated in Knighton, “Instruments, Instrumental Music and Instrumentalists”, 109–10.

¹⁵ Smith, “The Claviorgan”, 134.

¹⁶ Knighton, “Instruments, Instrumental Music and Instrumentalists”, 106.

function of their musical forces was more closely related to their immediate political status within the court.

Juana of Castile and Isabella of Portugal: Reflections of Power Through their Musical Patronage

Though Juana of Castile (a daughter of Ferdinand and Isabella) co-ruled what is now Spain alongside her husband, Philip ‘the Fair’ (1478–1506) from 1504, this investigation of her involvement with the institution of court music focuses on the period following her removal from the throne in 1507, and subsequent relocation to the Convent of St Claire, Tordesillas (where she remained until her death).¹⁷ As Mary Ferer outlines, the first of two rearrangements of Juana’s musical resources coincided with her move to Tordesillas, and was marked by a reduction in the number of musicians in her chapel.¹⁸

The significant changes made to Juana’s musical entourage—particularly the dismissal of foreign musicians, who had travelled throughout Castile with Juana as she mourned her husband, and their replacement with Spanish musicians who were stationed entirely at the convent—may be seen to mirror the changing status of their employer, rather than any changes in her stylistic preferences.¹⁹ Juana’s reported “fondness for music,” documented in the form of her early musical education and continued enjoyment of “singing melodies that she had learned in childhood,” along with her ownership of at least three musical instruments (recorded in a 1555 inventory) stands in contrast to this reduction of her musical chapel.²⁰ This presumably forced reduction—or, at least instigated beyond Juana’s diminishing sphere of influence—in the musical resources available to her is representative of the loss of political power Juana experienced in going from Queen of Castile (when married to Philip), to deposed monarch, who had been physically relocated beyond the court.

¹⁷ Mary Tiffany Ferer, “Queen Juana, Empress Isabel, and Musicians at the Royal Courts of Spain (1505–1556)”, *Tijdschrift Van De Koninklijke Vereniging Voor Nederlandse Muziekgeschiedenis*, vol. 65 no. 1–2 (2015): 15. Juana was deemed ‘unfit’ to rule due to declining mental health, following the death of her husband. For further reading see Bethany Aram, *Juana the Mad: Sovereignty and Dynasty in Renaissance Europe* (Baltimore: Johns Hopkins University Press, 2005).

¹⁸ Ferer, “Queen Juana, Empress Isabel”, 17. During the period 1506–1516, only thirteen musicians were directly under Juana’s employment. This is a stark contrast to the “12 trumpeters and ... 36 singers” that accompanied Juana and Philip from the Low Countries to Spain.

¹⁹ *Ibid.*, 15.

²⁰ *Ibid.*, 16.

The second key rearrangement of Juana's musical chapel occurred in 1516, when her son and nominated successor, Charles V, took the throne and recognised Juana as his titular co-ruler.²¹ Charles' establishment of the *Casa de Castilla del Emperador y la Reina Juana* (the Household of the Emperor of Castile and Queen Juana), which included musicians and instruments in the service of both himself and Juana, marks the reinstatement of a larger musical force that could be influenced by Juana's musical tastes. Notably, the formation of this shared musical household saw the reinstatement of Spanish musicians previously employed by Juana, including a singer, organist, vihuelist, and two trumpeters.²²

The inventory drawn up following Juana's death in 1555 reveals that she owned three musical instruments, two of which were keyboard instruments, with one listed as a "*llaviorgano* with its bellows in its box."²³ Whilst unconfirmed, it appears likely that these instruments may have accompanied Juana on her move to Tordesillas, in a fashion similar to the relocation of instruments and musicians that took place when her sisters married into foreign courts. The reported extant status of the claviorgan, and its continued location at the convent in Tordesillas lends some support to this theory, as it reveals the instrument to have been considered Juana's property (as opposed to being a shared resource) even after her death.²⁴

Charles V's marriage to Isabella of Portugal (who assumed the title Empress Isabella) in 1526, heralded a new level of female influence in both the political and cultural aspects of the Spanish court that contrasted with that of Juana's. Noted for her three successful regencies during Charles' many absences from Spain throughout the period 1528–38, Isabella was also responsible for the growth of the musical resources of the court—decimated somewhat by the absence of the musical contingent that accompanied Charles on his travels—through her establishment of a household of musicians (totalling thirty-four) not previously associated

²¹ Ferer, "Queen Juana, Empress Isabel", 18.

²² Ferer, "Queen Juana, Empress Isabel", 19; Tess Knighton, "Music and Musicians at the Court of Fernando of Aragon, 1474–1516" (PhD Dissertation, University of Cambridge, 1983), vol. 1, 98.

²³ A. Rodríguez Villa, *La reina Doña Juana la Loca: Estudio histórico* (Madrid: 1892), 519. Translated in Ferer, "Queen Juana, Empress Isabel", 16.

²⁴ José Ignacio Palacios Sanz, "La Organería en Castilla y León en Tiempos de Antonio de Cabezón", *Revista de Musicología*, vol. 34 no. 2 (2011): 286.

with the Spanish court.²⁵ Similarly to Juana, Isabella is recorded as having owned a number of keyboard instruments, including a clavichord and a claviorgan.²⁶

However, Isabella's musical household contained a majority of singers, which provided a "contrast and complement to the [instrumentalists] in the shared household [of Charles and Juana]." ²⁷ Where the absence of singers in Juana's musical chapel has been taken to mean that it was "unlikely any vocal polyphony was performed," the presence of singers in Isabella's chapel suggests the opposite.²⁸ In the same vein, Ferer suggests that "trumpets and percussion may have been heard seldom, if at all" in Juana's household, due to the "absence of ceremonial state occasions."²⁹ This alludes to the idea that the music performed in each household may have differed in both style and function, despite the sharing of resources (instruments and musicians) that occurred. The presence of singers in Isabella's chapel increases significantly the possibility that her claviorgan may have been used for accompaniment—something for which this type of instrument was particularly favoured at the time—whereas the claviorgan in Juana's possession may have offered a less costly alternative for the provision of polyphonic music.³⁰ As such, this further attests to the relationship between the individual (or household) allocation of musical resources and expressions of status at court.

PROLIFERATION OF CLAVIORGANS THROUGHOUT OTHER EUROPEAN COURTS: GIFT-GIVING AND COLLECTING

As Smith observes, the earliest records of claviorgans being present in England date from 1542/3 and 1547, in two inventories of the possessions of Henry VIII (1491–1547). By the time of Henry's death, he owned a total of four claviorgans, kept across two locations: the Palace of Westminster, and Greenwich Palace.³¹ One of the defining cultural characteristics of the Henrician court was the increasing popularity of musical patronage, a practice adopted

²⁵ Ferer, "Music and Ceremony at the Court of Charles V", *Music and Ceremony at the Court of Charles V: The Capilla Flamenca and the Art of Political Promotion*, (Boydell & Brewer: 2012), 178; Ferer, "Queen Juana, Empress Isabel", 21-22.

²⁶ María José Redondo Cantera, "The Inventories of Empress Isabella of Portugal", in *Los inventarios de Carlos V y la familia imperial*, ed. J.L. González García, (Madrid, 2010), 1271. It is also worth noting that Isabella employed the organist Antonio de Cabezón, who was also appointed to Juana's musical household in 1538.

²⁷ Ferer, "Queen Juana, Empress Isabel", 22.

²⁸ *Ibid.*, 16.

²⁹ *Ibid.*, 24.

³⁰ Montanari, "Florentine Claviorgans", 249; Knighton, "Instruments, Instrumental Music and Instrumentalists", 100. Both note the versatility of the claviorgan in its ability to be used in both solo and ensemble settings.

³¹ Smith, "The English Claviorgan", 22.

by both the monarch and numerous noble families of the early sixteenth century. Contemporary scholarship recognises the predominantly Italian influence on the widespread popularity of artistic patronage at court—texts such as Castiglione’s 1528 *Il Cortegiano*, (The Book of the Courtier) were translated into English, and English publications such as *The Institution of a Gentleman* (1555) were soon to follow³²—which saw, amongst other things, the “appreciation of Italian musical instruments” and the introduction of the Venetian practice of the consort in the Henrician court.³³

The similarities that Smith identifies between the decoration of the Henrician claviorgans (“painted arabesque work”) and those recorded in Medicean inventories is yet another instance of the influence that Italian musical culture had on that of the English court.³⁴ However, this particular parallel may be due to a more direct cause, rather than the result of a general cultural influence. Considering the increased practice of gift-exchange (in the form of art objects including musical instruments) as a form of diplomacy between European courts around this time, it is possible that, as Smith suggests, a number of the claviorgans present at the Henrician court “may have been brought ... as a diplomatic gift.”³⁵

As Montanari notes, claviorgans were present in Italy (particularly in the Florentine and later Tuscan courts, under the rule of the Medici family) from at least the 1490s, when two such instruments were included in a post-mortem inventory of the possessions of Lorenzo ‘il Magnifico’ de Medici (1469–92):

- (i) One organ of wood and tin with a *gravechordo* carved with pierced foliage placed with two bellows in a case.
- (ii) One *gravicembalo* that also serves as an organ; the pipes are missing but all the other devices and bellows are present.³⁶

³² Smith, “The English Claviorgan”, 21.

³³ Gabriele Rossi-Rognoni, “Italian Musical Instruments in Europe: The Dynamics of an Exodus”, *Marvels of Beauty and Sound: Italian Baroque Musical Instruments*, ed. Franca Falletti, Renato Meucci, & Gabriele Rossi-Rognoni, (Florence: Giunti Editore, 2007), 51. See also Smith, “The English Claviorgan”, 21; and Victor Coelho & Keith Polk, *Instrumentalists and Renaissance Culture, 1420-1600: Players of Function and Fantasy* (Cambridge: Cambridge University Press, 2016), 28-31.

³⁴ Smith, “The English Claviorgan”, 23. The inventories of musical instruments owned by the Medici family during the period 1492-1750 are discussed in Montanari, “Florentine Claviorgans”, 239-52.

³⁵ Smith, “The English Claviorgan”, 23.

³⁶ Archivio di Stato di Firenze, *Mediceo Avanti in Principato* 165, “Copia dell’inventario alla morte di Lorenzo il Magnifico”, (1512), in Montanari, “Florentine Claviorgans”, 239.

This record, along with other court documents and further inventories of subsequent Medici rulers, places claviorgans in Italy at the same time as their presence at the Spanish courts. This is likely due to the Spanish Empire's reach throughout parts of Europe, in particular Italy—with Naples, Sicily, and Sardinia in the possession of the Spanish during this time—which may have seen the import of musical instruments along with other goods.³⁷

Foreign Claviorgans in Spain: A Gift from Germany

There exists a number of recorded instances of claviorgans being offered and received as gifts between European courts from the late sixteenth to early seventeenth century. This coincides with the “heyday of the presentation of keyboard instruments” by Western traders and diplomats at Asian and Middle Eastern courts, which Woodfield recognises as the period from 1580 to 1615.³⁸

From surviving evidence and the investigations of existing contemporary scholarship, this practice appears to have involved the sixteenth- and seventeenth-century courts of Spain, Italy, France, England, and the German-speaking lands. Whilst there are only a select few examples of such exchanges involving claviorgans discussed in modern musicological literature, the inter-court exchange of cultural gifts is acknowledged as being a relatively common practice throughout Europe during this time, that was an “expression of the network of friendships and mutual esteem” that neighbouring courts may have experienced through their shared preoccupation with visual representations of their status.³⁹

One such example involves the arrival of a claviorgan for Prince Philip of Spain (1578–1621)—successor of Philip II (1527–98) and grandson of Charles V—from a “great prince” in Germany.⁴⁰ The gift-giver, whilst unidentified, was likely a relative of Prince Philip, who was now representative of the third generation of Habsburg descendancy positioned to rule Spain. The identity of the instrument's builder is also unknown, and it appears that the instrument itself is non-extant. However, there are still significant insights that may be drawn from this event. Prince Philip received this claviorgan at a time when Spain was experiencing a marked influx of central-European keyboard instruments—particularly of

³⁷ de Pascual, “Clavicordios and Clavichords”, 617.

³⁸ Woodfield “The Keyboard Recital in Oriental Diplomacy”, 60.

³⁹ Lightbown, “Some Notes on Spanish Baroque Collectors”, 199.

⁴⁰ de Pascual, “Clavicordios and Clavichords”, 617.

the Flemish school—an occurrence that Kenyon de Pascual believes to be linked to the “establishment of the Habsburg dynasty on the Spanish throne” earlier that century, with the ascension of Charles V in 1516.⁴¹

In this instance, the lack of information regarding the gift-giver’s identity precludes further exploration of the possible significance of this particular exchange. However, the occurrence of the exchange itself testifies to the existence of a relationship between the German and Spanish courts, to the extent that exchanges of cultural objects (such as musical instruments) were taking place. In particular, this interaction, involving the sharing of luxurious cultural objects, suggests an attempt to secure the longevity of the relationship between the German and Spanish courts, as Prince Philip—the designated recipient of the claviorgan—was not yet ascended to the throne.

Inherited Claviorgans: Elizabeth I and the Court Instruments of Henry VIII

Following Elizabeth I’s ascension to the English throne in 1558, the claviorgan still held a position of popularity amongst the noble class similar to that during the rule of Henry VIII, however there is little indication that Elizabeth had as strong a personal connection to this type of instrument as her father.⁴² However, the suggestion that Elizabeth I was not as intensely involved with the musical role of the claviorgans she is believed to have inherited—Smith notes that “none of [Henry’s] claviorgans have been traced in the Royal records past [the 1553/4 and 1547] inventories”—does not rule out this instrument’s broader cultural significance within the institution of her court.⁴³ As Katherine Butler points out, music held an esteemed position at the Elizabethan court, with Elizabeth’s own musicality—“she played the virginals, the lute, and similar plucked string instruments”—promoted on a political platform, to further establish her “power and authority, [therefore] asserting her suitability to rule.”⁴⁴

During the course of Elizabeth I’s reign (1558–1603), at least five of her known courtiers and counsellors possessed claviorgans. Appearing in inventories from 1578, 1581, 1603, and 1612 (the latter being a post-mortem inventory, and thus suggesting that the instrument

⁴¹ de Pascual, “Clavicordios and Clavichords”, 67.

⁴² Smith makes particular mention of the possibility of Henry VIII keeping a claviorgan (the one located at Greenwich) for his own personal use, “The English Claviorgan”, 23–24. The 1547 inventory drawn up after Henry’s death lists this instrument as being located in his private withdrawing chamber.

⁴³ Ibid.

⁴⁴ Katherine Butler, “By Instruments her Powers Appare: Music and Authority in the Reign of Queen Elizabeth I”, *Renaissance Quarterly* vol. 65, no. 2 (2012): 353–4.

had in fact been owned during Elizabeth's reign), claviorgans are established as having been present in the households of Robert Dudley, Dr. Thomas Wilson (Privy Counsellor), Sir Thomas Kytson, and Sir Robert Cecil (First Secretary), respectively.⁴⁵ The fifth recorded instance of a claviorgan being owned by a noble family associated with the Elizabethan court is that of Anthony Roper, who bought a newly constructed claviorgan from the English (formerly Dutch) keyboard maker, Lodewijk Theewes, sometime between the instrument's construction (1579), and his death in 1597.⁴⁶

Each of the first four individuals listed maintained exceptionally close ties to Elizabeth's court, either through their political position, patronage of music, favourable relationship with the Queen, or a combination of all three. It remains unconfirmed whether any of these instruments were part of the Henrician collection of claviorgans, however, Smith theorises that the instrument delivered to Thomas Wilson "by order from Mr. Secretary Walsingham" (presumably Francis Walsingham, Principal Secretary to Elizabeth I) is "an older instrument," as suggested by its "low valuation ... in the inventory," giving rise to the genuine possibility that Elizabeth's inherited claviorgans may have been loaned out to the households of various courtiers.⁴⁷

Another theory emerges regarding the experience Elizabeth I may have had of some of these instruments in a performance context. Smith suggests that the claviorgan at Kenilworth Castle may have been present during Elizabeth's 1575 visit to Robert Dudley (a mere three years before the inventory was drawn up), where she was "entertained with a performance of *Princely Pleasures*," a collaborative piece of music and drama by Edward Johnson and Richard Mulcaster.⁴⁸ From Butler's discussion of the various "tableaux" staged for the Queen as she toured the country on "summer progresses," it becomes apparent that one such performance, incorporating theatrics and music, occurred at Kenilworth Castle in 1575.⁴⁹ Whether or not the claviorgan was either present at Kenilworth during this time, or

⁴⁵ Smith, "The English Claviorgan", 24-7. Transcriptions (partial or complete) of the inventories referenced in Smith appear in the following: Elizabeth Goldring, "The Earl of Leicester's Inventory of Kenilworth Castle, c. 1578", *English Heritage Historical Review* 2, no.1 (2007):36-59; Albert J. Schmidt, "A Household Inventory, 1581", *Proceedings of the American Philosophical Society* 101, no. 5 (1957): 459-80; Hector Sequera, "House Music for Recusants in Elizabethan England: Performance practice in the music collection of Edward Paston (1550-1630)", PhD Dissertation (University of Birmingham, 2012): 58-59; Lynne Hulse, "Musique which Pleaseth Myne Eare: Robert Cecil's Musical Patronage", *Patronage, Culture and Power: The Early Cecils, 1558-1612. Studies in British Art* 8 (2002): 148.

⁴⁶ Smith, "The English Claviorgan", 26; Rose, "History and Significance", 583.

⁴⁷ Smith, "The English Claviorgan", 24.

⁴⁸ Smith, "The English Claviorgan", 25. For further reading, see also: David Price, *Patrons and Musicians of the English Renaissance*, (Cambridge: Cambridge University Press, 1981).

⁴⁹ Katherine Butler, "By Instruments Her Powers Appeare: Music and Authority in the Reign of Queen Elizabeth I", *Renaissance Quarterly* 65, no. 2 (2012): 369-70. Butler describes these tableaux as representing the Queen's ability to "transform chaos into a peaceful, ordered paradise," thus strengthening the image of a monarch well-equipped (culturally and politically) to rule. "Summer progresses" refer to the tours Elizabeth

used in the above-mentioned performance, the event of its arrival at the residence of one of the court's prominent musical patrons and favoured courtiers, lends it a certain significance, through its placement within Elizabeth's and her court's immediate cultural sphere.

The circumstances surrounding the Roper family's ownership of the 1579 Theewes claviorgan differs somewhat to the examples mentioned above. As Malcolm Rose notes, the Roper family, despite being Catholic (a politically fraught position during the Protestant reign of Elizabeth I), "held a dominant position in the legal scene in England" during the sixteenth century, and Anthony Roper—who first purchased the Theewes instrument—had a known association with the composer, Thomas Tallis (1505–85).⁵⁰ The relationship between Anthony Roper and Tallis is suggested by John Bennett as a possible patronage, with Tallis' widow, Joan, acknowledging "[Roper's] good favours shown to my late husband and me" in her will, in which she bequeathed Roper—the only bequest in either of the Tallis' wills to a "person of rank"⁵¹—"one *guilte* [gilt] bowl with the cover thereunto."⁵²

As a newly constructed instrument, the Theewes claviorgan was not given to Roper as a token of favour (as is suggested with the other instruments examined in this section), but rather purchased by Roper himself, evidenced by the discovery of the family's coat of arms on four parts of the instrument.⁵³ In this case, neither the claviorgan, nor the individual in possession of it were linked directly to the Elizabethan court. Rather, these connections—through Thomas Tallis and his position in the Chapel Royal, and Theewes' own receipt of patronage from the royal court⁵⁴—formed part of the broader social network around the instrument and its owner, reflecting the "close relationships ... through familial connections or political influence" that united England's musical patrons under the extended power of the court.⁵⁵

I made of England during the summers of 1559-1603, and their cultural and political purposes are discussed further in Nancy Kemlar Schmid, "Elizabethan Progresses, 1559-1603", (Seminar Paper, University of Wisconsin, 1971).

⁵⁰ Rose, "History and Significance", 581-2.

⁵¹ John Bennett, "A Tallis Patron?", *Royal Musical Association Research Chronicle* 21 (1988): 41.

⁵² Will of Joan Tallis (1587), from the Public Record Office (PRO), Leicester, in Bennett, "A Tallis Patron?", 41.

⁵³ Malcolm Rose, "Further on the Lodewijk Theewes Harpsichord", 281; Rose, "History and Significance", 577.

⁵⁴ In 1578/9, Theewes is mentioned in a record of payment for work relating to "a payre of virginalles", *A Biographical Dictionary of English Court Musicians, 1485-1714*, ed. Andrew Ashbee & David Lasocki (Aldershot: Ashgate, 1998), in Rose, "History and Significance", 586.

⁵⁵ Smith, "The English Claviorgan", 25.

PATRONAGE AND SPECTACLE: PROMOTING SOFT POWER AT COURT, AND THE ROLE OF THE CLAVIORGAN

What was most specific to music as a courtly art ... was how it communicated both as audible, expressive sound and as idea, concept, or metaphor ... Even without music's aural presence, a mere image of an instrument or mention of an individual's musicality evoked a host of qualities and connotations.⁵⁶

Katherine Butler, 2015.

Royal patronage of the arts, as an expression of taste through financial support and cultural endorsement within sixteenth- and seventeenth-century courts was considered to be an explicit display of a monarch's power or a courtier's social status. Christopher Hogwood notes that a "ruler needed to be capable of distinguishing the good from the bad without ministerial advice," and that music fulfilled an important role as "political propaganda ... [and] a sphere for competition with rival courts."⁵⁷ The expansion of the instrumental forces of the Habsburg, French, and English courts during the period 1520–50, as well as the increasing involvement of monarchs and nobles in the performance of instrumental music, attests to the growing perception of the importance of music (and musical proficiency) in promoting and maintaining courtly power.⁵⁸

Beyond the marked influence that patronage had on the "creation of musical genres and styles," in not only the courts, but also church, civic, and private spheres, this cultural practice gave rise to the propagation of different "layers" of musical practitioners, notably professional and amateur musicians.⁵⁹ The side-by-side existence of these two groups of performers, whilst also existing in civic music-making contexts, is represented in a more concentrated manner within the microcosm of the court where the relationship between 'amateur' and 'professional' could also be synonymous with that of 'patron' and 'employee'.

The often rigorous social codes influencing the musical practice of monarchs and nobles—for instance, Castiglione recommended that such individuals should only perform in "familiar, and loving company, having nothing *elles a doe* [else to do]"⁶⁰—meant that their

⁵⁶ Katherine Butler, *Music in Elizabethan Court Politics*, (Woodbridge: Boydell & Brewer, 2015), 196.

⁵⁷ Christopher Hogwood, *Music at Court*, (Edinburgh: The Folio Society Limited, 1977), 9.

⁵⁸ Victor Coelho & Keith Polk, "Renaissance Instrumental Music and its Patrons", in *Instrumentalists in Renaissance Culture, 1420-1600: Players of Function and Fantasy*, (Cambridge: Cambridge University Press, 2016), 27–8.

⁵⁹ Coelho & Polk, "Renaissance Instrumental Music", 17; Coelho & Polk, "Instrumental Music", in *European Music, 1520-1640*, ed. James Haar, (Woodbridge: Boydell & Brewer, 2006), 540.

⁶⁰ Castiglione, *Il Cortegiano*, 1528, in Hogwood, *Music at Court*, 8.

personal musical abilities often went unheard, however, this is not to say that they went unpublicised. The concept of courtly spectacle as a way of promoting the power of the monarch through cultural outlets (such as “the arts of dance and music”⁶¹) manifested to various degrees—depending on available resources—in both the royal and smaller ducal courts of Europe. Large-scale, ‘public’ entertainments such as court ballets, theatre, and musical performances contributed to the presentation of a courtly lifestyle of good taste and leisure, in which Cowart observes, “being entertained was one of the highest privileges, and the ability to produce entertainment one of the highest signifiers of power.”⁶² Though Cowart’s observation is made in direct reference to the French court of Louis XIV (1638–1715)—where the “noble identity and way of life” was heavily influenced by the concept of spectacle and the “ideal of pleasure”⁶³—the role of spectacle and music in establishing a particular image of the monarch is also evident in other European courts of the sixteenth and seventeenth centuries.

The presence of claviorgans throughout royal and ducal courts in this period, and the suggestion of their association with both professional and amateur musicians in a variety of settings within this context, indicates toward their being involved with the ongoing promotion and success of spectacle as a means of representing a ruler’s power. The extent of monarchs’ and their courtiers’ personal engagement in the arts, through activities such as patronage (of professional musicians and instrument builders) and performance, and their promotion of a court-wide culture of spectacle—curated events such as musical performances, ballet, and theatre, featuring “strong visual elements”⁶⁴—has led much contemporary scholarship to view music at court as a particularly political act.⁶⁵ Whilst the political motivations behind both patronage and spectacle, as well as their symbiotic existence and occurrence within the same social context renders these two phenomena quite similar in many aspects, Hogwood argues that the key difference between them is that of visibility, wherein patronage could be displayed through the practice of spectacle:

⁶¹ Cowart, *The Triumph of Pleasure: Louis XIV and the Politics of Spectacle* (Chicago: The University of Chicago Press, 2008), 5.

⁶² *Ibid.*, xvi.

⁶³ *Ibid.*, xviii.

⁶⁴ *Ibid.*, xv.

⁶⁵ For further reading about the politically charged nature of early modern court music, see David Wyn Jones, “Music at the Imperial and Royal Court”, pp. 8–29 in *Music in Vienna: 1700, 1800, 1900*, (Rochester, NY: Boydell & Brewer, 2016); Tess Knighton et al., *Companion to Music in the Age of the Catholic Monarchs*, ed. Tess Knighton, (Boston: Brill, 2017).

James [the first] ... understood the political power of spectacle ... For a king, it was more important that his patronage should be visible, rather than that he should be able to indulge his own tastes in private.⁶⁶

The significance of using music as a dominant means of promoting an individual's and the court's power is noted in much early music scholarship, to the extent that there now exists a substantial understanding of the role music played within this particular context. As Richard Leppert observes, sound (in this case, instrumental music) contributes to the construction of a particular meaning that is inherent to the context in which it occurs:

I shall suggest something about the alliances between human desire ... and the manipulation of power ... played out on the field of activities I shall call sonoric landscapes ...: (1) that sounds surround us, helping to construct us as human subjects and to locate us in particular social and cultural environments; (2) that sounds produced or manipulated by humans result from conscious acts and hence carry a semantic and discursive charge; (3) that all sounds—even those not produced by humans but merely 'heard' by them—can be read and interpreted; and, (4) drawn from the preceding three, that sounds are a means by which people account for their versions of reality ... That is, people do not employ sounds arbitrarily, haphazardly, or unintentionally.⁶⁷

Here, Leppert asserts that all sound experienced within a delimited context (either a physical or social space) serves a distinct purpose. In the case of early modern Europe's royal courts, this idea can be seen in the use of instrumental music to communicate the differing status between this social space and those existing outside of the court. This particular "sonoric landscape" also features an additional layer of meaning: the communication of status specific to the ruler in whose court these sounds occur. Multiple aspects of the music heard at court contribute to the conveyance of this particular reading of its social and cultural meanings, including the styles of music played, as well as the instrumentation used, and the people performing it. Below, I will examine the role of claviorgans in the latter two aspects.

⁶⁶ Hogwood, *Music at Court*, 41.

⁶⁷ Richard Leppert, *The Sight of Sound: Music, Representation and the History of the Body*, (Los Angeles: University of California Press, 1993), 15.

CLAVIORGANS AND THE PROFESSIONAL MUSICIAN: A MATCH MADE THROUGH PATRONAGE

Evidence supporting the suggestion that claviorgans existed predominantly in the domain of the professional court musician during the period of the sixteenth and seventeenth centuries, relates wholly to the purpose of instrumental music at court, and the performative differences between the ‘amateur’ and the ‘professional’. As already noted earlier in this chapter, the ‘amateur’ musician and patron were often one and the same, and in the context of Europe’s royal courts, this could be the monarch, or a high-ranking (often influential or affluent) courtier.

Most significantly, Smith considers the absence of any known repertoire explicitly for the claviorgan to be the strongest indicator that this type of instrument was most frequently used for improvisatory performances, given the prevalence of these instruments in the courtly setting, where there existed multiple “opportunities for commissioning music.”⁶⁸ Beyond the physical boundary of the court, but still within its sphere of influence, claviorgans have also been located within areas of noble households specifically associated with professional musical practice. In the 1636 inventory of William Cavendish, Duke of Newcastle’s Nottinghamshire estate, Welbeck Abbey, a claviorgan (“1: Organ and *harpsicall*, to geather [harpsichord, together]”⁶⁹) was located in the “*Gallerye* [gallery]”, and was one of four inventoried keyboard instruments that remained locked and under the care of Mr. Tomkin, the “keyboard player” employed by Newcastle.⁷⁰ As Smith notes, this suggests that these particular instruments (including the claviorgan) were not readily available to the wider members of the household, with their use limited to spaces, such as musicians’ galleries and chapels, where professionals would perform in the service of their employers.⁷¹

Tomkins’s association with the royal court—at this point, under the Stuarts—believed to have been parallel to his employment at Welbeck Abbey (“ecclesiastical and royal

⁶⁸ Smith, “Not for Amateurs! [?]”, 133.

⁶⁹ John Rolleston, *A note of Seuerall Instruments and Setts of bookes Remaining in diuers rooms of the house, taken the 9th Nouember. 1636.*, transcribed in Lynne Hulse, “The Duke of Newcastle and the English Viol”, *The Journal of the Viola da Gamba Society* 29 (2001): 28–43. The claviorgan listed in this inventory is also referred to in Smith, “The English Claviorgan”, 29.

⁷⁰ Hulse, “The Duke of Newcastle”, 29, 42. Hulse acknowledges the uncertainty surrounding the exact identity of ‘Mr. Tomkins’, noting that the musician of this name employed by Newcastle could have been either of the Tomkins brothers—John (d. 1638), or Giles (d. 1668)—who were both employed by the Stuart court throughout their lives, and served as organists for a time at St Paul’s Cathedral and Salisbury Cathedral, respectively (29–30).

⁷¹ Smith, “The English Claviorgan”, 29–30.

appointments ... would not have precluded temporary service in a private household”⁷²), further raises the esteem in which his position in a ducal household would have been held, and thus accounts at least partly for the separation of certain instruments. This resonates with the widespread regard afforded to professional court musicians (and some instrument builders) throughout Europe, who were often recruited and retained for their virtuosity, coming to occupy positions that carried “higher prestige than civic employment, [and] usually distinctly higher salaries.”⁷³

The association of the claviorgan with professional music-making at court is further strengthened by the role that instrumental music (particularly that involving keyboard instrumentation, whether for an ensemble or a solo performer) has been determined to have played as a “symbol of princely presence.”⁷⁴ The politicisation of music at court in this way—to the extent that it may be considered a form of “propaganda” as well as a skilled artform⁷⁵—saw, too, the politicisation of musical instruments owned by, and used at court. In this sense, both the sonic and visual qualities of court-owned claviorgans become significant when considering their position as objects through which manifestations of spectacle could be achieved.

CREATING A CULTURE OF SPECTACLE: THE SOUND AND SIGHT OF THE CLAVIORGAN AT COURT

Given the dearth of known repertoire for the claviorgan during the sixteenth and seventeenth centuries, there is little musical evidence to point present-day researchers toward the specific contexts or court events where the unique sounds of these instruments may have been heard. Whilst the inclusion of claviorgans in inventories of musical instruments and other cultural objects owned by monarchs and other members of the nobility serves to confirm their physical presence in the social environment of ‘the court’, it does not describe their use in a musical context.

Additional information included in some inventories does, however, offer more insight into the performative use of claviorgans. Particularly, the inclusion of descriptive information about a listed instrument’s state of functionality, or, in rarer cases, the specific

⁷² Hulse, “The Duke of Newcastle”, 30. Hulse also refers to a 1634 “complaint” from Salisbury Cathedral regarding Giles Tomkins’s “lengthy absences to the court” (30).

⁷³ Coelho & Polk, “Renaissance Instrumental Music”, 17.

⁷⁴ Knighton, “Instruments, Instrumental Music and Instrumentalists”, 99.

⁷⁵ Hogwood, *Music at Court*, 9, 33; Butler, “By Instruments her Powers Appeare”, 354.

location of the instrument provides valuable information as to the likelihood of the instrument's use in music-making activities. An example of the documentation of an instrument's functional state through inventories is that of a claviorgan owned by the Medicean court in Florence, in the mid-to-late seventeenth century. The first entry referring to this instrument appears in a 1666 post-mortem inventory of Cardinal Giovanni Carlo de' Medici:

A *graviorgano* covered with rose-coloured velvet and garnished with golden trimming ... with the coat of arms of His Most Reverend Highness.⁷⁶

Just over a century later (following its relocation to the “Villa al Poggio Imperiale for the use of the Duchess Vittoria della Rovere” around 1670⁷⁷) the instrument's functionality is referred to, in a 1767 inventory, revealing its disrepair:

A *cimbalo*, with *graviorgano* ... with the case covered in red velvet on the outside, with several strips of golden trimming and brass studs ... with the Medici Cardinal coat of arms, ‘non-playable’.⁷⁸

Between these two references to the instrument, is another listing in an inventory (‘inventario della Villa del Poggio, 1691) which confirms the instrument's relocation following Cardinal Giovanni Carlo's death. The relocation of this claviorgan, considered in light of its later loss of musical functionality, suggests the likelihood of its having been used as a playing musical instrument during the latter half of the seventeenth century. Keeping this instrument—an item of cultural capital—in its combined objectified and embodied state (as a functional musical object), rather than capitalising on its transferable monetary value, further supports the value placed on the sonic characteristics of the claviorgan within the context of courtly music-making.

One of the most prominent examples of an inventory shedding light on the specific location of a claviorgan within a royal residence is that of the Greenwich Palace claviorgan,

⁷⁶ Archivio de Stato de Firenze (ASF), *Miscellanea Medicea* 31, ins. 10, translated in Montanari, “Florentine Claviorgans”, 241.

⁷⁷ Montanari, “Florentine Claviorgans”, 241.

⁷⁸ ASF, *Imperiali a Real Corte Lorenese (IRC)* 3392, “giornale della guardaroba generale” (1767), c. 337, translated in Montanari, “Florentine Claviorgans”, 241.

appearing in the 1547 inventory of Henry VIII's possessions.⁷⁹ In comparison to the three claviorgans listed at the Palace of Westminster, the Greenwich claviorgan is described as being kept in the "*Kynges priuey Chambre* [King's Privy Chamber]," or Withdrawing Room.⁸⁰ Smith draws attention to the "special status" of this room, noting the strict rules determining which courtiers and advisors were permitted to enter showed "little change over the centuries," and were intended to retain a high level of privacy, within a largely 'public' court.⁸¹ Interestingly, there is very little information about the size or appearance of the Greenwich claviorgan, contrasting with the more detailed descriptions of the highly decorated instruments at Westminster (which are discussed later on in this chapter):

In the *Kynge's* [King's] withdrawing chamber ... One *faire* [fair] instrument being regals and *virgynalles* [virginals].⁸²

This omission of descriptive detail is suggestive of the greater privacy and exclusivity of this part of the court, where "*onely* [only] the Lords & others of Our *privie Counsell* [Privy Council]: and permitting Bishops and other Lords" were granted entry into the "outer" Withdrawing Room.⁸³ Given the restricted entry to this part of the King's chambers, the claviorgan kept within would have been heard by only a select few members of the court, or, as Smith suggests, perhaps only by Henry himself:

[The Greenwich claviorgan] would have been one of the King's private instruments, that he would either have played himself, or one of his personal musicians would have played to him.⁸⁴

As a result, this does rule out the Greenwich claviorgan—the only one, as far as records show, present at the palace—as having contributed to the broader musical landscape of this

⁷⁹ Relevant excerpts of this inventory (which covers four of the royal palaces, including Westminster and Greenwich, where the claviorgans were kept) appear in Andrew Ashbee, *Records of English Court Music* (Aldershot: Ashgate, 1986-96), vol. 7, 383-98; Smith, "The English Claviorgan", 22-4; and Hogwood, *Music at Court*, 30-2.

⁸⁰ Smith refers to this location as the 'Withdrawing Room' and distinguishes this room from the Privy Chamber. Both terms appear in the inventory transcriptions, with the 'withdrawing chamber' alluded to as the more private of the two areas.

⁸¹ Smith, "Not for Amateurs! [?]", 139. For further reading on the practices of politics and music in the Privy Chamber, see Andrew Ashbee, "Groomed for Service: Musicians in the Privy Chamber at the English Court, C. 1495-1558", *Early Music* 25, no. 2 (1997): 185-97.

⁸² Ashbee, *English Court Music*, 7: 390, in Smith, "Not for Amateurs! [?]", 139.

⁸³ Ashbee, "Groomed for Service", 187.

⁸⁴ Smith, "Not for Amateurs! [?]", 139.

court location, yet hints at a valuable insight into Henry VIII's personal tastes, as well as indicating the likely intersection between the public 'shows' of a monarch's musical involvement and their own personal engagement with music, both as an appreciator and performer.

Other sources emerging from the courts and noble residences of sixteenth- and seventeenth-century Europe also indicate positively towards the use of claviorgans in a performance context. A small number of references to the performative use of the claviorgan in the setting of the court exist: in accounts of diplomatic visits and the arrival of gifts, and publications of artistic depictions of events, disseminated with the intent of "glorifying" monarchs.⁸⁵ These references (though few in number, and spread across most of Europe, over the course of almost two centuries) suggest the inclusion of claviorgans within the "sonoric landscapes" of Europe's courts, which—as theorised in Leppert's observations on the social meaning of music—positions the sound of these instruments as a meaningful signifier of the royal status and power they were understood to represent.⁸⁶ This interpretation further positions the use of the Greenwich claviorgan as a notable exception to emerging ideas of how these instruments were used within European courts, and as such, serves to highlight the comparatively greater value that Henry VIII may have placed on this variety of combination instrument.

Where evidence for the sound of claviorgans at court is largely suggestive, that of their visual impact is more explicitly recorded and widespread, existing in inventory descriptions, iconographical sources, and extant instruments.⁸⁷ A common aspect uniting these claviorgans is their highly decorative appearance, featuring colourful materials that contribute to the visual representation of the instruments' "costly prestige," and the elevated socio-political and financial status of their owners, rather than their musical function.⁸⁸

Descriptions of the visual appearance of combination keyboards not only appeared in Medicean inventories of the sixteenth and seventeenth centuries (which are discussed

⁸⁵ Smith references all of these instances in "Not for Amateurs! [?]", 134–9. These examples all appear in Smith's article, and refer to (in listed order): a demonstration of a claviorgan on the occasion of a Venetian envoy's 1492 visit to the court of Maximilian I (1459–1519) in Strasbourg; the arrival of a claviorgan from Germany for Prince Philip of Spain towards the end of the sixteenth century; the 1512 publication *Triumphzug*, honouring Maximilian I, which depicted a procession of court musicians with their instruments (one of which is identified as a claviorgan), and; the presence of a claviorgan in Henry VIII's Withdrawing Room at Greenwich Palace.

⁸⁶ Leppert, *The Sight of Sound*, 15.

⁸⁷ The purpose of including descriptions of instruments' visual appearance in inventories of cultural object collections is discussed in greater depth in Chapter 2. For further reading on the discoveries of iconographical evidence of claviorgans in court settings, see Smith "Not for Amateurs", 140–44.

⁸⁸ Dennis, "Musical Sound and Material Culture", 374.

further in Chapter 2) but can also be found in inventories of courts and noble households from England and Spain. One of the earliest instances of this appears in Sancho de Paredes's inventory of the musical instruments located in the Alhambra, Granada (1500):

Plus two claviorgans in their cases, one of scarlet and white panels, and the other of painted wood, which do not work, and pipes are missing from both, and they have two pairs of bellows with their lead weights.⁸⁹

Later, in 1547, two of the three claviorgans kept at the Palace of Westminster are described in the post-mortem inventory of Henry VIII:

Item a *paire* [pair] of double *Regalles* [regals] ... with *iii Stoppes* [three stops] of pipes *couered* [covered] with purple *vellat enbrawdred* [velvet embroidered] all over with *damaske pirls and Venice golde* [damask pearls and Venice gold] ... and the *Kinges Armes* and *Quene Janes Armes likewise enbrawdred* [King's and Queen Janes' coat of arms also embroidered].

Item. An *Instrumente* [combination instrument⁹⁰] with a double *Virgynall* [virginal] and a double *Regall* [regal] with *iii Stoppes* of pipes, of *woode* [wood] painted with *grene Rabeske woorke* [green Arabesque work] with a *foote of wainscott* [base of oak⁹¹].⁹²

Finally, around 1578, a similar entry appears in the inventory of Kenilworth Castle, the seat of the Earl of Leicester:

Item an *Instrumende* [combination instrument] of *organes, regalles* and *virginalls* [organs, regals and virginals], the *virginall* covered with *crimsin* [crimson] velvet and garnished with *golde* [gold] lace.⁹³

⁸⁹ 'Mas dos claviorganos en sus caxas, el uno de paño colorado y blanco, y el otro de madera pintada, que estan desconçertados, e les faltan sendos canos, e tienen dos pares de fuelles con sus pesas de plomo', Translated in Knighton, "Instruments, Instrumental Music and Instrumentalists", 105.

⁹⁰ The Tudor English term *Instrumente* was used to denote a combination instrument. See Wilson Barry, "The Keyboard Instruments of King Henry VIII", *The Organ Yearbook* 13 (1982): 34.

⁹¹ Barry, "Instruments of King Henry VIII", 36.

⁹² Transcribed in Hogwood, *Music at Court*, 30-32.

⁹³ Transcribed in Goldring, "The Earl of Leicester's Inventory", 56.

In each of the above examples, the five instruments mentioned appear to be brightly coloured and “garnished” with decorative motifs and details, rather than the painted imagery (featuring people, mythical figures and creatures, and landscape scenes) that could also be found on the lids of keyboard instruments of the period. This difference in decorative style between the claviorgans described above and other single-component keyboard instruments of the time suggests that the decorative elements of the court-owned claviorgans may have served another purpose. As Dennis asserts, the practice of decorating the underside of harpsichord, clavichord, or virginal lids in the early modern period—such that the often most detailed part of the instrument was only visible when the lid was lifted—is tied to the manipulation of an instrument’s “aesthetic balance” and thus may be understood as a way of communicating the “powerful, sometimes [politically] inflammatory role” of musical performance.⁹⁴

However, as with the claviorgans listed in court inventories, this does not appear to be the case. Taking particular note of the presence of individual and familial coats of arms on some of these instruments (the Medici Cardinal and Henrician claviorgans, as well as the Theewes claviorgan bearing the Roper family coat of arms), the intended visual impact of these instruments focuses more on the communication of ‘ownership’, rather than the promotion of the owners’ status. It is in this point—of using the visual appearance of claviorgans to communicate ownership and maintain a consistent representation of status, rather than to simply legitimise or communicate the existence of this status—that the difference in the royalty and aristocracy’s use of the visual elements of musical instruments to that of the upper-middle-classes’ becomes evident.⁹⁵

As such, it may be understood that claviorgans present at European courts and within their spheres of social influence (the households of noble families and other individuals associated with the politics of the court) were valued objects on multiple levels. Evidence pointing towards the musical (performative) use of these instruments suggests that they occupied a largely public role within courtly culture, existing for the most part within the domain of professional musicians, who provided music in the service of their employers and patrons. In turn, the often improvised nature of the music they performed, and the instruments they

⁹⁴ Dennis, “Musical Sound and Material Culture”, 375.

⁹⁵ The use of musical instruments (particularly keyboards, though not combination instruments) by the emergent upper-middle classes to distinguish themselves within the social hierarchy from the seventeenth century onwards is discussed in relevant detail in Leppert, *The Sight of Sound*; Dennis, “Musical Sound and Material Culture”. These two investigations of this cultural practice may be considered in comparison to Knighton’s examination of the role of instruments in a courtly context, in “Instruments, Instrumental Music and Instrumentalists”.

performed with, became essential to establishing the sensory context (aural and visual) of the court. The prevalence of this music, and the widespread presence of claviorgans, coupled with the elevating social connotations of musical practice in the courtly microcosm of the sixteenth and seventeenth centuries links these instruments to the distinctly politicised concept of patronage, as well as the carefully constructed ideal of courtly spectacle.

CHAPTER 2: CURIOSITIES OF MUSIC & MECHANICS: TECHNOLOGICAL EXPERIMENTATION AND COMBINATION KEYBOARDS

OVERVIEW

Combination keyboards and other mechanical musical objects have appeared in private collections known as cabinets of curiosity (*Wunderkammern*) throughout the sixteenth to eighteenth centuries. In this chapter, the history of collecting and curating cultural objects and ‘curiosities’ of nature, art, and the sciences is examined in order to determine the extent to which the ideals of materialist philosophy in the early modern period have shaped the development of combination keyboards.¹ Responding to the idea that this period in Europe was characterised by a heightened focus on experimentation and discovery across a wide range of disciplines (including those of the sciences and arts), this chapter theorises that the invention, construction, and continual redesign of combination keyboards was one of the outcomes of this intellectual movement.

This examination of combination keyboards as outcomes of experimentation in the fields of musical instrument design, construction and mechanics begins within the context of cabinets of curiosity. As repositories of ‘new’ or ‘intriguing’ knowledge (conveyed in both physical and abstract forms), cabinets of curiosity are understood in this chapter as physical, visual spaces where the products of intellectual inquiry were brought together and displayed. The role of combination keyboards within these early museum-like spaces is explored, as is the balancing of their roles as musical instruments with that of their visual roles—as *objets d’art* or demonstrations of mechanical and design innovation—through an analysis of the patterns of cultural object collecting displayed by the Florentine Medici court in the sixteenth and seventeenth centuries.

A second point is also raised within the context of cabinets of curiosity: the incorporation of structural and aesthetic elements of non-musical objects, such as furniture, into the design and construction of combination keyboards. Here, three extant claviorgans (1590, 1593, and 1598), attributed to the German organ builder Laurentius Hauslaib, are

¹ Materialism as a philosophical theory in the seventeenth and eighteenth centuries is explored in this study in terms of its celebration of physical matter (tangible, corporeal substances), and the influence that it was believed to exert on all aspects of human existence and experience (both tangible and intangible). Julien Offray De La Mettrie’s belief (put forth in *L’Homme Machine* (1747) that all abstract or metaphysical experiences—such as imagination—were the result of a physical influence is examined in association to the relationships between performer, instrument, and music (as a sonic, and therefore intangible experience).

analysed as particularly noteworthy examples of this design phenomenon, and are compared to objects of furniture found in German, English, and Italian collections.

Moving beyond the contextual space of cabinets of curiosity, this chapter goes on to address the perception of combination keyboards as ‘curiosities’, and looks into the ways in which experimental instruments and other types of musical machine may be viewed as symbols of early modern materialist philosophy, characterised by their mechanical and epiphenomenal nature.² Michele Todini’s Greater Machine (*Macchina Maggiore*), from his *Galleria Armonica* (1650-1690), and Pierre and Henri-Louis Jaquet-Droz’s musical automaton ‘The Keyboard Player’ (ca.1772-1774) are used as case studies, to highlight connections between their creation and the concepts put forth by Diderot and La Mettrie regarding the role of automation in the performance of music and of ‘the musician as machine’. Through these case studies, concepts of sensory illusion, automation, and the relationship between instrument and performer are investigated in relation to their historical philosophical contexts, linking them to broader ideals of early modern intellectual inquiry and practice.

THE MEDICI COLLECTIONS 1553-1716, FLORENCE

The further centralisation of monarchical power that occurred across England, France, Spain, and the states of the German-speaking lands and Italy during the mid-sixteenth century saw a marked growth in the populations of these areas, leading to significant increases in courtly wealth both for monarchs, such as the Tudors in England, and de facto rulers, such as the Medici of Florence and Tuscany.³ The increased availability of economic resources, as well as the growing popularity of intellectual pursuits and their associated objects amongst the ruling classes, contributed to a strengthening of the influential relationship between this politically powerful social class and new artistic and scientific outputs and practices. Best exemplified by the practice of royal patronage (as explored in Chapter One), the role of both the arts and sciences at court became not only deeply entwined with the representation and maintenance of a monarch’s power, but also

² As mechanical objects, combination keyboards are comparable to La Mettrie’s understanding of human beings: abstract, or intangible experiences (such as the production of music, and thought, respectively) can only be achieved through physical processes. This study also understands combination keyboards to be epiphenomenal objects in the sense that their delimited musical ‘abilities’, or capacity, to produce certain sounds is not able to be changed, or dictated by the performer, but is rather pre-determined by a set of physical limitations.

³ Coelho and Polk, “Instrumental Music”, 527-556.

represented heightened ostentation and experimentation, in an aesthetic, mechanical, and performative sense.

The following case study—the Florentine Medici family’s collection of musical instruments and other cultural objects (amongst which a number of claviorgans are documented)—is an example of the institutionalisation of personal collections that occurred during the sixteenth and seventeenth centuries, becoming known as cabinet (*kammer*) collections (including *Wunder-*, *Kunst-*, and *Schatzkammern*—wonder or ‘curiosity’, art, and treasure, respectively).⁴

GENERATIONAL COLLECTING: A FAMILY EFFORT

Gerard Turner observes a link between the Medici family and the practice of generational collecting in his discussion of the history of the Medici collections and their significance within the overall history of what he terms the ‘cabinet of experimental philosophy.’⁵ Here, it is noted that Cosimo I de’ Medici’s (1519–1574) collection of “art objects, coins, and armour” was the “nucleus” for a larger, enduring collection maintained and added to by generations of his successors.⁶ Looking beyond collecting behaviours concerning musical instruments, it is clear that the practice of generational collecting within the Medici family originated prior to the establishment of Cosimo I’s collection (the first of the Medici collections to have sufficient evidence supporting the presence of combination keyboards).

Martha McCrory’s publication detailing a selection of inclusions in the gemstone collection of Lorenzo de’ Medici, ‘il Magnifico’ (1449–1492) notes that a portion of the collection had in fact fallen into Lorenzo’s possession as inherited items from the two preceding generations. Interestingly, McCrory also notes that by the time Cosimo I inherited the duchy in 1539, he inherited a greatly reduced collection of gems, owing to the departure of Alessandro de’ Medici’s (1510–1537) wife, Margherita of Austria, in 1537 with the majority of the collected items.⁷ Given the considerable role that these cabinet collections played in communicating the status of an individual and their court, it is entirely

⁴ Turner discusses the typical contents of the various types of cabinet collections and the interchangeable nature of this content, “The Cabinet of Experimental Philosophy”, 295.

⁵ Ibid., 301.

⁶ Ibid.

⁷ Martha McCrory, “Some gems from the Medici Cabinet of the Cinquecento”, *The Burlington Magazine*, vol. 121, no. 917 (August 1979): 509–515.

possible that Cosimo's voracious collecting could have been motivated by a desire to remedy the loss of his predecessors' collected objects.

This practice is also documented in specific relation to claviorgans and other musical instruments owned by the Medici, in court inventories and other related documents that are discussed by Giuliana Montanari with the purpose of highlighting the often overlooked presence of combination keyboards at prominent European courts.⁸ The inventories that Montanari analyses reveal consistent Medici ownership (and in some cases, convincing suggestions of use) of claviorgans during the period under examination, and of the eight instruments combining harpsichord and organ that were documented during this period, there is sufficient documentary evidence that at least five were in the collection as it passed through the ownership of more than one Medici ruler.⁹

As this ever-growing collection of musical instruments, artworks, small treasures such as jewellery and gemstones, and larger objects such as furniture and armour passed through successive generation of the Medici, the personal interests and tastes of each owner remained visible within the collection's contents. The most notable example in the context of this research is of Grand Prince Ferdinando (1663-1713), who incidentally never ruled, as he did not outlive his father, Cosimo III (1642-1722), but was influential in expanding the number of claviorgans owned by the Medici.

At least three claviorgans can confidently be linked to Grand Prince Ferdinando, who was "himself a keyboard player ... deeply interested in musical instruments."¹⁰ The first of his claviorgans was an instrument "registered as belonging to the court collection", that had been in the possession of Antonio de' Medici until his death in 1621, the second, attributed to Domenico da Pesaro (fl. 1533-1575), and the third, a cabinet-like organ with a removeable spinet.¹¹ Ferdinando's personal interest in keyboard instruments is further demonstrated through the relocation of the instrument previously kept by Antonio de'

⁸ Partial transcriptions and translations of Medici inventories and related documents from the Archivio de Stato di Firenze appear in Montanari, "Florentine Claviorgans", 236-259.

⁹ These five claviorgans are discussed in Montanari, pp. 236-259, and are most easily distinguished by descriptions of their appearance: "black velvet and lace trimmed" (240), "poor condition in the [Villa Medici] chamber of the Princesses" (ibid.), "organ with wooden pipes, and inseparable *buonaccordo*" (ibid.), "rose-coloured velvet and ... gold trimming" (241), and "cabinet-like organ ... with a removeable spinet" (242), respectively.

¹⁰ Ibid., 241-242.

¹¹ These instruments are described by Montanari, and select translations from the inventories in which they appear are provided by the same. Montanari notes that the da Pesaro instrument appeared in multiple inventories (1716, 1732, 1744, and 1769) until it was auctioned in 1771, "Florentine Claviorgans", 242.

Medici to his personal chamber in 1681.¹² The movement of this claviorgan into the Grand Prince's private quarters points towards the likelihood that this instrument was able to fulfil its function as a musical instrument, which stands in contrast to the states of disrepair that some of the other Medici-owned claviorgans inhabited whilst still appearing in collection inventories.

At this point, it is important to acknowledge the shifting definition of a 'cabinet collection' during the sixteenth and seventeenth centuries. The storage and display of smaller objects (such as gems or scientific and mathematical instruments) in physical cabinets does not present much difficulty with being termed a 'cabinet collection'. However, the expansion of such collections, and the inclusion of larger objects (such as furniture and musical instruments) saw them expand beyond the physical confines of individual cabinets, and in some cases, beyond entire rooms or buildings.¹³

Throughout the period focused on in this case study, inventories reveal that many of the claviorgans belonging to the Medici court collection were housed across a number of locations associated with ruling and non-ruling members of the Medici family.¹⁴ This is reflective of the transient nature of court-owned claviorgans in other parts of Europe at this time, as these instruments were frequently moved between familial residences, or sent out on loan to close associates of their owners.¹⁵ Returning to Montanari's modern review of claviorgans owned by the Medici family—including historical references to their appearance, condition and location—reveals three examples of instruments being moved between residences, which are explored below.

Two Residences in Rome: 1577-1598

Traversing the reigns of Francesco I (1574-1587) and Ferdinando I (1587-1609), Montanari lists a claviorgan ("covered in black velvet garnished with lace trimmings") as being delivered to the Medici Cardinal's residence, the Palace of Trinità de' Monti, in Rome,

¹² Montanari, "Florentine Claviorgans", 241.

¹³ The expansion of cabinet collections into multiple physical spaces was in fact encouraged by Quiccheberg in *Inscriptiones* (1565), as a convenient way to organise a vast array of different kinds of objects. Quiccheberg makes it clear that 'institutionalised' collections—i.e. owned by a court—would be considered unified irrespective of the objects not occupying the same physical space.

¹⁴ Montanari, "Florentine Claviorgans", 240.

¹⁵ The movement of Medici-owned claviorgans between residences and other family members bears striking similarity to the pattern of 'claviorgan borrowing' that occurred in Elizabethan England (see Chapter 1 for further detail and references).

around 1577.¹⁶ By 1598, after Ferdinando's accession to power, it appears that this instrument had been relocated to the Villa Medici, Rome. The relocation of the 'black velvet' claviorgan from the residence of a Cardinal to the residence of the ruling Duke can not only be interpreted as representative of possibly changing relationships within the court following a succession, but also indicates a shift in the instrument's function. Whilst it is unknown from the available information whether this claviorgan was actively used for performance in either of its Rome locations, the 'recalling' of this instrument, and its deliberate placement in a "wooden theatre built for Ferdinando I [in the Villa Medici]" marks a change in its status: from 'loaned instrument' to 'in the physical collection of the Duke'.¹⁷

Restoration, Relocation and Loan: 1587-1588

In 1587, a claviorgan ("with wooden pipes") located within "the chamber of the Princesses" in the Villa Medici is noted as being in "poor condition."¹⁸ In 1588, it reappears in an inventory, "delivered by master Giovanni Batista Citerni, master of organs," into the possession of court composer, Emilio de' Cavalieri.¹⁹ Important details about Cavalieri's social and political status position him closely to the Ferdinando I's court. A member of one of Rome's "most prominent families," whose connections with Ferdinando predated his inheritance of the duchies of Florence and Tuscany, Cavalieri was provided with a "unique position, in charge of both musicians and artists [at court]."²⁰ In light of Cavalieri's elevated status, this particular act of claviorgan relocation serves as an example of the amalgamated musical and status-confirming roles of this particular species of instrument. Additionally, the presence of a claviorgan, recently restored to a functional state (in fact, it would seem, for the express purpose of being delivered to its new guardian), in the possession of a high-ranking court musician, begins to suggest towards this instrument being used as a musical instrument, and playing a role in the making of music in the Medici ducal court.

¹⁶ Montanari, "Florentine Claviorgans", 240. To differentiate between the Medici-owned claviorgans, I will list the most salient visual descriptors taken from inventory listings, as provided in Montanari, pp. 236-259, due to an absence of any reference to builders or dates of construction. Any dates provided in the following three examples are also taken from Montanari, as listed in relevant inventories.

¹⁷ The mention of Ferdinando I's wooden 'theatre' appears in Montanari, "Florentine Claviorgans", 240.

¹⁸ Montanari, "Florentine Claviorgans", 240.

¹⁹ ASF, *Guardaroba Medicea* 132, 'inventario generale', 27.4.1588, c.H2s; translated in Montanari, "Florentine Claviorgans", 240.

²⁰ Ann E. Moyer, "'Review: Emilio de'Cavalieri 'gentiluomo romano': His Life and Letters, His Role as Superintendent of All the Arts at the Medici Court, and His Musical Compositions by Warren Kirkdale", *Renaissance Quarterly* 56.1 (2003): 179.

From Cardinal to Duchess: 1666-1670

The final example of claviorgan relocation under Medici rule covered here is that of a claviorgan with “rose-coloured velvet ... garnished with golden trimming”.²¹ The 1666 inventory in which it appears reveals that it had been kept in the possession of Cardinal Giovanni Carlo de’ Medici (1596-1666), and, presumably functional—as there is no apparent evidence of its being restored at this time—was “to be placed in the Villa al Poggio Imperiale for the use of the Duchess Vittoria della Rovere” (wife of Ferdinando II).²² The designation appearing in the 1670 *Guardaroba Medicea* that this instrument was “for the use of the Duchess” is a promising suggestion towards the intended purpose of this particular claviorgan: that it would be played. Whilst there remains no indication of who exactly would have played this instrument (it is possible that the Duchess may have used the instrument personally, or alternatively, it may have been for the use of musicians in her employ), the inclusion of this level of detail regarding the intended purpose of the ‘rose-velvet’ claviorgan’s relocation is not otherwise seen in inventory records of other claviorgans that were moved between Medici residences.²³ The appearance of the same instrument in a later inventory (1769) with the designation “*guasto*” further supports the hypothesis that following its 1670 relocation, it was in a playable state, and as such would have been a part of music-making activities in the ducal court.²⁴

In each of the examples discussed above, where the claviorgans were physically relocated or repurposed (as visual objects, rather than functioning musical instruments), they remain “institutionally contained”, by virtue of their belonging to a collection of cultural objects presided over by a single owner.²⁵ This unification of physically separated instruments through ownership (understood here in relation to the concept of embodied cultural capital) further acts to substantiate the social influence of institutionalised collections in their role as political structures. However, in each of these cases, irrespective of the designated function of each claviorgan, the visual appearance of the instruments is portrayed as their most defining feature, even preceding the complexity of their mechanical structure.

²¹ ASF, *Miscellanea Medicea* 31, ins. 10, translated in Montanari, “Florentine Claviorgans”, 241.

²² The relocation of this instrument was detailed in the inventory ASF, *Guardaroba Medicea* 822, 9/3/1670, 45, 52, translated in Montanari, “Florentine Claviorgans”, 241.

²³ For example, the ‘black-velvet’ claviorgan discussed in the first example of instrument relocation is only recorded as being “received from the Chamber of His Highness and sent to Giardino della Trinità”. ASF, *Guardaroba Medicea* 79 ‘inventario generale’, 20/9/1577, translated in Montanari, “Florentine Claviorgans”, 240.

²⁴ Montanari translates *guasto* to mean “non-playable”. This description of the instrument’s state appears in ASF, *IRC* 3392, ‘giornale della guardaroba generale’, 12/5/1767, in “Florentine Claviorgans”, 241.

²⁵ Robertson, “Preface”, x.

CLAVIORGANS AS VISUAL OBJECTS IN THE MEDICI COLLECTIONS

The majority of inventory records from the Medici collections include detailed descriptions of the claviorgans' external decoration. It is unknown whether this was for identification purposes (as there are otherwise no references to the instruments' builders) or whether these visual descriptions were the inventory-maker's response to encountering an instrument that, whilst visually striking, they may not have been overly familiar with, nor possessed adequate terminology to describe.²⁶ The decorative elements of the Medici claviorgans consistently include bright colours (paint), velvet and lace, and the use of other visual (yet not musically functional) features such as carved figures and portraits:

A cabinet-like instrument played with keys, with strings and pipes, and bellows that make a lid, and several drawers to pull out, completely painted inside and outside and all covered with black velvet garnished with lace trimmings and silk.²⁷

A *graviorgano* [claviorgan] covered with rose-coloured velvet and garnished with golden trimming and small brass gilded buttons, with a cover of rose-coloured damask with a fringe all around of golden lace and its stand painted vermillion.²⁸

A harpsichord with two stops, with an ebony and ivory keyboard, with a case painted outside with small figures including two mermaids, tritons, and others, the lid completely covered in arabesques in gold, with the outer case carved and partly gilded outside, and inside there are wooden pipes for the organ and bellows, and on one side of this case a naked lady with a violin is shown seated while a small dog dances.²⁹

²⁶ Descriptions of the appearance and functional state of claviorgans and other combination keyboards, rather than the use of instrument-specific nomenclature also appears in English court inventories during the reigns of Henry VIII and Elizabeth I, transcribed in Goldring, "The Earl of Leicester's Inventory", 56.

²⁷ ASF, "Inventario Generale", *Guardaroba Medicea* 79 (20/09/1577), translated in Montanari, "Florentine Claviorgans", 240.

²⁸ ASF, *Miscellanea Medicea* 31, ins. 10 (n.d.), in Montanari, "Florentine Claviorgans", 241.

²⁹ ASF, "Affari diversi", *Imperiale e Real Corte Lorenese* 3444, no.836 (17/03/1777), in Montanari, "Florentine Claviorgans", 244. This claviorgan was listed as part of Prince Ferdinando's estate in 1717, four years after his death, and endured into the eighteenth century, where it was described in the above-referenced entry.

This use of claviorgans' visual characteristics as a way to identify them within larger collections of instruments aligns with the distinct absence of any "scientific criterion ... [used for] the grouping of objects [in late sixteenth-century German and Italian *Wunderkammern*]", beyond the separate display chambers suggested by Quiccheberg to enhance the effect of a display.³⁰ Considering that the establishment and curation of cabinet collections was, by and large, an amateur undertaking, as too was the ownership of claviorgans and other 'specialty' instruments, it is unsurprising that the objects within these collections were presented in such a way that they came to represent a function of enjoyment, rather than utility. The concept of enjoying the sight, sound, and possession of these musical objects, as well as engaging with their functions in an 'amateur' way, reflects the courtly origins of cabinet collections, where the collection itself reflected the inquiry, experimentation and skill of others—i.e. 'professionals', whose work benefitted directly from royal patronage—and is just as inherent in less explicitly didactic collections, such as the Medici collection of musical instruments and other cultural objects.

CLAVIORGANS (1590, 1593, 1598) BY LAURENTIUS HAUSLAIB

This case study examines the shared structural and visual aesthetics of combination keyboards and decorative forms of furniture that appeared in cabinet collections during the sixteenth and seventeenth centuries. Here, the analysis of the intersection of form, function, and decoration in Hauslaib's claviorgans serves as the basis for a comparison of their salient structural characteristics with furniture and similar objects also present in cabinet collections. This, in turn, highlights a new aspect of the relationship between combination keyboards and cabinet collections, extending beyond the power-based concept of ownership, to address these instruments' status as aesthetic 'curiosities'.

The extant 1590 and 1598 claviorgans (*Figures 2.1* and *2.2*) attributed to Laurentius Hauslaib (Nuremburg, 1568-1625)—housed respectively in the Museu de la Música, Barcelona, and the Metropolitan Museum of Art, New York—are two remarkable examples of the manipulation of structure and decoration to disguise (at least partially) an object's musical function.³¹ Each of these instruments is a combination of a small chest (chamber)

³⁰ Antonio Aimi, Vincenzo de Michele, & Alessandro Morandotti, "Towards a History of Collecting in Milan in the Late Renaissance and Baroque Periods", *The Origins of Museums: The Cabinet of Curiosities in Sixteenth- and Seventeenth-Century Europe*, ed. Oliver Impey & Arthur MacGregor (Thirsk: House of Stratus, 2001), 31.

³¹ Claviorgan, 1590, Laurentius Hauslaib (alternate spelling: Lorenz Hausleib), Museu de la Música, Barcelona, MDMB 821; Claviorgan, 1598, Metropolitan Museum of Art, NY, Accession No. 89.4.1191.

organ, and an octave spinet able to be coupled to the organ, or removed from the main body of the instrument.³² Another claviorgan, dating from 1593 (*Figure 2.3*), is also suspected to also be Hauslaib's work, and is housed in the Glinka Museum, Moscow. Llimona and Smith both note that this claviorgan—previously classified as a “desk-spinet ... by an unknown Italian builder” but otherwise lacking in documentation—bears sufficient similarity to Hauslaib's 1590 and 1598 instruments in both its structural and decorative compositions, such that it has been attributed to him, pending evidence to the contrary.³³



FIGURE 2.1 - CLAVIORGAN, L. HAUSLAIB (1590), MDMB 821. PHOTO © BARCELONA MUSEU DE LA MÚSICA.

³² Organological analysis of the 1590 instrument appears in Llimona, “Claviorgans Attributed to Laurentius Hauslaib”, 87-90. The 1598 instrument is analysed in Stewart Pollens, “The Claviorganum by Laurentium Hauslaib, Nuremburg, 1598”, *Das Österreichische Cembalo: 600 Jahre Cembalobau in Österreich*, (Tutzing: Alfons Huber, 2001), 247-67.

³³ Llimona, “Claviorgans Attributed to Laurentius Hauslaib”, 93; Smith, “History and Use of the Claviorgan”, 106.



FIGURE 2.2 - CLAVIORGAN, L. HAUSLAIB, 1593. ³⁴



FIGURE 2.3 - CLAVIORGAN, L. HAUSLAIB, 1598, ACC. NO. 89.4.1191. PHOTO © METROPOLITAN MUSEUM OF ART, NY.

³⁴ Llimona, "Claviorgans Attributed to Laurentius Hauslaib", 96.

DEVIATIONS IN CLAVIORGAN DESIGN, SIXTEENTH AND SEVENTEENTH CENTURIES

During the sixteenth and seventeenth centuries, there existed a wide range of combinations of plucked string and pipe instruments that can be categorised as ‘claviorgans’. As examined in the literature review, the present-day nomenclature for the identification of claviorgans (established by Smith, and drawing on both historical classification conventions and modern terminology) provides twenty-first century organologists with a more consistent means of distinguishing the myriad varieties of claviorgans.³⁵ As a result of this diversity within a single variety of combination keyboard instrument, there exists a multitude of examples of sixteenth- and seventeenth-century claviorgan design from across Europe. These examples are evident in the form of extant instruments, descriptions of instruments appearing in historical inventories, as well as surviving iconographical representations, including paintings and design sketches.

From this body of surviving instruments and other representations of non-extant examples, it is apparent that the majority of claviorgans from the sixteenth and seventeenth centuries followed a similar structural design. The organ component (specifically, a case for the organ pipes and bellows) in these instruments and their representations consistently appears as a large, rectangular structure, upon which the smaller component instrument is situated—giving rise to the description of such combinations as a “table organ with a *spinetta* on top” (*Figures 2.4 and 2.5*).³⁶ Barbieri observes a variation on this structure—the *claviorganum in forma cimbali* (claviorgan in the shape of a harpsichord)—detailed in a 1568 document outlining a commission for a claviorgan that “should have the same shape as a harpsichord down to the floor ... without bulges in any part of it.”³⁷ Yet, despite this specified design variation, the claviorgan mentioned here may still be broken down into two main structural components: the harpsichord on top, and the organ beneath, with the characteristic shape of the harpsichord maintained as a salient visual feature, to the point of dictating the shape of the entire instrument.

³⁵ Smith’s revised nomenclature for claviorgans is inclusive of any plucked string instrument and any pipe organ variant – thus including harpsichords, virginals, spinets, and chest organs and regals (free-reeds), “History and Use of the Claviorgan”, 30–8.

³⁶ This description appears in Patrizio Barbieri, “Roman Claviorgans and ‘Table Organs with a Spinetta on Top’ 1567–1753”, *Early Music* 44, no. 3 (2016): 395.

³⁷ Archivio di Stato, Roma (ASR), Notai dell’Auditor Camarae, vol. 6249, ff.177r, 10/09/1568, translated in Barbieri, “Roman Claviorgans”, 396.

Comparatively, the Hauslaib claviorgans are not immediately recognisable as musical instruments until the keyboard or bellows are made visible, by opening the case, or viewing the rear of the instrument. These instruments are also considerably smaller than their harpsichord- or spinet-shaped counterparts: the entire Theewes claviorgan (including both the harpsichord and organ components, plus their casework) measures 127cm high, 233 cm long (from keyboard to tail ends), and 104.8 cm wide, whereas the 1590 Hauslaib measures only 70 cm high, 56 cm long, and 80 cm wide, and the 1598 claviorgan measures 61.5 cm high, 55.3 cm long, and 71.1 cm wide.³⁸ This variation in size corresponds with the differing pitch of the instruments, as the Hauslaib claviorgans sounded at octave pitch. Smith suggests this may have had some influence on the contexts in which the smaller claviorgans were used (their higher pitch may have decreased the likelihood of their use in ensemble performances), however, given the scarcity of surviving evidence regarding the use of, or preference for these instruments in performance, this theory remains speculative.³⁹ It must be noted that the ‘cabinet’ design of smaller claviorgans is not unique to the Hauslaib instruments, with four known Italian claviorgans from the sixteenth to eighteenth centuries also presenting with this structure.⁴⁰ Each of these instruments are referred to in terms of their uniqueness, and this, along with their scarcity and excessive decoration suggests that the smaller ‘cabinet’ design of claviorgan was not commonplace.

³⁸ V&A, “Dimensions”, The Theewes Claviorgan: More Information (n.d.), accessed 19/01/19, <https://collections.vam.ac.uk/item/O60635/the-theewes-claviorgan-claviorgan-theewes-lodewyk/>. Llimona, “Claviorgans Attributed to Laurentius Hauslaib”, 87. There is no available data for the dimensions of the 1593 instrument.

³⁹ Smith, “History and Use of the Claviorgan”, 106.

⁴⁰ Montanari includes a 1577 Medici inventory record of ‘a cabinet-like instrument played with keys, with strings and pipes, and bellows that make a lid’ in “Florentine Claviorgans”, 240.; Barbieri also makes note of another three such claviorgans—one owned in 1631-1636 by Cardinal Francesco Barberini, another left by Duke Antonio Maria Salviati in 1704, and the third, left in Rome by Cardinal Carlo Barberini Jr. around 1738, “Roman Claviorgans”, 400-1.



FIGURE 2.4 - DETAIL FROM "THE FOUR SEASONS", FRIEDRICH VAN VALCKENBORCH, 1619.⁴¹



FIGURE 2.5 - CLAVIORGAN, LODEWIJK THEEWES, 1547. 125–1890. © VICTORIA & ALBERT MUSEUM, LONDON.

⁴¹ Smith, "History and Use of the Claviorgan", 116.

‘SMALL’ KEYBOARD INSTRUMENTS AND CABINETS IN EARLY MODERN COLLECTIONS

The diminutive size of the Hauslaib claviorgans may also be compared to a claviorgan (non-extant) once belonging to Phillip II of Spain (1527-98). Touted as his “most valuable stringed keyboard instrument” this clavichord-organ combination measured 62.5cm long, and was kept in a case “covered and lined with crimson velvet and decorated with gilt studs.”⁴² Kenyon de Pascual questions the likelihood of its being “regarded as a serious musical instrument,” and in justifying such a statement, which carries connotations of the instrument’s ‘lesser’ musical value, we must look to the historical purpose of ‘small’ instruments.⁴³ Falling into two categories, highly decorated ‘small’ keyboard instruments in the sixteenth century were either intended to be looked at or to be played. Kenyon de Pascual notes that the instruments of the former category were often “princely toys or decorative objects for a cabinet of curiosities.”⁴⁴ It is in this last statement that we encounter a direct connection between cabinet collections and an instrument similar to the Hauslaib claviorgans.

The structural design and decoration style of each of Hauslaib’s claviorgans bears a strong resemblance to the secretary cabinets regularly found throughout sixteenth- and seventeenth-century European collections, which were used to store smaller objects (such as stones, shells, or coins), as well as being works of craftsmanship worthy of exhibition in their own right.⁴⁵ The cabinets pictured below (*Figures 2.6 and 2.7*) date from the mid-seventeenth century, and despite their stark contrast in decoration, are both well-defined examples of this popular style of construction. This same cabinet design is clearly evident in all three of the Hauslaib claviorgans, with two doors opening out to reveal an arrangement of small drawered compartments, and hidden decorative elements such as inlays and bas-relief figures presented in a triptych-like manner. The larger structural elements (such as the casework and doors) serve to conceal the explicitly musical components of the claviorgans—with the manuals hidden behind the cabinet doors when closed, and the pipes located out of view, at the rear of the instrument.

Comparing the 1590 Hauslaib claviorgan (*Figure 2.1*) and the Elector Maria Anna cabinet (*Figure 2.7*) reveals significant similarities in the decoration and the physical

⁴² de Pascual “Clavicordios and Clavichords”, 620.

⁴³ Ibid., 620-1.

⁴⁴ Ibid., 620.

⁴⁵ The style and origins of sixteenth- and seventeenth-century secretary cabinets is outlined in Hertha Wegener, “A 17th Century Intarsia Cabinet”, *Brooklyn Museum Bulletin*, Vol. 9 No 4. (1948): 1-6.

composition of each of these objects. Both the claviorgan and the cabinet feature opulent colours and valuable materials to create a striking visual effect. The claviorgan is veneered in a red-dyed tortoiseshell, and the drawer handles are decorated with silver ornaments, whilst the triptych of figurines (representing the Muses) is made of bronze.⁴⁶ The pristine white of the Elector Maria Anna cabinet is achieved through the use of ivory cladding, and contrasts with the lapis lazuli inserts (which are hidden until the doors are opened), bordered in gold-plated silver, set in each of the drawers and triptych panels.⁴⁷



FIGURE 2.6 - CABINET, CA. 1660, BARGRAVE COLLECTION, CANTERBURY. PHOTO: JOHN WEBB.⁴⁸

⁴⁶ Llimona, "Claviorgans Attributed to Laurentius Hauslaib", 87.

⁴⁷ Bayerisches Nationalmuseum Object Database, "Cabinet of the Elector Maria Anna, widow of the Elector Maximilian I of Bavaria", R 2139, (n.d.), accessed 10/04/19, <https://www.bayerisches-nationalmuseum.de/index.php?id=547&laufnr=00032411>.

⁴⁸ Oliver Impey & Arthur MacGregor, eds., *The Origins of Museums*, 208.



FIGURE 2.7 - ELECTOR MARIA ANNA'S CABINET, CA. 1655-82, R2139. PHOTO: D103112, © BAYERISCHES NATIONALMUSEUM.

The function of such cabinets, within early modern collections is clearly documented, as many of these objects survive, and are described consistently throughout twentieth- and twenty-first-century literature and museum catalogues as having been used for the storage of valuables, such as “coins, jewellery, or other precious objects.”⁴⁹ In keeping with the main purpose of these collections—to represent the wealth and status of their owners—the motivation behind the lavish decoration of the cabinets is clear: that any object within the collection, irrespective of its function, should contribute to the overall message and assumptions of objective and subjective value communicated through the collection.

Similarly, the decoration of the Hauslaib claviorgans can be explained in this way. Even though the 1593 and 1598 instruments (*Fig. 2 and 3*) are not as lavishly decorated as their 1590 sibling, the same approach to their decoration remains evident through the relatively unadorned exterior, the use of valuable materials (mother of pearl and gold, respectively) on the interior, and the use of the concealment effect to render these instruments’ musical function a hidden, rather than explicit feature. It is through the concealment of these instruments’ musical function—the one characteristic separating them from other pieces of decorative furniture—that further positions them as embodiments of

⁴⁹ Wegener, “17th Century Intarsia Cabinet”, 1.

the philosophy of early modern cabinet collections. The idea that in order to access (or even become aware of) the musical component of these extraordinary objects there must be a physical ‘unveiling’, perpetuates the value of exhibitionism and conspicuous display inherent in cabinet collections. Across all the various types of these collections—such as those ‘specialising’ (but not necessarily limited to) in visual art, natural history, or coins and jewels—there existed a strong sense of presenting objects with the intention of appealing to viewers’ emotions and aesthetic sensibilities.

The Baroque counteracted the principles of regularity, equilibrium and moderation with free, imaginative invention and the quest for the marvellous and the new. The taste for metamorphoses, disguise and the precariousness of appearances comes across in all forms of the era’s art.⁵⁰

The contribution of decorative elements to the overall aesthetic impact of the Hauslaib claviorgans allows them to be considered prime examples of three key design elements—sound, structure, and decoration—co-existing equally within a single object. Paolini suggests that attributing equal value to non-functional visual elements in this way subverts the “specific logic” of other types of musical instrument, where this musical function is visually apparent.⁵¹ The disruption of the sound-structure relationship that occurs in instrument-objects such as the Hauslaib claviorgans, results in a modification of the object’s meaning. In this sense, the musical function (the meaning) of these claviorgans is disrupted by their structure (resembling something other than an instrument), and the use of ostentatious decoration and valuable materials suggests that the object is of significant visual—not musical—value.

MUSICAL MACHINES: TECHNOLOGICAL EXPERIMENTATION AND EXPRESSIONS OF MATERIALISM IN EARLY MODERN EUROPE

The ‘wonder and curiosity’ that influenced much of the scientific experimentation, and technological and artistic innovation of the early modern period is clearly represented within the concept of cabinet collections, and the objecthood of combination keyboard instruments. Both cabinet collections and combination keyboards embody the idea of innovation in an interdisciplinary sense, whereby objects and principles from a range of

⁵⁰ Paolini, “Between Decoration, Form and Function”, 66.

⁵¹ Ibid., 61.

intellectual disciplines are brought together to be displayed (and, in the case of combination keyboards—to interact) in a cooperative way.

The focus in this section shifts to the influence of early modern conceptions of materialism on the invention and perception of combination keyboards and ‘automated’ music in an exhibitive context. The first example, Michele Todini’s *Galleria Armonica* (1650–90), represents an alternate type of cabinet collection, showcasing the original inventions and technological innovations of the builder (Todini), rather than reflecting social status or wealth. The two musical objects from the *Galleria Armonica*, the Greater Machine and the Machine of Polyphemus and Galatea (*macchina di Polifemo e Galatea*)—also referred to in contemporary literature as the Golden Harpsichord—are uniquely complex combination keyboards, and are the subjects of analysis within this example. An examination of these instruments’ musical components and structural composition explores yet another instance of mid-to-late seventeenth-century experimentation with automation and the blurring of boundaries between ‘the controller’ and ‘the controlled’ (performer and instrument, respectively), and the influence that the prevalent materialist philosophy had on the development of these concepts.

The second example is a musical automaton, The Musician (1772–74), built by Pierre and Henri-Louis Jaquet-Droz, featuring a female automaton ‘playing’ an instrument resembling a chest organ or harmonium, alleged to originally have been a *clavessin organisé*—an organ-harpsichord combination.⁵² The only known instance of a combination keyboard having been associated with an automaton during the seventeenth or eighteenth centuries, The Musician presents a rare opportunity to consider combination keyboards—the ‘curiosities’ of their time—in relation to other types of mechanical curios, and further examine their previously ignored role in the technological innovations and approaches to automation and music during this period.

MICHELE TODINI’S *GALLERIA ARMONICA* (1650–90)

The *Galleria armonica e matematica* (‘gallery of harmony and mathematics’; commonly referred to as the *Galleria armonica*) is a cabinet collection from the seventeenth century,

⁵² The claim that The Musician’s instrument used to be a claviorgan is explored by Adelheid Voskuhl, when tracing the references to and evidence of this automaton’s history in *Androids of the Enlightenment: Mechanics, Artisans and Cultures of the Self* (Chicago: Chicago University Press 2003), p. 130. The majority of sources dating from the twentieth and twenty-first centuries often erroneously refer to the instrument as a clavichord.

consisting of only four objects: two mathematical and two harmonic ‘machines’. All four of these machines were designed, constructed, and owned by one individual, Michele Todini (1616-90).⁵³ Intended as a gallery to showcase Todini’s craftsmanship and innovative thinking through the construction of experimental clockwork ‘machines’ and musical instruments, the construction of the *Galleria armonica* commenced in Rome, in 1650.⁵⁴ All that survives of this collection today is the Machine of Polyphemus and Galatea (referred to from here as the Golden Harpsichord, as it is called in the majority of modern-day literature), and a 1676 document authored by Todini, titled *Dichiaratione della galleria armonica, eretta in Roma*.⁵⁵ Considered the “more important” machines of the *Galleria armonica*, the Golden Harpsichord and the Greater Machine are successful embodiments of Todini’s vision to combine multiple musical instruments, and incorporate visual elements such as sculpture into the instrument’s functionality.⁵⁶ The sonic qualities of these two instruments are also the result of Todini’s ambitious experimentation, with timbre and sound production being manipulated to create the illusion of automation (whereby some of the component instruments would appear to play independently of the performer).

The Greater Machine (Macchina maggiore)

The machine of the organ, large harpsichord and three spinets, lyra and violin that play in concert, each with their carving decorations, pedestals, boards, cornices, picture and other appurtenances for the same machine.⁵⁷

The first of the musical machines of the *Galleria armonica*, the Greater Machine, is perhaps the largest known combination keyboard instrument to ever have existed. Unfortunately no longer extant, this instrument consisted of seven separate instruments, as listed in the description above from a 1678 creditor’s inventory. Todini is believed to have started construction on the Greater Machine around 1650, with the harpsichord and three spinets in

⁵³ Barbieri notes that following Todini’s death in 1690, the *Galleria armonica* remained intact and passed into the ownership of the Marquises of Verospi until 1796 when there were no longer any male heirs, and the *Galleria* was broken up, “Michele Todini’s *Galleria armonica*”, 575-577.

⁵⁴ Ibid., 566.

⁵⁵ The Golden Harpsichord is housed in the Crosby Brown Collection of Musical Instruments, Metropolitan Museum of Art, NY, (89.4.2929a-e); Todini’s *Dichiaratione* was published in Rome by Francesco Tozzoni in 1676.

⁵⁶ Barbieri, “Michele Todini’s *Galleria armonica*”, 565.

⁵⁷ Description of the Greater Machine, in ASR, “Descriptio pro craeditoribus Michaelis Todini”, 30 Not. Cap., uff.28, vol. 339, ff.207r-208v, translated in Patrizio Barbieri, “Michele Todini’s *Galleria armonica*”, 567. The ‘three spinets’ are identified as ‘an octave spinet, a spinettone, and a tiorbino’, in Grant O’Brien and Francesco Nocerino, “The Tiorbino: An Unrecognised Instrument Type Built by Harpsichord Makers with Possible Evidence for a Surviving Instrument”, *The Galpin Society Journal* vol. 58 (2005): 184-235.

place by 1656. The remaining components—the lyra, violin, and organ—were added two years later, following a forced hiatus caused by an outbreak of plague, which saw Todini “obliged to close the room where the machine was housed, and seal it in the presence of a notary.”⁵⁸

During the Greater Machine’s construction, Todini noted a number of “difficulties” in achieving the combination of such a great number of instruments, especially incorporating instruments that were not of the keyboard family. In particular, the violin, whose “arch [bridge] ... allows for one string to be played, whilst leaving another [unplayed]”, and the lyra, which had to be strung “back to front [in order to find the correct string from the keyboard]”, are recorded in *Dichiaratione* as having required structural adjustment to render them playable within the larger instrument.⁵⁹ However, the “greatest difficulty” Todini encountered during his work on the Greater Machine, was “making the instruments seem more or less remote from the player.”⁶⁰

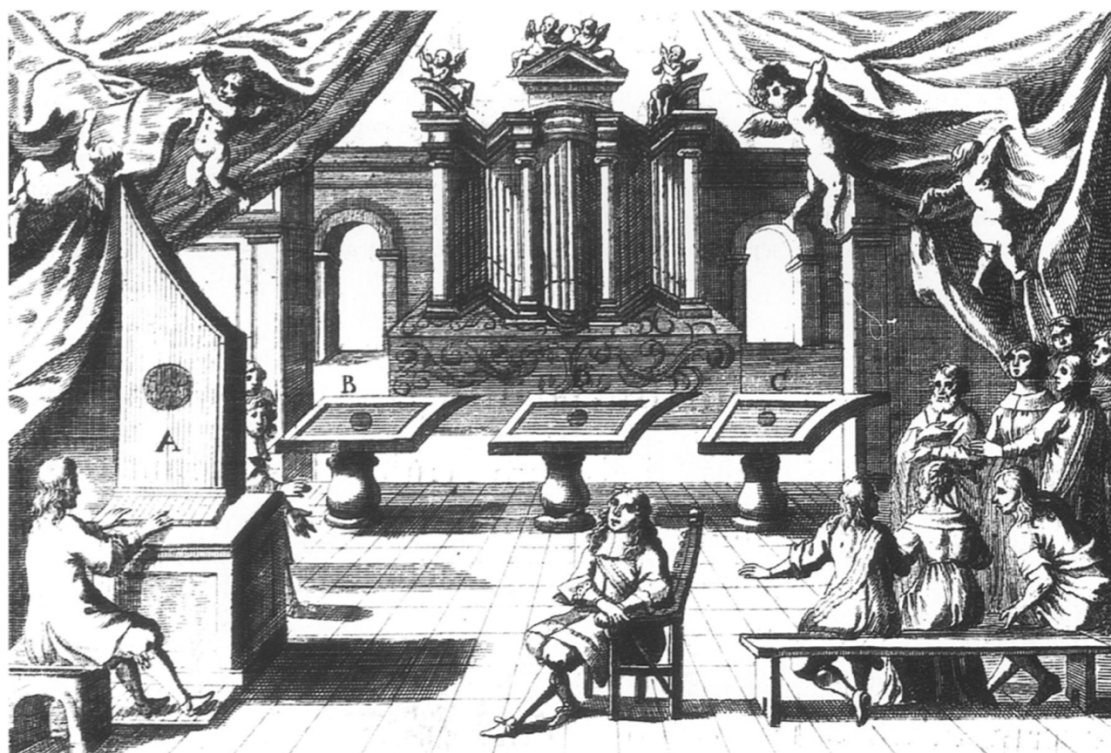


FIGURE 2.8 - TODINI'S GREATER MACHINE DEPICTED BY ATHANASIUS KIRCHER IN 'PHONURGIA NOVA', KEMPTEN:1673, PLATE 16. ⁶¹

⁵⁸ Barbieri, “Michele Todini’s *Galleria armonica*”, 567.

⁵⁹ Todini, *Dichiaratione*, 8, 10. Translation my own.

⁶⁰ Ibid., 8. Translation my own.

⁶¹ Barbieri, “Michele Todini’s *Galleria armonica*”, 569.



FIGURE 2.9 - 'MACCHINA MAGGIORE', PLATE 33, FILIPPO BONANNI, 'GABINETTO ARMONICO', ROME:1722.⁶²

This idea of combining multiple component instruments through one playing mechanism (controlled by the performer from the harpsichord), and creating the illusion that the instruments not touched by the performer sounded autonomously, is most clearly encapsulated in the only surviving images of the Greater Machine. Engravings by Athanasius Kircher, published in 1673 (Figure 2.7), and Filippo Bonanni in 1722 (Figure 2.8), reveal vastly different representations of the Greater Machine. Despite being published during Todini's (and the Greater Machine's) lifetime, and depicting the general layout of the instrument—with the performer closest to the audience, and three component instruments standing 'independently' to the performer's right—it is acknowledged both in *Dichiaratione* and modern literature that Kircher's engraving is "merely the fruit of the engraver's imagination."⁶³ Remarking that "the person who made the drawing had never seen the original", Todini provides his own description of the Greater Machine: "three quilled instruments are placed therein [the 'body' of the combined instrument] ... facing towards the person who plays it."⁶⁴ Bonanni's engraving more closely resembles Todini's description, and also appears to depict a more realistic structure—similar to that of the

⁶² Barbieri, "Michele Todini's *Galleria armonica*", 575.

⁶³ *Ibid.*, 568.

⁶⁴ Todini, *Dichiaratione*, 10-1, 24-5, translated in O'Brien & Nocerino, "The Tiorbino", 188.

extant Golden Harpsichord—with the large, painted body of the Greater Machine, or the platform on which it sits, as feasible locations for the concealed mechanism used to combine the component instruments.⁶⁵

Despite the unverified accuracy of Bonanni's depiction of the Greater Machine, his engraving, when considered alongside Todini's own description, provides valuable insight into the visual aesthetic of the instrument, and how this may have shaped its reception (as well as that of the *Galleria armonica* more generally) at the time. In *Dichiaratione*, Todini describes the Greater Machine as having two “façades ... with gold carvings, intersected with paintings by Gaspare di Possino [Gaspard Dughet, 1615–75], which is original work,” information confirmed in the 1678 creditors' inventory (quoted at the opening of this example, see footnote 71), which also refers to the presence of carvings, pictures, and other decorative elements.⁶⁶ In Bonanni's engraving, the “suggestion of a landscape” is apparent on the left façade of the instrument (above the performer), and the carvings frame the façade pipes on the right hand side of the instrument, and adorn the pedestals supporting the visible keyboards.⁶⁷

In 1674 (following permission from the papal Camera Apostolica, or financial council), Todini opened the *Galleria* to the public, charging a “lawful and appropriate fee” for admission.⁶⁸ The support his creditors demonstrated for this enterprise is reflected in an agreement from 1677, whereby Todini was required to be “available twice weekly ... to give public demonstrations or to carry out ordinary maintenance.”⁶⁹ It is unclear when Todini stopped demonstrating the objects of the *Galleria* to the public, however, the next reference to the display of Todini's creations appears in the early eighteenth century, in Giacomo Pinarolo's guidebook to Rome.⁷⁰ Now under the ownership of the Marquises of Verospi (who acquired the contents of the *Galleria* after Todini's death, in 1690), the guidebook notes that “the machines themselves were located, together with a collection of antique statues in the gallery frescoed by Francesco Albani [in the Verospi palace, in Via del Corso].”⁷¹

⁶⁵ Support for the Bonanni engraving being the more accurate of the two surviving iconographical representations of the Greater Machine is given following consideration of the available evidence regarding the context of the engravings in Winternitz, “The Golden Harpsichord”, 156; Barbieri, “Michele Todini's *Galleria armonica*”, 576; and O'Brien & Nocerino, “The Tiobino”, 188.

⁶⁶ Todini, *Dichiaratione*, 14–5.

⁶⁷ Winternitz, “The Golden Harpsichord”, 156.

⁶⁸ Barbieri, “Michele Todini's *Galleria armonica*”, 566.

⁶⁹ ASR, “Descriptio pro creditoribus Michaelis Todini”, in Barbieri, “Michele Todini's *galleria armonica*”, 567.

⁷⁰ Giacomo Pinarolo, *Trattato della cose più memorabili di Roma, tanto antiche, che moderne*, vol. 2, Rome: Gaetano Zenobj, 1713.

⁷¹ Barbieri, “Michele Todini's *Galleria armonica*”, 575.

Whilst both the “artistic ... and musical aspect[s]” of Todini’s machines fails to “exhaust” modern scholarly interest in them—evident through the themes explored in twentieth- and twenty-first-century publications—there is little historical mention of either the Greater Machine’s or the Golden Harpsichord’s musical capabilities, beyond Todini’s comprehensive descriptions.⁷² From the available seventeenth- and eighteenth-century source material concerning the Greater Machine and its place within the Galleria, it appears that this object—though able to produce sound, and be engaged with as a musical instrument—was valued more for its mechanical ingenuity and visual impact, representing the ability of an individual to engineer a ‘solution’ to the early modern desire for a “one-man”, or “surrogate”, orchestra.⁷³

The Golden Harpsichord (The Machine of Polyphemus and Galatea)⁷⁴

In the second room [of the *Galleria*] is a representation of the realm of Polyphemus, with many statues of gold, among them Galatea; it shows a procession through the sea drawn by two dolphins harnessed to Cupid, who sits in a seashell surrounded by a large retinue of sea nymphs and is served by Tritons as large as life that carry a cembalo ... Polyphemus sits upon a mountain, which is his habitat, in the fable, in the act of playing a *sordellina*, or *musette*, to please Galatea; within the said mountain is a machine for producing the sound of the *sordellina*, which one plays from a keyboard situated under that of the previously mentioned cembalo.⁷⁵

Todini’s description of the Golden Harpsichord introduces the impressive visual nature of this instrument, the second of two musical machines in the *Galleria armonica*. Construction of the Golden Harpsichord commenced in 1656, some six years after that of the Greater Machine, and this harpsichord-organ combination represents Todini’s most ambitious union of auditory illusion and visual art.⁷⁶ The harpsichord component of this instrument is the

⁷² Winternitz, “The Golden Harpsichord”, 156.

⁷³ The desire of early modern instrument makers to create an orchestral soundscape in a single instrument is discussed in Winternitz, “The Golden Harpsichord”, 155; and Barbieri, “Violicembalos and other Italian Sostenente Pianos 1785–1900”, *The Galpin Society Journal*, 62 (2009): 139.

⁷⁴ Winternitz first dubbed the Machine of Polyphemus and Galatea ‘The Golden Harpsichord’ in the 1950s, and this has since been how it has been referred to in publications throughout the twentieth and twenty-first centuries.

⁷⁵ Description of the Golden Harpsichord, from Michele Todini, *Dichiaratione*, 5–7, translated in Stewart Pollens, “Michele Todini’s Golden Harpsichord”, 34–5.

⁷⁶ Barbieri, “Michele Todini’s *Galleria armonica*”, 571.

salient musical feature, positioned in the structure's centre and flanked by sculptures of the mythical figures of Polyphemus and Galatea (to the left and right of the harpsichord, respectively, see *Figure 2.9*). Together, these figures create a tableau, depicting Polyphemus attempting to woo Galatea with music from his *sordellina* (also a sculpture), the sound of which Todini intended to simulate with an organ mechanism concealed beneath Polyphemus.⁷⁷



FIGURE 2.10 - GOLDEN HARPSICHORD, CROSBY BROWN COLLECTION OF MUSICAL INSTRUMENTS, 89.4.2929A-E. PHOTO © METROPOLITAN MUSEUM OF ART, NY.

Also present in this scene are the figures of various Tritons, dolphins, and nymphs, used as a decorative stand for the harpsichord, as well as contributing to the depiction of the mythological narrative.⁷⁸ The decorative elements of the Golden Harpsichord, whilst serving a distinct role in their own right—depicting a scene from Greek mythology—also facilitate Todini's intention of creating a musical machine that both gave the impression of automated sound (one instrument playing independently of the performer located at the harpsichord), and used one instrument (the organ) to simulate the sound of another (the *sordellina*).

⁷⁷ Todini's 1676 description of the Polyphemus statue's instrument as a *sordellina* is supported in modern organological descriptions of the Golden Harpsichord including Barbieri, "Michele Todini's *Galleria armonica*", 569; and Winternitz, "The Golden Harpsichord", 149-156.

⁷⁸ Winternitz, "The Golden Harpsichord", 149.

The Golden Harpsichord relies on the physical separation of its sculptural and musical components to achieve Todini's desired illusion of the organ-simulated *sordellina* (held by the Polyphemus figure) playing independently of the harpsichord, which would be controlled by the performer.⁷⁹ However, the second keyboard located under that of the harpsichord, which Todini indicated would be used to control the organ mechanism is not present in the instrument in its extant state, and as Pollens notes, there is "no trace of trackers or other devices for linking a keyboard with the remote organ."⁸⁰

"Major problems encountered with the organ mechanism," recorded by Todini as including a lack of space for contrabass pipes in the cavity beneath Polyphemus as well as the substantial quantities of air required for them to sound, are suggested as possible explanations for the organ component's failure to survive through to the modern day.⁸¹

As such, the extent of Todini's success in physically combining the organ and harpsichord components of the Golden Harpsichord remains unclear, with Todini's claim that "only one person was ever able to play the instrument with perfection ... no one else could overcome the difficulties of supporting the wind supply" the only potential record of its being played.⁸² Despite the lack of convincing organological evidence for the Golden Harpsichord's functionality as a combination instrument, it is nevertheless a unique example of a serious attempt to design such an instrument, with the express purpose of using its hybrid nature to create the illusion of autonomous sound production. The significance of the Golden Harpsichord as an early attempt at an 'automated' combination instrument is further compounded by the use of humanoid sculptures in the creation of the auditory illusion. Todini's desire to centre this illusion around the *sordellina* held by the Polyphemus figure seeks to anthropomorphise this sculptural element of the Golden Harpsichord, and further blur the boundaries between the roles of performer and instrument, and their relationships with sound production, visual impact, and musical functionality.

⁷⁹ *'E dentro al detto monte stanno le Machine per sar sonare la dette Sordellina, quale si suona con una tastatura porta sotto à quella del già nominato Cimbalo'*, Todini, *Dichirazione*, 6. Translation my own.

⁸⁰ Pollens, "Michele Todini's Golden Harpsichord", 36.

⁸¹ Pollens, "Michele Todini's Golden Harpsichord", 36-7. Pollens acknowledges that Todini talks sufficiently about the issues encountered with the installation of the organ component and the range of solutions trialled during construction, to support the belief that this part of the Golden Harpsichord did exist at some point of his lifetime.

⁸² Pollens, "Michele Todini's Golden Harpsichord", 36.

MATERIALISM AND PERFORMATIVE SCIENCE IN THE EARLY MODERN PERIOD: EXPERIMENTAL AND AUTOMATED MUSICAL INSTRUMENTS

If combination keyboards, in their state as mechanical objects, could be considered as ‘belonging’ to the realm of the private cabinet collection, then musical automatons may be considered as their more publicly ‘available’ counterparts, embodying the same experimental approach to the application of mechanical technologies and the integration of sound production and capacity for musical expression into this process. The focus on the physical nature of musical objects (including instruments and other musical ‘machines’) during the early modern period is not to be confused with the cultural focus on the form, materials, or other physical qualities of instruments in the modern phenomenon of critical organology. The influence of materialist ideals on the scientific and artistic innovators of the seventeenth and eighteenth centuries should be recognised when considering the motivations behind their work, and the outcomes of their experimentation. Writing about sound and the performance of music in relation to early modern materialism, Denis Diderot (1713–84) and Julien Offray de La Mettrie (1709–51)—whose relevant works, *Memoires sur different sujets de mathematique*, and *L’homme machine*, respectively, both published in 1748—provide “aesthetic justification” for the automation of music performance, and draw parallels between the existence of humanity and automata, viewing “both the human body and the human soul as functions of mechanics.”⁸³ In Diderot and La Mettrie’s works, and later also in Marie-Dominique-Joseph Engramelle’s 1775 treatise, *La tonotechnie*, the “line between human musicians and musical machines” is “blurred”, with Engramelle even going so far as to “unmask the mysteries surrounding popular automata in human or animal form.”⁸⁴ Whilst, as Cypess notes, these “revelations” about the mechanical functioning of such objects contributed to the “spread of knowledge among ... listeners and observers”—with the aim of enabling the widespread use of automated technology to accurately preserve musical works—the act of unveiling the ‘trade secrets’ of automaton manufacturers also stands as an active contribution to the “culture of popular science.”⁸⁵

Bernadette Bensaude-Vincent and Christine Blondel explore the influence that the flourishing seventeenth-century “culture of curiosities” had on the development of the

⁸³ Rebecca Cypess, “It Would be Without Error: Automated Technology and the Pursuit of Correct Performance in the French Enlightenment”, *Journal of the Royal Music Association*, 142.1 (2017): 3.

⁸⁴ Ibid.

⁸⁵ Ibid.

popularisation of science as discussed by Cypess.⁸⁶ Acknowledging that the cabinet collections of the aristocracy at this time were heavily distilled representations of a broader scientific and experimental culture, Bensaude-Vincent and Blondel focus on more generalised manifestations of performative science within eighteenth-century French society. The rise of the “public sphere” (whereby public opinion became a powerful counter-influence on previously held authorities and traditions⁸⁷) and efforts from within scientific disciplines to achieve greater exposure amongst non-scientific audiences, led to the “sensationalising” of activities, such as public demonstrations of experiments, through the “mobilisation of aesthetic emotions.”⁸⁸

The relationship between sensationalised ‘performative’ science and the intellectual integrity of these disciplines is outlined by Jessica Riskin:

Over the course of the eighteenth century, amusement—the captivation and manipulation of the visual sense—has acquired an intellectual purpose ... derived from prevailing sensationalist pedagogy, founded on the axiom that knowledge entered the mind through the senses.⁸⁹

The entertainment-value of performative science in its eighteenth-century form, which Liliane Pérez identifies as being derived from the blurring of boundaries between objects and spectacles thought of as amusements, and those with tangible intellectual, moral, or economic value, was also a source of tension. To which realm did these new inventions—such as automata and experimental instruments—belong? Pérez suggests that “curiosity met utility in several ways ... [conveying] symbolic and philosophical meanings; [providing] employment to skilled workers, and [fostering] connections between trades.”⁹⁰ Gaillard-Desaudray’s ‘Lycée des Arts’ (established in France, 1792) is one such example of the convergence of curiosity and utility. The product of Desaudray’s belief that “sciences and the arts go forward hand in hand, [lending] one another mutual assistance,” the Lycée

⁸⁶ Bernadette Bensaude-Vincent & Christine Blondel, “Introduction: A Science Full of Shocks, Sparks and Smells”, *Science and Spectacle in the European Enlightenment*, eds. Bernadette Bensaude-Vincent, and Christine Blondel (Aldershot: Ashgate, 2008), 1-10.

⁸⁷ The concept of the rise of the public sphere as a way for the middle-class to gain power within society is explored further in Jürgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*, trans. Thomas Burger & Frederick Lawrence (Cambridge: MIT Press, 1989).

⁸⁸ Bensaude-Vincent and Blondel, “Introduction”, 6-9.

⁸⁹ Jessica Riskin, “Amusing Physics”, *Science and Spectacle in the European Enlightenment*, eds. Bernadette Bensaude-Vincent, and Christine Blondel (Aldershot: Ashgate, 2008), 46.

⁹⁰ Liliane Pérez, “Technology, Curiosity and Utility in France and England in the Eighteenth Century”, *Science and Spectacle in the European Enlightenment*, eds. Bernadette Bensaude-Vincent, and Christine Blondel (Aldershot: Ashgate, 2008), 34.

consisted of a “ballroom, concert hall, [and a] cabinet of physics and curiosities” (amongst other amenities such as a restaurant and coffee room), which Pérez regards as representative of an “aesthetics of utility,” which was influential in shaping the widespread success of this new method of disseminating knowledge.⁹¹

‘The Musician’ (La Musicienne), Pierre & Henri-Louis Jaquet-Droz, 1772-74

A beautiful and graceful young girl, ‘The Musician’ plays various tunes on the harmonium with unfailing regularity and virtuosity, while breathing and turning her head as if to look at the musical score. It is indeed the hands of ‘The Musician’ which play, by pressing on the twenty-four keys of the keyboard.⁹²

One of only ten known android automata from the eighteenth century, the Jaquet-Droz’s extant ‘The Musician’ is considered “exemplary of [her] genre ... realistically carry[ing] out sophisticated motions ... appealing and charming in [her] performance, and [her] clockwork mechanisms are hidden entirely in [her body].”⁹³ Most commonly recognised—historically, and in modern literature—for her mechanical characteristics and status as an automaton, ‘The Musician’ also holds significant interest from an organological perspective, for the possibility of a tangible link with combination keyboards.

There is very little modern literature addressing the instrument that ‘The Musician’ ‘plays’, with sources from the mid-twentieth century claiming that she plays a clavichord, or deflecting focus away from the instrument itself, in favour of examining the musical ‘performance’ as a whole.⁹⁴ In a corporate film promoting the historical output of the Jaquet-Droz’s, uploaded to YouTube in 2011 by the Jaquet-Droz watch-making company, ‘The Musician’ is described by the narrator as playing the harmonium, which the accompanying

⁹¹ Desaudray, cited in Pérez, “Technology, Curiosity and Utility”, 35. Pérez also introduces the concept of ‘the aesthetics of utility’ as a derivation of Adam Smith’s 1759 theory ‘aesthetics of purpose’, which encouraged a new understanding of machinery: that it could be amusing and aesthetically pleasing (a curiosity) as well as functional.

⁹² Jaquet Droz, “Jaquet Droz Corporate Movie”, YouTube video, 17:49, December 5, 2011, 6:30-7:24, <https://www.youtube.com/watch?v=WofWNcMHcl0>.

⁹³ Voskuhl, *Androids in the Enlightenment*, 5. ‘The Musician’ is currently housed in the Musée d’Art et d’Histoire, Neuchâtel, Switzerland.

⁹⁴ Silvio Bedini claims that ‘The Musician’ plays a clavichord, in “The Role of Automata in the History of Technology”, *Technology and Culture*, 5.1 (1964): 24-42, whereas Shelby McCloy foregoes examination of the instrument altogether, focusing on the ingenuity of the automaton’s ‘performance’ in “Automata”, *French Inventions of the Eighteenth Century* (University Press of Kentucky, 1952), 103-10.

audio-visual footage reveals to actually be a small pipe organ.⁹⁵ As late as 2013, Adelheid Voskuhl presents the claim that ‘The Musician’ (also referred to as ‘The Harpsichord Player’) “originally played ... a *clavessin organise* or *clavecin organique*, a combination of harpsichord and organ,” although the current instrument is just comprised of an organ, with no indications as to when any alterations may have occurred.⁹⁶ Claiming that combination instruments such as the claviorgan were used to “amplify the sound in musical performances in domestic, semi-public, and public spaces,” Voskuhl speculates that this may have influenced the Jaquet-Droz’s decision to supplement the sound of the harpsichord with that of an organ component.⁹⁷

Whilst it is unclear whether or not ‘The Musician’ was ever explicitly included in a cabinet collection, she exists not only as a piece of detailed and “artistically sophisticated” clockwork, but also as a curiosity—in the conceptual sense—given her “large gestural and musical repertoire,” ability to move separate body parts (notably, her “body [torso], head, eyes, arms, hands, and fingers”⁹⁸), and the added distinction that the instrument played exists as a separate entity within the whole object.⁹⁹ This last distinction is important, as the act of performance being carried out by the android automaton of ‘The Musician’, mirrors the relationship existing between the musical interface (keyboard) and a human performer, more so than in any other musical automaton of the same period. In particular, the realistic motions of this automaton’s arms, hands, and fingers, together with their internal structure—the “skeletal” structure of each hand is “modelled on real, human hands”¹⁰⁰—contributes to the Jaquet-Droz’s success in not only creating an illusion of human activity through ‘The Musician’, but going so far as to actually simulate it.

⁹⁵ Jaquet Droz, “Jaquet Droz Corporate Movie”, 6:30-7:24.

⁹⁶ Voskuhl, *Androids in the Enlightenment*, 130. Voskuhl notes that these two French terms for a claviorgan appear in descriptions of the automaton in the 1770s and 1780s. This claim is also presented in Cypess, “It Would Be Without Error”, 17.

⁹⁷ Voskuhl, *Androids in the Enlightenment*, 130. This is comparable to the continual redesign and production of different iterations of the claviorgan that took place throughout its history, which will be explored further in Chapter Three.

⁹⁸ Henri-Louis Jaquet-Droz, 1780, in Cypess, “It Would be Without Error”, 17.

⁹⁹ Voskuhl, *Androids in the Enlightenment*, 132-3.

¹⁰⁰ Jessica Riskin, “The Defecating Duck, or, The Ambiguous Origins of Artificial Life”, *Critical Inquiry*, 29 (2002-3): 605.

Comparative Reception of Combination Keyboards and Musical Automata

The soul and the body fall asleep together ... when [the soul] is asleep, it is as if it did not exist.¹⁰¹

La Mettrie, 1748.

Jaquet-Droz's creation of a realistic simulation of musical performance—encapsulating the physical relationship between performer and instrument, as well as alluding to the less quantifiable relationship between performer and repertoire (through the simulation of affect)—engages fully with the early modern preoccupation with the material aspects of human existence. This approach to the mechanical exploration of the relationship of control between performers and musical instruments (which can be read as a metaphor for the relationship of influence between people, and internal and external stimuli, which was fundamental to the conceptualisation of early modern materialism) is similar to the approach taken by Todini in his creation of the musical machines of the *Galleria Armonica*.

The Jaquet-Droz's use of a clearly mechanised representation of a human being, to demonstrate that neither the performer themselves, nor the instrument, are the sole controlling force in the music-making act. On the other hand, Todini's Greater Machine offers a more subtle interpretation of the materialist belief that all actions, beliefs, and feelings are the result of physical matter (which La Mettrie terms 'mechanical' processes), presenting the audience with a living performer who appears not to be in complete control of, but acting alongside the numerous component instruments, despite the reality being that the instruments, and so too, the performer, are once again reliant on concealed, predetermined mechanisms.

The main point of difference between the long-term reception and longevity of musical automata and combination keyboards (the former enduring with more cultural and financial success into the Industrial era) lies in the distinct aspects of society—and its philosophy—that each represents. Both musical automata and combination keyboards were historically regarded as cultural objects, capable of (if not explicitly designed to) elicit a sense of awe in those encountering them by tapping into the fascination with the pushing of scientific and artistic boundaries that is synonymous with the early modern period. However, further consideration reveals combination keyboards to be portrayed as symbols of a specifically

¹⁰¹ Julien Offray de La Mettrie, *Machine Man and Other Writings (L'Homme Machine)*, 1747, trans. and ed. Ann Thomson (Glasgow: University of Cambridge Press, 1996), 6.

musical world-view, despite the value placed on their mechanical and technological characteristics. The associative link between combination keyboards and their origins within the music-making practices and social structures of the ruling classes of Europe that endured into the late eighteenth and nineteenth centuries does not appear as strongly in the perceptions of musical automata of the same period. Although musical automata appeared within the sphere of the ruling classes—such as the presentation of ‘The Musician’ at the court of Louis XVI and Marie Antoinette, in 1775¹⁰²—they are more often associated with the industrialisation of human society, and the materialist ‘blurring’ of the boundaries between the concepts of ‘the machine’ and ‘man’.

Made particularly evident through the writings of Diderot, La Mettrie, and Engramelle, the prefacing of connotations of technological ‘progress’ within musical automata, over those relating to the social and political implications of music, appears in the promotion of the idea of “recreating the ideal performance of a piece of music” in order to allow composers’ works to be more widely disseminated “with an ideal purity that would demonstrate its greatness.”¹⁰³ This attitude, which leans towards the primacy of the composers’ intentions, rather than that of the human performer (deemed “unreliable” in the opinion of Engramelle¹⁰⁴) or the audience, is not apparent in the case of combination keyboards, where the experience of the audience, or listener-observer, is seen as more important.

¹⁰² Jaquet Droz, “Jaquet Droz Corporate Movie”, 4:20–4:44.

¹⁰³ Rebecca Cypess, “It Would be Without Error”, 3.

¹⁰⁴ *Ibid.*, 1.

CHAPTER 3: REINVENTION OF COMBINATION KEYBOARDS IN THE EIGHTEENTH AND NINETEENTH CENTURIES: NEW TECHNOLOGIES AND NEW PURPOSES

OVERVIEW

An instrument's development or obsolescence depends on a multitude of unstable forces—economic, political, social, technological, as well as compositional and performance-related ones—that interact with varying intensity and unpredictable consequences.¹

Laurence Libin, 2000.

In 1910, Francis Galpin identified the regular reinvention of the claviorgan as having occurred with “each succeeding century” from the first mention of this phenomenon in Kircher’s *Musurgia Universalis* (1610) through to the late nineteenth century.² The continued renewal of interest in this instrument type in the mid-eighteenth to nineteenth centuries is particularly evident through the surge of new variants, and the redesign of existing types of combination keyboards. Galpin proposed two stages in the history of combination keyboards: the first spanning from the late fifteenth century origins of the claviorgan, to the mid-eighteenth century, and the second from the mid-to-late eighteenth century through to the final decades of the nineteenth century. This periodisation of combination keyboards’ history is still maintained in contemporary musicological literature, with publications on this instrument species either focusing on one of these periods, or making a distinction between the two.³

Within the framework of this study, drawing on the methodological framework of critical organology, this distinction between the ‘periods’ of the history of combination keyboards raises two points for consideration. The first relates to the way that contemporary scholars engage with and ‘create’ the history of musical instruments. Researchers could consider whether the retrospective application of such a distinction detracts from the likely circumstance that changes in an instrument species’ cultural role or

¹ Libin, “Progress, Adaptation, and the Evolution of Musical Instruments”, 197–8.

² Francis W. Galpin, *Old English Instruments of Music*, 173.

³ Montanari divides her discussion of claviorgans into two parts, the first covering the period 1492–1780, and the second from 1780–1900, “Florentine Claviorgans”, 236–259. Barbieri also acknowledges this divide, focusing solely on the latter of the two periods, in “Volicembalos and other Italian Sostenente Pianos (1785–1900)”, *The Galpin Society Journal*, 62 (2009): 117–139.

function were not the result of a conscious decision, but rather the result of more organic or gradual shifts within a society and its culture. On the other hand, I recognise that the use of such a distinction could be a useful historiographical tool for allowing a deeper, more nuanced engagement with combination keyboards and their place within their social, cultural, and historical contexts. With this second point in mind, making the distinction between the different ‘stages’ of combination keyboards’ history acknowledges the numerous and often dramatic changes that took place in the societies that made and used these instruments.

This chapter examines the period 1740–1892, the lead-up to the “obsolescence” of combination keyboards, a phenomenon that Libin describes as “an example of rapid diversification, followed by decimation.”⁴ There were immense changes in European society during this time, with the growth of the middle class and increasing industrialisation, which brought about changes to cultural perceptions of music, instruments, and music-making practices. In this chapter I will examine the impact that significant social, cultural, and economic shifts had on the role of combination keyboards, as well as increasing diversification in approaches to their design and production.

A prominent aspect distinguishing the ‘second wave’ (ca.1841–1892) of combination keyboards from their early modern predecessors is that of their redesign, along with the development of new variants, which incorporated new technologies and emerged as the result of changing approaches to keyboard instrument design. Along with the association of these instruments with new societal contexts, where previously they had been objects exclusive to the cultural contexts of the ruling classes, it was not only the form, sound, and musical capabilities of combination keyboard instruments that changed, but also their target audience, meaning that they started to be integrated into the music-making experiences of entirely new groups of people.

Here, the idea of an increased ‘democratisation’ of keyboard instruments and their music is central, and the rise of the middle class as ‘consumers’ of objectified cultural capital (exemplified in the extreme by the French Revolution, which saw cultural capital forcefully removed from the ruling classes, and more widely disseminated across societal divides) will be evaluated for its role in creating a demand for marketable musical instruments that were suitable for domestic use. On the other side of this demand lie those responsible for the production (both design and construction) of such instruments. In terms of the production of

⁴ Libin, “Progress, Adaptation and the Evolution of Musical Instruments”, 206.

combination keyboards, the growth of the musical instrument market, and the advent of mass production of capital disrupted the ‘craftsman culture’ that had previously defined instrument building, in favour of a ‘patent culture’, which encouraged designers and inventors from backgrounds that were not exclusively musical to participate in the creation of new instruments.

The final section of this chapter examines the impact of the above changes, primarily investigating the failure of combination keyboards to succeed commercially, in comparison to other types of keyboard instruments that were also available in the market. The changing meaning of ‘curiosity’ objects during this time is also covered, through an analysis of the presence and reception of combination keyboards (both reiterations of previously existing types, and new variants) at International Exhibitions across Europe in the mid-to-late nineteenth century. This concept in particular raises questions surrounding the role of technological innovation in musical instrument design, and the steady increase of other keyboard-specific technologies—such as those of the piano and harmonium—that appear at odds with the general shift away from combination keyboards, the antecedent of expressions of experimentalism in musical instruments.

COMBINATION KEYBOARDS OF THE EIGHTEENTH AND NINETEENTH CENTURIES: RE-IMAGINED DESIGNS, AND NEW INVENTIONS

From the mid-eighteenth century onwards, there emerged a range of new approaches to keyboard instrument design. Amongst these developments—which impacted design aspects such as structure (external and internal), composition (materials), and instruments’ overall visual appearance (decoration)—experiments with keyboard action and sound production mechanisms stand out in contemporary literature as the most significant area of change. While most of these ‘new’ actions (for the most part inspired by pre-existing innovations from previous centuries) related specifically to the instruments recognised today as early pianos, there is notable overlap with combination keyboards. For example, variants such as the claviorgan and mother-and-child instruments were ‘re-imagined’ to include some of these new actions and other emergent technologies.

The majority of examples (extant, and non-extant) of these re-imagined combination keyboards originated in the German-speaking lands, where they were “widely advertised ...

during the last quarter of the eighteenth century.”⁵ However, the practice of combining keyboard instruments in this new way was also undertaken by Italian and French builders, and even appeared in England following the arrival of builders from Central Europe (such as Johann Christoph Zumpe, from South-Germany, in the 1750s).⁶

PIANO-HARPSICHORD COMBINATIONS, 1740–1760

The design of the piano-harpsichord combinations originating late in the first half of the eighteenth century appears most similar to the concept of the claviorgan—comprising harpsichord and organ—of the late-fifteenth to early-eighteenth centuries, as they combine two distinct instrument types in a single, stand-alone instrument (as opposed to a large, built-in instrument, such as a church organ). However, unlike the common table-and-harpsichord shape of the previous centuries’ claviorgans (e.g. the 1547 Theewes claviorgan, *Fig. 2.3*), the piano-harpsichords of the eighteenth century bear significant resemblance to the early pianos being developed around the same time (see *Figures 3.1* and *3.2* for representations of this shape). This resulted (whether intentionally or not) in the greater concealment of a ‘secondary’ instrument, or the additional component instrument within the one performers and audiences would have first seen.

⁵ Rebecca Cypess, “Keyboard-Duo Arrangements in Eighteenth-Century Musical Life”, *Eighteenth-Century Music*, 14.2 (2017): 184.

⁶ Giovanni Paolo Di Stefano, “The ‘Tangentenflügel’ and Other Pianos with Non-Pivoting Hammers”, *The Galpin Society Journal*, 61 (2008): 90.



FIGURE 3.1 – TANGENTENFLÜGEL (NOT TANGENTENFLÜGEL-COMBINATION), FRANZ JAKOB SPATH, 1799, (PRIVATE COLLECTION, SWITZERLAND). ⁷

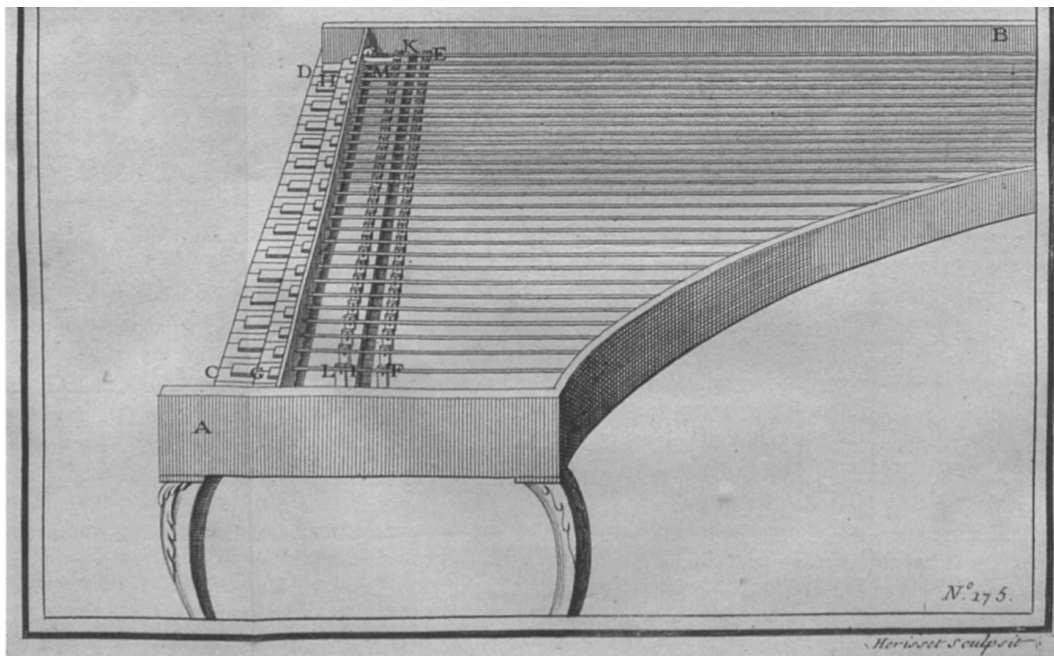


FIGURE 3.2 - ILLUSTRATION OF JEAN MARIUS' COMBINED HARPSICHORD-PIANOFORTE ACTION, IN 'MACHINES ET INVENTIONS APPROUVÉS PAR L'ACADEMIE ROYALE DES SCIENCES' (PARIS, 1735), BOTTOM OF PLATE 4. ⁸

⁷ Di Stefano, "The 'Tangentenflügel'", 242.

⁸ Giovanni Paolo Di Stefano, "The Clavecins à Maillets of Veltman and Marius: New observations on some of the first pianos in France", *Early Music*, 39.1 (2011): 44.

Despite the first pictorial representation of a proposed combination of piano and harpsichord actions appearing in 1735 (shown above, in *Figure 3.2*), fifteen years after the death of the French instrument builder, Jean Marius, to whom it was attributed, the latest research places a 1746 instrument, by Giovanni Ferrini (fl.1732-85), as the earliest surviving example of a successful combination of harpsichord and piano, and a non-extant, three-manual instrument by German builder, Wahl Friedrich Fickert, in 1742, as the earliest known attempt at combining these two instrument types.⁹

In the period 1757-59, records in the form of two reports dated 1759 and 1765, respectively (the latter is a shortened version of the former), reveal the presentation of two harpsichord pianos by Dutch instrument-builder, Andries Veltman, to the Académie des Sciences.¹⁰ Though plagued, as Di Stefano notes, by claims of plagiarism (it was believed at the time, that the concept for the earlier of the two instruments, from 1757, was originally conceived by the harpsichordist, Moutier), both of Veltman's piano-harpsichord combinations remain amongst the earliest examples of harpsichords with an added piano action, with an additional "device to engage and disengage the hammer action ... by using a knee pommel," which would have allowed a single performer to alternate between various timbral combinations with minimal disruption to the performance.¹¹

For even greater enjoyment, [Herr Spath] has combined the ... *Forte-piano-Clavecin* with the quilled *Flügel* in the most beautiful arrangement, including two keyboards, to give much delightful variety.¹²

Leipziger Zeitungen, 10th September 1765.

This advertisement from the *Leipziger Zeitungen* in 1765 for a combination instrument by Franz Jakob Spath (1714-86), appears in the midst of the period 1751-1770, during which Spath is believed to have developed a combination of his tangent-action piano, the *Tangentenflügel*, and a harpsichord.¹³ There is some uncertainty as to which of two instruments by Spath—the 1751 Elector of Bonn instrument, and the instrument advertised

⁹ Giovanni Paolo Di Stefano, "The Clavecins à Maillets", 42; Michael Latcham, "The Apotheosis of Merlin", *Musique Ancienne—instruments et imagination, Actes des Rencontres Internationales 'Harmoniques', Lausanne 2004* (Bern: Peter Lang, 2006), 277.

¹⁰ Di Stefano, "The Clavecins à Maillets", 43.

¹¹ *Ibid.*, 45.

¹² Advertisement for Franz Jakob Spath's instruments combining the *Tangentenflügel* with a harpsichord, from *Leipziger Zeitungen*, 10th September 1765, translated in Latcham, "The Apotheosis of Merlin", 277.

¹³ Comprehensive explanations and analyses of eighteenth-century tangent-action instruments are provided in Michael Latcham, "Franz Jakob Spath and the 'Tangentenflügel', an Eighteenth Century Tradition", *The Galpin Society Journal*, 57 (May 2004): 150-70; and Di Stefano, "The 'Tangentenflügel' and Other Pianos with Non-Pivoting Hammers", *The Galpin Society Journal* 61 (2008): 79-104.

above—was the first of his combination instruments (Michael Latcham presents a convincing discussion of evidence suggesting that the 1751 instrument could have included an organ component “to imitate the ‘proper flute’”, or that it combined the tangent action with a “harpsichord action ... [with] leather quills”), but there is sufficient evidence overall to indicate that such instruments were produced, alongside other *Tangentenflügels* that did not incorporate other component instruments.¹⁴

VIS-À-VIS COMBINATIONS: A SUB-CATEGORY OF PIANO-HARPSICHORD COMBINATIONS, 1770S AND 1780S

Other combination keyboards incorporating piano and harpsichord actions were produced by builders such as Johann Andreas Stein (1728–92), Ferdinand Hofmann (1756–1829), and Johann Peter Milchmeyer (1750–1813); however, they differ significantly to the ‘traditionally’ shaped piano-harpsichord combinations covered above. The *vis-à-vis* style of instrument is not considered new to the late eighteenth century, with one known extant *vis-à-vis* harpsichord, attributed to Roque Blasco, dating from 1691.¹⁵ Despite this very clear link to past instrument designs, there also exists the suggestion that the *vis-à-vis* instruments of the eighteenth century were re-imaginings of the mother-and-child instruments of the Ruckers family in the seventeenth century, as both types of instrument are designed to allow either one or two players.¹⁶

Stein, Hofmann, and Milchmeyer are known to have constructed *vis-à-vis* instruments, which are characterised by the two component instruments facing each other, and sharing a common case, bentside, and soundboard.¹⁷ However, while these builders adhered to the same general structure in their instruments, they each produced noticeable variations on the idea of the *vis-à-vis* keyboard instrument, which are examined below.

Stein, Vis-à-Vis Piano-Harpsichords (1777 & 1783)

Both of Stein’s *vis-à-vis* instruments are described by Latcham as “large rectangular instruments intended for two players, one at the harpsichord end and one at the piano

¹⁴ Latcham, “Franz Jakob Spath and the ‘Tangentenflügel’”, 163–6.

¹⁵ Beurmann, “Iberian Discoveries”, 183.

¹⁶ Rebecca Cypess illustrates the possible connection between seventeenth-century mother-and-child instruments and eighteenth-century *vis-à-vis* instruments in “Keyboard Duo Arrangements”, 203.

¹⁷ The earliest definition of a *vis-à-vis* instrument is in Jacob Adlung’s *Musica mechanica organoedi*, 1768, English translation by Quentin Faulkner (Lincoln, NE: Zea E-Books, 2011), 109.

end.”¹⁸ Both instruments can also be played by a single performer, with trackers running the length of the 1777 instrument to allow the piano and harpsichord to be coupled together and played from either end; and the piano component of the 1783 instrument able to be coupled to the upper manual of the harpsichord component.¹⁹

In this case, Stein’s repeated inclusion of a mechanism allowing for both component instruments to be played by a single performer mirrors the performance possibilities of the mother-and-child virginal. Common amongst both the mother-and-child and the *vis-à-vis* is the inclusion of two distinct instruments (either of different type or pitch) that share a soundboard, and may be played either separately or together, by one or two performers.

Hofmann, Doppelflügel (1779)

Hofmann’s instrument, the *Doppelflügel*, differs from other *vis-à-vis* keyboards of the late eighteenth century in that it does not combine different actions (e.g. piano and harpsichord), instead combining two harpsichords. Karl Heinrich Ludwig Pölitiz’s *Handwörterbuch der Wissenschaften und Künste* (1805) includes a description of Hofmann’s instrument in the definition of the *Doppelflügel*:

A wing-shaped instrument with two keyboards on both sides, so that two people can play at the same time ... In 1779, for example, Hofmann built one with two keyboards on both sides ... [and] all four keyboards could be [coupled] for one person at the same time.²⁰

Hofmann’s *Doppelflügel* is an example of a combination of two double-manual instruments, which would, when both instruments were played together by either one or two performers, result in a strengthened tone, emulating that produced by the ‘keyboard-duo’

¹⁸ Latcham, “Franz Jakob Spath and the “Tangentenflügel””, 160.

¹⁹ Ibid. Both instruments are extant, the 1777 is owned by the Museo di Castelvecchio, Verona, and the 1783 is housed at the Conservatorio di Musica San Pietro a Majella, Naples.

²⁰ ‘...ein flügelartiges Instrument mit ein oder zwei Klavieren auf beiden Seiten, so daß zwei Personen zugleich spielen können ... So baute Hofmann ... im Jahre 1779 eins mit zwei Klavieren auf beiden Seiten, bei welchem zugleich alle vier Klaviere für eine Person gekoppelt werden konnten’, Karl Heinrich Ludwig Pölitiz, *Handwörterbuch der Wissenschaften und Künste nach ihrer allmählichen Entwicklung bis zu ihrer gegenwärtigen Gestalt* (Regensburg, 1805), 265, accessed through Münchener Digitalisierungs Zentrum, Digitale Bibliothek, <http://mdz-nbn-resolving.de/urn:nbn:bvb:12-bsb10401553-1>. Translation my own.

instrumentation phenomenon observed by Charles Burney and his contemporaries in the German-speaking lands and France during the late eighteenth century.²¹

As for the mechanics of Hofmann's instrument, there does not appear to be any information detailing how he facilitated the coupling of both instruments such that one performer could play both of them. The non-extant status of Hofmann's *Doppelflügel* precludes any organological examination of the instrument, and the only insight available on this aspect of its function exists in a 1779 advertisement, which makes the claim that "when all four keyboards are coupled, the action is no harder to play on than a normal harpsichord," but does not divulge exactly how—if this claim is accurate—it was achieved.²²

Milchmeyer, Mechanischer Clavierflügel (1783)

In the same year as Stein's second surviving *vis-à-vis* piano-harpsichord, Milchmeyer produced an instrument "capable of producing as many as two-hundred-and-fifty sounds through the combination of stops and the activation of different keyboards."²³ There is no explicit mention as to whether or not Milchmeyer's *Mechanischer Clavierflügel* was strictly a *vis-à-vis* instrument, as there is no clear description of its layout. However, in Milchmeyer's description of the instrument's capabilities, he mentions that "the bottommost keyboard (a pantalon²⁴), can be pushed out, [so that] two people can play it at the same time."²⁵ It is also noted in the same description that "the *Flügel* and the *Pantalon* can ... be played together at the same time by one person," which suggests that performers' engagement with the interfaces of the *Mechanischer Clavierflügel* followed at least the same principles as *vis-à-vis* type instruments, allowing for one or multiple performers to use the instrument simultaneously.²⁶

²¹ Cypess examines the Central European practice of using two keyboard instruments (often separate instruments, played by two performers, such as teacher and student, or two members of the same family) in performance in "Keyboard Duo Arrangements", 2-4.

²² Translation of advertisement for Hofmann's *Doppelflügel* from the *Coburger Wöchentliche Anzeige* (28 May 1779), in Cypess, "Keyboard Duo Arrangements", 204.

²³ Cypess, "Keyboard Duo Arrangements", 204-5, from a description written by Milchmeyer himself, which appeared in *Magazin der Musik für das Jahr 1783*, ed. Carl Friedrich Cramer. The German term used to refer to these 'combinations' of sounds is *Veränderungen*, which appears in multiple sources, and is examined in depth by Latcham, in "Franz Jakob Spath and the 'Tangentenflügel'", 156-58.

²⁴ The pantalon is described as a type of hammer-instrument, likely using tangent-action, Latcham, "Franz Jakob Spath and the 'Tangentenflügel'", 155.

²⁵ Translation of Milchmeyer's description on *Magazin der Musik*..., in Cypess, "Keyboard Duo Arrangements", 205.

²⁶ This excerpt from Milchmeyer's description of his instrument appears in Latcham, "Franz Jakob Spath and the 'Tangentenflügel'", 161.

Milchmeyer's instrument, though a combination of hammered and quilled actions, varies significantly from the *vis-à-vis* combinations of both Stein and Hofmann. Questions of structure aside, the *Mechanischer Clavierflügel* incorporated a variety of stops (such as the *Flöte*, *Clarinet*, and *Fagott*), which could be engaged to alter the sound of the component instruments, and thus create an ever wider range of timbral possibilities. The result of this extended range of the *Mechanischer Clavierflügel*'s timbral capabilities is summed up by Milchmeyer:

Because of the power and variety of the instruments, it is completely like a small orchestra.²⁷

The use of combination keyboards to try to imitate an ensemble of instruments made up of different families—creating an early type of acoustic soundbank, the likes of which are apparent in the modern-day equivalent of simulated Musical Instrument Digital Interface (MIDI) sounds—is one of the earlier indications of the shifting perceptions of these instruments' functions in the eighteenth century.

CLAVIORGANS (PIPE AND STRINGED KEYBOARD COMBINATIONS), 1770S–1790S

The 'original' combination keyboard instrument, the claviorgan, enjoyed somewhat of a renaissance during the late eighteenth century with the unprecedented range of developments occurring in the design and construction of stringed keyboard instruments. This is not to say that the claviorgan in its original harpsichord-organ form had been abandoned between the end of the seventeenth and the late eighteenth century, as these instruments are recorded as still having been constructed and played during this period, one particularly notable example being Handel's use of a harpsichord-organ combination in *Saul*, in 1739.²⁸

The emergence of a 're-imagined' claviorgan—combining an organ component with the increasingly popular piano—often referred to as an "organised piano" (or the French equivalents, *clavecin-organisé*, or *piano-forté organisé*) not only celebrated the versatility of

²⁷ Latcham, "Franz Jakob Spath and the "Tangentenflügel", 161.

²⁸ Laurence Libin, "The Instruments", *Eighteenth-Century Keyboard Instruments*, ed. Robert Marshall (New York: Routledge, 2004), 5; Montanari, "Florentine Claviorgans", 252. Montanari also provides examples of claviorgans owned both by the Florentine Court, and outside it, being restored and maintained in a playable condition during the 1760s and 1770s (243–44, 247, 251).

new piano technologies by including them in combination instruments, but also continued the “search for a multiplicity of tone colours, and control over sustaining power” that had started to be realised in earlier iterations of the claviorgan.²⁹ The combination of both articulated sound (from the attack of notes from the harpsichord component) and sustained sound (from the organ component) was considered a wholly positive aspect of claviorgans long before Stephen Wessel engaged with this idea from a distinctly organographical perspective in the 1970s, with Giovanni Battista Doni writing after 1642:

Claviorgans ... sustain the sound ... They blend much better with the voice
[than harpsichords] ... and would sound well in every kind of room.³⁰

As such, the production of piano-organ claviorgans of varying styles, sizes, and dispositions throughout the last thirty years of the eighteenth century, may be viewed as a natural continuation of this experimentation with keyboard instrument tone, which would, inevitably, result in the discovery of new purposes for these instruments, and a reconsideration of the social and musical contexts for which they were deemed both practical, and appropriate.

Two English Organised Square Pianos: Zumpe & Buntebart (1774), and Longman & Broderip (1786)

Originally from Germany, but producing pianos from his own English workshop from 1761, Johannes Zumpe collaborated with fellow German immigrant, Gabriel Buntebart from 1768 to 1778.³¹ In 1774 Zumpe and Buntebart produced what is possibly the earliest organised square piano (extant, Collections du Musée de la Musique, Philharmonie de Paris, E.991), made up of a “small square piano with a simple *Stoßmechanik* with no escapement mechanism”—as per all of Zumpe’s surviving pianos—and a concealed, internal organ component, with a small pedal-activated bellows (see *Figure 3.3*).³²

²⁹ The term ‘clavecin organise’ is noted in Montanari, “Florentine Claviorgans”, 253; and Smith, “History and Use of the Claviorgan”, 272, and “Not for Amateurs! [?]”, 149. The interpretation of the claviorgan as a way of providing some control over the non-sustaining sound of the harpsichord is presented in Stephen Wessel, “The Claviorganum in England”, *The English Harpsichord Magazine and Early Keyboard Instrument Review*, 1.8 (1977), 227.

³⁰ Giovanni Battista Doni, *Trattato della musica scenica* (after 1642), posthumously published in *De’ trattati di musica di Gio: Batista Doni patrizio fiorentino, Tomo secondo* (Firenze: Stamperia Imperiale), translated in Montanari, “Florentine Claviorgans”, 250.

³¹ Laurence Libin, “Robert Adams’ Instruments for Catherine the Great”, *Early Music*, 29.3 (August 2001): 362.

³² Description of Zumpe’s surviving pianos from Di Stefano, “The ‘Tangentenflügel’ and Other Pianos”, 90.



FIGURE 3.3 - ZUMPE AND BUNTEBART ORGANISED SQUARE PIANO, 1774. COLLECTIONS DU MUSÉE DE LA PHILHARMONIE DE PARIS, E.991. PHOTO: CLAUDE GERMAIN (N.D.) [HTTPS://COLLECTIONSDUMUSEE.PHILHARMONIEDEPARIS.FR/DOC/MUSEE/0157855/PIANO-CARRE-ORGANISE](https://collectionsdumusee.philharmoniedeparis.fr/doc/musee/0157855/PIANO-CARRE-ORGANISE).

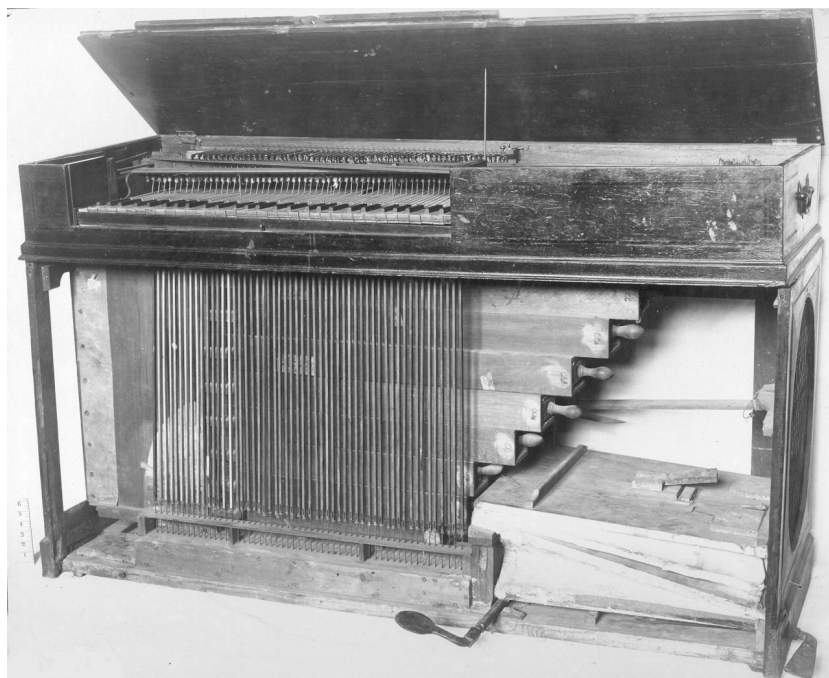


FIGURE 3.4 - LONGMAN AND BRODERIP ORGANISED SQUARE PIANO, 1786. 89.4.2803, CROSBY BROWN COLLECTION OF MUSICAL INSTRUMENT, METROPOLITAN MUSEUM OF ART, NY.

There is limited information about the disposition and internal mechanisms of the Zumpe and Buntebart organised square piano; however, this style of single-manual combined instrument was neither patented, nor one of the designs that remained “exclusive” to “individual workshops,” such as those of Spath and Schmahl.³³ As a result, other well-known piano-building firms in both England and France—such as Adam Beyer, Sébastien Érard, and Longman and Broderip—also adopted this design and produced similar instruments, which were exported across Europe and North America.³⁴

One such similar instrument is the extant 1786 organised square piano by Longman and Broderip (Crosby Brown Collection of Musical Instruments, The Metropolitan Museum of Art, NY, 89.4.2803), pictured above (see *Figure 3.4*). Evident in both the images of the Zumpe and Buntebart instrument and that by Longman and Broderip, are the similarities in the instruments’ internal and external structures. Though there are subtle differences in the internal layout of the two instruments (the wooden flue pipes in the Longman and Broderip instrument are located towards the front; the bellows are placed horizontally, and have only one pedal attached), the salient features that enable them to function as piano-organ combinations are essentially the same. The item description for the Longman and Broderip instrument on the Metropolitan Museum’s website states:

Below the piano keys, the case has been cut through in order to allow long stickers to extend directly from the keys to the organ box where [they] operate valves enclosed in the windchest, allowing air into the pipes of the organ.³⁵

The ‘stickers’ (the long strips of wood placed vertically between the base of the keyboard and the bottom of the instrument) described in the Longman and Broderip instrument are also present in the one by Zumpe and Buntebart, and likewise the bellows-pedal, which is positioned within reach of the performer.

³³ Libin, “The Instruments”, 5.

³⁴ Montanari, “Florentine Claviorgans”, 253. Montanari notes that a rare, but non-extant piece specifically for an ‘organised’ instrument was composed between 1787 and 1791, at the court of Catherine II of Russia, who owned a number of keyboard instruments imported from other European countries. Organised pianos were also bought by the Florentine court from the 1780s onwards. Eleanor Smith makes note of the export of an organised upright grand piano to Williamsburg, Virginia in 1799, “Not for Amateurs! [?]”, 152.

³⁵ Metropolitan Museum of Art, “Organised square piano (square piano and pipe organ), 1786”, (n.d.), accessed 10/04/19, <https://www.metmuseum.org/art/collection/search/505338>.

Stein, Claviorgan (1781) ³⁶

Another extant instrument by Johann Andreas Stein, the 1781 claviorgan (Göteborgs stadsmuseum, Sweden, GM4478) features a wing-shaped grand piano with a curved bentside, atop a similarly shaped enclosed base, housing the organ component.³⁷ Smith asserts that “the addition of organ pipes was not restricted to the square piano,” and Stein’s claviorgan is valuable, tangible evidence of this, although the organised square piano is recognised as the more popular variant.³⁸ It is unknown how many instrument builders may have produced this particular type of claviorgan during the 1770s to 1790s, but a patent application lodged by John Crang Hancock in 1790 for “a wing-shaped piano with a single rank of organ pipes” (of which no examples by Hancock survive) suggests that experimentation with the design of an organised grand piano was not as limited as it appears through the small number of recorded attempts.³⁹

Stein’s claviorgan joined a host of his other ‘experimental’ instruments, including the *vis-à-vis* harpsichord-piano, the *Melodica* (“an organ that responded dynamically to the pressure of the finger”), and the *Poly-Tono-Clavichordium* (another combination instrument that will be examined later on in this chapter).⁴⁰ As with other combination keyboards of the time, the piano and organ components of the 1781 claviorgan could be played either together or separately, and similar to the earlier claviorgans of the sixteenth and seventeenth centuries, the instrument featured a separate manual for each component, the lower of which was used for playing the coupled instrument.⁴¹ However, Blanton observes that the “single register of stopped wooden pipes at 8’ pitch” did not extend across the instrument’s entire range: of the five-octave compass, from *FF-f*³, the organ component only extended from *C-f*³.⁴²

³⁶ Stein’s 1781 instrument is also referred to as ‘the Gothenburg Claviorganum’, in the most comprehensive study of the instrument to date, by Robin Blanton, “Johann Andreas Stein’s 1781 Claviorganum and the Construction of Art in Eighteenth-Century Augsburg” (PhD Dissertation, University of Gothenburg, 2012).

³⁷ An image of the Stein 1781 claviorgan is provided in Blanton, “Johann Andreas Stein’s 1781 Claviorganum”, 3.

³⁸ Smith, “Not for Amateurs! [?]”, 151.

³⁹ Ibid.

⁴⁰ Blanton, “Johann Andreas Stein’s 1781 Claviorganum”, 2.

⁴¹ Ibid.

⁴² Blanton, “Johann Andreas Stein’s 1781 Claviorganum”, 2.

Érard, Organised Square Piano (1791)

Revisiting the organised square piano design popularised by English instrument building firms of the 1770s and 1780s, the extant 1791 instrument by Sébastien Érard (Collections du Musée de la Musique, Philharmonie de Paris, E.995.15.1) is a clear example of the spread of this style of combination keyboard into France. As can be seen below in *Figures 3.5* and *3.6*, the external and internal structure of the Érard organised square piano is virtually indistinguishable from Zumpe and Buntebart's, and Longman and Broderip's examples.

Considered the “heir of *claveçons organisés* [organised harpsichords] of the previous centuries, and the precursor of the piano-harmoniums of the following [nineteenth] century,” organised square pianos enjoyed “a certain success” in the salons and aristocratic apartments of pre-Revolution France.⁴³ The presence of organised pianos in the physical spaces occupied by the French aristocracy leading up to and during the time of the Revolution saw a continuation of their earlier status as symbols of social and political status. Montanari identifies organised square pianos by Érard (as well as other prominent builders whose organised instruments were exported to France) as being among the “instruments confiscated from the nobility” during the Revolution.⁴⁴

⁴³ ‘Héritier des claveçons organisés des siècles précédents et précurseur des pianos harmoniums du siècle suivant’, Philharmonie de Paris, “Piano Carré Organisé – Maison Érard”, (n.d.), accessed 05/05/19, <https://collectionsdumusee.philharmoniedeparis.fr/0158183-piano-carre-organise-erard.aspx>. Translation my own.

⁴⁴ Montanari, “Florentine Claviorgans”, 253, 255.



FIGURE 3.5 - ÉRARD ORGANISED SQUARE PIANO (EXTERIOR VIEW), 1791. COLLECTIONS DU MUSÉE DE LA PHILHARMONIE DE PARIS, E.995.15.1. PHOTO: JEAN-MARC ANGLÈS, (N.D.).
[HTTPS://COLLECTIONSDUMUSEE.PHILHARMONIEDEPARIS.FR/IMAGE.ASHX?Q=HTTP://WWW.MIMO-INTERNATIONAL.COM/MEDIA/CM/IMAGE/CMIM000024196.JPG](https://collectionsdumusee.philharmoniedeparis.fr/image.ashx?Q=HTTP://WWW.MIMO-INTERNATIONAL.COM/MEDIA/CM/IMAGE/CMIM000024196.JPG).



FIGURE 3.6 - ÉRARD ORGANISED SQUARE PIANO (INTERIOR), 1791. COLLECTIONS DU MUSÉE DE LA PHILHARMONIE DE PARIS, E.995.15.1, PHOTO: JEAN-MARCH ANGLÈS, (N.D.).
[HTTP://WWW.MIMO-INTERNATIONAL.COM/MEDIA/CM/IMAGE/CMIM000024198.JPG?_GA=2.75307474.1730326857.1560293924-1109808253.1560046869](http://www.mimo-international.com/media/cm/image/cmim000024198.jpg?_GA=2.75307474.1730326857.1560293924-1109808253.1560046869).

COMBINATION KEYBOARDS FOR NEW CONTEXTS: SOCIETAL AND TECHNOLOGICAL SHIFTS IN THE EIGHTEENTH AND NINETEENTH CENTURIES

From its origins in the late fifteenth century, through to around the mid-eighteenth century, the claviorgan “percolated through the courts of the higher echelons of society,” intriguing both the nobility, instrument builders, musicians, and other artists under their patronage.⁴⁵ As established in the previous chapter, this gave rise to the production of innovative variations on the claviorgan’s original Spanish design, as well as the invention of entirely new and experimental combination keyboard instruments.

Considered the domain of the ruling classes prior to the mid-eighteenth century, combination keyboard instruments, and the music they produced, were synonymous with the wealth of financial means and available time enjoyed by a comparatively small section of European society. As Richard Leppert has observed:

[Instrumental music] is something cultural, not natural; the manifestation of another level of power ... the power of music making is not only the power to control time through the expenditure of leisure; it is also the license to waste time. Music is visually extravagant.⁴⁶

Entering the second half of the eighteenth century, we see changes occurring on many levels within European society, impacting the cultural and political structures responsible for shaping and maintaining the contextual spheres occupied by combination keyboards. This section analyses the impact of two major types of societal transformation on the function and perceived cultural meaning of combination keyboards: the repurposing of these instruments through significant political upheaval, resulting in the transfer of cultural capital between contrasting social contexts; and the unprecedented commodification of keyboard instruments, through the emergence of a ‘market’ for musical instruments, and shifting approaches to the design and manufacture of cultural objects.

The first of these transformations—brought about by the changes in the composition of society, resulting from the growth of the upper-middle classes and the gradual democratisation of the arts and the economy—resulted in musical instruments (particularly keyboards, which are amongst the more complex and expensive instruments to build and

⁴⁵ Knighton, “Instruments, Instrumental Music, and Instrumentalists”, 135.

⁴⁶ Leppert, *The Sight of Sound*, 27.

maintain) taking on new social meanings and cultural roles. Since the seventeenth century, there had been an increasing shift in society from a “feudal order to a mercantilist, precapitalistic order,” the effects of which were evident in the role that instrumental music and musical instruments played in assisting people to position themselves within, or conversely, distinguish themselves from different social classes.⁴⁷ Not dissimilar to how music and instruments had been used (and were still being used) by the royal courts of Europe to distinguish themselves from the people they ruled, the increasingly wealthy upper-middle classes used the visual and sonic presence of the instruments they bought to communicate clear messages about their “class pedigree and cultural accomplishment,” and therefore establish a sense of “socio-political superiority.”⁴⁸

The upper-middle classes’ adoption of owning and playing keyboard instruments as a particular social ‘code’ remained a widespread practice throughout the eighteenth century, as reflected through the century’s music-making practices, and visual art: many portraits would include a family’s keyboard instrument, such as double-manual harpsichords serving as symbol of newfound wealth and status, and carrying connotations of moral and cultural refinement.⁴⁹ However, the shifting political dynamic enabling this portion of society access to new forms of socio-cultural ‘power’ also led to more pronounced, and in some cases forceful, instances of social and political restructuring. One such example—the French Revolution—saw an emphatic persecution of the ruling classes, and a dismantling of their social and cultural power structures. In the first example in this section, which looks at the reconsidered role of combination keyboards in a revolutionary society, I investigate the ways in which cultural objects holding particular functional and symbolic value may be repurposed to fit within an ideologically opposing context, and come to reflect a new set of political and cultural values.

The second type of societal transformation to impact on cultural perceptions of combination keyboard and the ways in which they were used stems from industrial and economic changes prevalent during the eighteenth century. In particular, the advent of mass production and the increased standardisation of musical instrument design can be seen as having a direct impact on the ‘artisan culture’ and specialised craftsmanship previously responsible for the production of a range of different types of combination keyboards. I will examine the impact that new methods of manufacturing and divisions of labour brought about by

⁴⁷ Leppert, *The Sight of Sound*, 7.

⁴⁸ *Ibid.*, 8-9.

⁴⁹ *Ibid.*, 72-74.

industrialisation had on practices of keyboard building, as well as the role that combination keyboards came to play within this new cultural domain.

The incorporation of new keyboard technologies in combination keyboards of the mid-eighteenth and nineteenth centuries, as well as the development of new designs that used concepts of combining different timbres and instrument types is a key focus of this investigation, and is examined in relation to the commercialisation and marketing of musical instruments. The rise of a ‘patent culture’ alongside the development of new types of instruments and related technologies is evident in this period, and is explored through the display and advertisement of combination keyboards and other musical inventions at international exhibitions and similar events throughout the second half of the nineteenth century.

COMBINATION KEYBOARDS, THE FRENCH REVOLUTION, AND THE PARIS CONSERVATOIRE: FROM STATUS SYMBOL TO PEDAGOGICAL TOOL?

Published in 1890, Antonio Bartolomeo Bruni’s *Un Inventaire sous la Terreur, état des Instruments de Musique relevé chez les Emigrés et Condamnés* (‘Inventory under the Terror, Musical Instruments Confiscated from Emigrants and the Convicted’) lists the musical instruments seized from political emigrants and persecuted members of the nobility and wealthy bourgeoisie during the early years of the French Revolution.⁵⁰ This document is the result of the activities of the eleventh sub-committee of the *Commission temporaire des Arts*, established in 1793, and including amongst its members Bernard Sarrette (1765–1858)—the first director of the Paris Conservatoire (Conservatoire de musique de Paris)—and violinist, Antonio Bruni (1759–1823).⁵¹

In fulfilling the purpose of the sub-committee—to “prepare a survey or [sic] musical instruments as they were confiscated” to be repurposed for “performance or study purposes at the Conservatoire”⁵²—Bruni, who compiled the inventory, attended over 110 residences, and recorded between 367 and 404 separate instruments, of which 126 were stringed keyboard instruments.⁵³ All of the items seized came from the properties of French

⁵⁰ Antonio B. Bruni, *Un Inventaire sous la Terreur, Etat des Instruments de Musique relevé chez les Emigrés et Condamnés, par A. Bruni, L’un des Députés de la Convention*, ed. J. Gallay, Paris: Georges Chamerot, 1890.

⁵¹ Joseph Bennet, “A Musical Inventory Under the Terror”, *The Musical Times and Singing Class Circular* 31.568 (1890): 329; Albert Hess, “The Transition from Harpsichord to Piano”, *The Galpin Society Journal*, 6 (1953): 83.

⁵² Frances Palmer, “Un Inventaire sous la Terreur, Etat des Instruments de Musique relevé chez les Emigrés et Condamnés. [Review]”, *The Galpin Society Journal*, 41 (1988): 132.

⁵³ Bennett, “A Musical Inventory”, 329; Hess, “The Transition”, 91; Frédéric de La Grandville, *Une histoire du piano au Conservatoire de Musique de Paris, 1795-1850* (Paris: L’Harmattan, 2014), 181.

emigrants and other political representatives from elsewhere in Europe (such as Russia, Austria, and Spain) who were aligned with the *Ancien Régime*, who refused to re-enter the country at the request of the French revolutionary Convention.⁵⁴

Included in the lists of pianos taken to the *Dépôt National* (National Depot, housed in the former Hôtel de Doué), were six organised square pianos:

(32). A piano, *organisé*, painted white, by Adam Berjer [sic], *Londini fecit*, year 1788, [house where confiscated:] Kinsky.

(57). An English piano, *organise*, by Longuian [sic] and Broderip, No. 26, [house where confiscated:] Tavernier de Boulogne.

(68). A piano, *organisé*, by Sebastien Erard *et frères*, year 1790, [house where confiscated:] Becdelièvre.

(73). A piano, *organisé*, by Johannes Zumpe, *Londini fecit*, year 1771, [house where confiscated:] Orsay.

(150). A piano, *organisé*, by Adam Berger [sic], *Londini fecit*, year 1775 ... [house where confiscated:] Ambassadeur d'Espagne [Spanish Ambassador].

(219). A piano, *organisé*, by Sebastian Erard, *frère et Cie*, built in Paris, 1791 ... [house where confiscated:] Vilquier.⁵⁵

From the depository of instruments (including the six combination keyboards listed above), Sarrette and Bruni were further tasked with “choosing the best instruments for use at the Institute [Conservatoire],” primarily due to the founders of the Paris Conservatoire acknowledging that they had, “in this moment,” free access to instruments that now belonged to “the national domain,” therefore allowing them to avoid the “great expense”

⁵⁴ Bennett, “A Musical Inventory”, 329.

⁵⁵ Translation and transcription of Bruni, *Un Inventaire*, in Hess, “The Transition”, 88-9. Hess notes that the misspellings ‘Berjer’ and ‘Berger’ were referring to English instrument builder Adam Beyer, and ‘Longuian’ referred to Longman, of Longman & Broderip.

(however necessary) of buying instruments for educational purposes.⁵⁶ Following the sale of some of these instruments in 1797, the Conservatoire was left with four organised square pianos, amongst a total of forty pianos, designated for use in classes.⁵⁷ The 1790 organised square piano by Érard, for instance, “served the organ class from 1816 to 1830, replacing the ... organ during the winters.”⁵⁸

The active use of Érard’s 1790 organised piano during this fourteen-year period is one of the longest recorded instances of a confiscated instrument being used for its new purpose, as envisaged by the *Commission temporaire des Arts*. Besides the sale of many of the stringed keyboard instruments held at the *Dépôt National*, some were reclaimed by the families who had originally owned them, during the Bourbon Restoration (ca. 1815–1830), whilst others were supposedly lost due to various reasons, ranging from claims of “unsuitable storage conditions, pilfering, and official corruption,” to having been used “as firewood during the cold winter of 1816.”⁵⁹

Although the steady decimation of the Conservatoire’s collection of confiscated instruments resulted in the establishment of a new collection of donated and purchased instruments, considered an improvement from the “old, out-dated instruments [of the first collection] ... [that needed] frequent repair,” the well-documented political motivations behind the creation of the first collection, and indeed the Conservatoire itself, provide a valuable example of the impact of social restructuring on the musical and broader cultural roles of combination keyboards.⁶⁰

In this particular instance, the act of confiscating the six organised square pianos from their original settings can be seen as the forceful transfer of a type of objectified cultural capital—historically considered synonymous with a high level of social status, and financial and cultural exclusivity—from one social context to another, impacting directly on

⁵⁶ ‘...pour choisir les meilleurs instruments pour l’usage de l’Institut ... Lorsque l’Institut sera organisé [en Conservatoire], il faudra, à grands frais, le fournir d’instruments qui sont donnés en ce moment pour rien dans les ventes des domaines nationaux’, Constant Pierre, *B. Sarrette et les origines du Conservatoire national de musique et de déclamation* (Paris: Delalain Brothers, 1895), 94, in Grandville, *Une histoire du piano*, 181. Translation my own.

⁵⁷ Grandville, *Un histoire du piano*, 182.

⁵⁸ ‘le piano organisé ... il sert à la classe d’orgue, remplaçant de 1816 à 1830 l’orgue ... durant les hivers’, Grandville, *Un histoire du piano*, 183. Translation my own. Grandville also notes that this instrument was the one confiscated from the Becdelièvre family (as indicated in Bruni’s inventory, see entry no. 68), 182.

⁵⁹ Grandville discusses the process of previously persecuted families returning to France and reclaiming their possessions from the Conservatoire, *Un histoire du piano*, 183–4; Palmer notes some of the factors that precluded instruments from reaching the Conservatoire at all, “Un Inventaire sous la Terreur [Review]”, 133; the firewood claim appears in Ernest Closson, *The History of the Piano*, trans. Delano Ames (1947), in Hess, “The Transition”, 94.

⁶⁰ ‘...de vieux instruments, démodés et insuffisants, tenant mal l’accord et exigeant de fréquentes réparations’, Grandville, *Un histoire du piano*, 184. Translation my own.

the perceived function of the instruments. In their new role as educational tools (facilitating individuals' acquisition of embodied cultural capital), the four organised pianos that made it to the Conservatoire were no longer treated as *objets d'art*, nor sonic or visual symbols of power structures that indulged intellectual, artistic, and mechanical experimentation. This assimilation of the combination keyboards (rare by virtue of their small number) with other, more common types of keyboards (such as harpsichords and pianos) included in the same collection, by focusing entirely on their musical function, serves to remove any additional social or cultural meanings that they may have previously been associated with. As a result, these instruments were successfully transplanted between opposing social contexts, whilst still retaining a fundamental aspect of their objecthood and function: their ability to be used to make music.

NEW KEYBOARD TECHNOLOGIES AND CHANGING APPROACHES TO INSTRUMENT MANUFACTURE: FROM CRAFTSMEN TO MASS PRODUCTION

One consequence of the industrial revolution and related social upheavals was the dissolution of secretive, exclusive craft guilds that since the Middle Ages had sought to protect members from excessive competition ... Not coincidentally, the nineteenth century saw a greatly accelerated pace of invention and mass sales of relatively inexpensive, often novel instruments.⁶¹

Laurence Libin, 2000.

Since their origin, and up until the second half of the eighteenth century, combination keyboards have been, almost exclusively, the product of specialised, artisan craftsmanship. Throughout the sixteenth and seventeenth centuries in particular, the most prevalent of combination keyboards, the claviorgan, was the “most expensive of all keyboard instruments,” precluding many, bar the very wealthy, from engaging with it as either a work of art, or a musical instrument.⁶² With the rapid increase of new technologies being developed for keyboard instruments (such as different kinds of playing action in instruments preceding the modern piano⁶³), as well as the rise of industrialisation across Europe from the 1760s, many instrument builders capitalised on the opportunity to compete in the emergent musical instrument market.

⁶¹ Libin, “Progress, Adaptation and the Evolution of Musical Instruments”, 198.

⁶² Wessel, “The Claviorganum in England”, 227.

⁶³ A prime example of this new wave of keyboard technology is the development of various styles of hammer-action, see Latcham, “Franz Jakob Spath and the Tangentenflügel”, 150-70; Montanari, “Florentine Claviorgans”, 252-59.

Brought about by the social and political changes taking place throughout much of Europe, the adoption of material consumerism (previously limited to the ruling classes during the fifteenth to seventeenth centuries) by the newly wealthy upper-middle classes was creating not only a greater need for material objects in general, but also for objects that possessed particular cultural meanings and significances, such as musical instruments.⁶⁴ As Libin discusses in the quote at the start of this section, the dissolution of craft guilds (that had exerted significant influence on the production of commodities such as musical instruments throughout the early modern period) also contributed to the rise of this new economic environment, in which the artisanal knowledge required to design and construct instruments was no longer as exclusive as it had previously been.⁶⁵ As a result, the “accelerated pace of invention ... of inexpensive ... novel instruments” was no longer driven solely by specialist instrument builders financed by their patrons, but enterprising individuals from backgrounds of instrument building, industrial manufacture, and mechanical invention.⁶⁶

Combination Keyboards as Part of the Musical Instrument Industry: Regional, National, and International Exhibitions, 1841–1892

Recognised as “some of the most significant cultural phenomena of the nineteenth century,” international exhibitions were “intended to demonstrate, through comparative and competitive displays, the development of every branch of human endeavour: from industry to manufacturing, to art and design.”⁶⁷ The frequency of such exhibitions throughout Europe and North America (notably England, Ireland, France, and America) during the 1850s to 1890s demonstrates a widespread recognition and appreciation of the commercial and social benefits these events brought about. The international exhibitions of this period served to not only display and promote the technological developments of various industries and disciplines (as Kirby outlines above), but were also representative of strong political and social beliefs prevalent throughout Europe at this time. Davis recognises that a “dense and rich culture of exhibitions” already existed prior to the zenith period of

⁶⁴ Chandra Mukerji, *From Graven Images: Patterns of Modern Materialism* (New York: Columbia University Press, 1983), 2, 14–20.

⁶⁵ The influence of the Guilds on instrument design and construction during the sixteenth and seventeenth centuries is also discussed in Koster, “The Mother and Child Virginal”, 79; Rose, “The History and Significance”, 2–4.

⁶⁶ Libin, “Progress, Adaptation and the Evolution of Musical Instruments”, 198.

⁶⁷ Catherine Sarah Kirby, “Exhibiting Music: Music and International Exhibitions in the British Empire, 1879–1890” (PhD Thesis, University of Melbourne, 2018), 1.

international exhibitions, and notes that this stemmed from the smaller exhibitions operating on national and regional scales from as early as the 1820s in areas of Europe such as the German states, and Italy.⁶⁸

The almost-guaranteed inclusion of musical instruments at international exhibitions as well as their smaller-scale regional and national counterparts, may be perceived as a key feature of this cultural phenomenon for a number of reasons. First and foremost, the instruments themselves, as objects of technological and cultural significance within their native musical canons, were the direct result of the industrious activities of invention, design, engineering, and manufacturing. This alone would have rendered them appropriate for display at such exhibitions, alongside other objects (such as agricultural and factory machinery, and scientific instruments) that were also reflections of the same ‘modernising’ activities.⁶⁹ Additionally, the “positioning of music as both an art form ... and as an entertainment to be listened to and enjoyed” within the culture of nineteenth-century exhibitions—resulting in live performances of musical works and not merely the silent display of instruments or scores—increased the number of ways that music could be present and experienced within these spaces.⁷⁰ Considering exhibitions of art and industry within the wider context of educative or informative displays in the nineteenth century, which Libin describes as being driven by a “paternalistic attitude ... [reinforcing] a doctrine of continual improvement,” these public events promoting new developments and inventions offered significant contributions to the “rational recreation movement” that was a prominent feature within the class system culture of Europe at this time.⁷¹

Combination keyboards are recorded as having been displayed or advertised at numerous exhibitions (both international and regional or national) over the period 1841–1892. From exhibition catalogues, official guides and reports, as well as scholarly articles documenting the history of combination keyboards during the nineteenth century, it is possible to piece together a list of specific instruments present at these exhibitions, as well as information on their builders and operation. This data is divided primarily by exhibition type (international, and regional or national) and then presented chronologically by date, as shown in Tables

⁶⁸ John R. Davis, “Representation, Rivalry and Transfer: The German States and the 1862 Exhibition”, *The Journal of the Decorative Arts Society 1850-the present*, 38 (2014): 165–166.

⁶⁹ Paul Greenhalgh, “The Art and Industry of Mammon: International Exhibitions 1851–1901”, in *The Victorian Vision: Inventing New Britain*, ed. John M. MacKenzie, London: V&A Publications, 2001, p. 266, quoted in Kirby, “Exhibiting Music”, 1.

⁷⁰ Kirby, “Exhibiting Music”, 23.

⁷¹ Libin, “Progress, Adaptation, and the Evolution of Musical Instruments”, 190; Kirby, “Exhibiting Music”, 27–8.

3.1 and 3.2. The decision not to divide by instrument type serves to illustrate the diversity (or lack thereof) of instruments displayed, as well as to highlight trends in builder representation. In the case of exhibitions that featured separate divisions for ‘contemporary’ and ‘historical’ collections of instruments, only the contemporary ones will be included.

Table 3.1: Combination Keyboards at International Exhibitions, 1851–1888

1851: Great Exhibition of the Art and Industry of All Nations ⁷² (London, England)		
Instrument	Presenting Manufacturer (as listed in catalogue)	Patent-Holder, or Inventor (if different from Presenting Manufacturer)
Double or twin semi-cottage pianoforte (<i>Figure 3.7</i>)	JONES, John Champion (Great Britain)	
Pianoforte with Coleman’s æolian attachment *	NUNNS & CLARK (United States)	
Patent double grand pianoforte (<i>Figure 3.8</i>)	PIRSSON, James (United States)	
Piano-Violino	WOOD, J. S. (United States)	
Pianoforte with ‘panorgue’ *	JAULAIN, Julien (France)	
Patent double piano-harmonium	VERHASSELT-D’OUTRELEPONT, F. (Belgium)	
1867: Exposition Universelle ⁷³ (Paris, France)		
Piano Quatuor [bowed keyboard]	BAUDET (France)	
4 piano-harmoniums	[not listed]	
1885: International Inventions Exhibition (Division I: Instruments and Appliances Constructed or In Use Since 1800) ⁷⁴ (South Kensington, England)		
Grand organo-pianos [number unspecified]	METZLER & Co. (England)	
1886: International Exhibition of Industry, Science and Art ⁷⁵ (Edinburgh, Scotland)		
Patent organ-piano	DUNN & DAVIDSON (Scotland)	METZLER (patent-holder)
		COLLARD & COLLARD (manufacturer)

⁷² Information about the instruments listed here is from *Musical Instruments in the 1851 Exhibition: A transcription of the entries of musical interest from the Official Illustrated Catalogue of the Great Exhibition of the Art and Industry of All Nations, with additional material from contemporary sources*, ed. Peter and Ann Mactaggart (Welwyn, England: Mac & Me Ltd), 1986.

⁷³ Information on the ‘Piano Quatuor’ appears in Frederic Clay “Reports Upon Musical Instruments (Class 10)”, in *Reports on the Paris Universal Exhibition, 1867*, Vol. 2 (London: George E. Eyre & William Spottiswoode (for Her Majesty’s Stationery Office), 1868), 197–219; Montanari notes the four piano-harmoniums in “Florentine Claviorgans”, 257.

⁷⁴ *International Inventions Exhibition, 1885: Official Catalogue*, (London: William Cowes and Sons, 1885), transcribed in Kirby, “Exhibiting Music”, 443–457.

⁷⁵ *International Exhibition of Industry, Science and Art, Edinburgh 1886: Official Catalogue*, (Edinburgh: T & A Constable, 1886), transcribed in Kirby, “Exhibiting Music”, 501–2.

<i>1888: Glasgow International Exhibition</i> ⁷⁶		(Glasgow, Scotland)
Patent violinista piano	HAY, Samuel (Scotland)	
Patent organo piano		
Instruments marked with * are variations on the definition of ‘combination keyboard’ used in this study. These instruments are able to be attached to another instrument in order to create a type of combined instrument, but an important distinction exists in that the component instruments do not always share common sound-production structures, such as a soundboard or strings.		

Table 3.2: Combination Keyboards at Regional or National Exhibitions, 1841–1861, and 1892

<i>1841: Tuscan Exhibition of Arts and Crafts</i> ⁷⁷			(Tuscany, Italy)
Instrument	Presenting Manufacturer (as listed in catalogue)	Patent-Holder, or Inventor (if different from Presenting Manufacturer)	
Fisarmonica [permanent piano attachment]	DUCCI, Antonio and Michelangiolo		
<i>1844: Tuscan Exhibition of Arts and Crafts</i> ⁷⁸			(Tuscany, Italy)
Harmonium attachment for piano [removeable] *	DUCCI, Antonio and Michelangiolo		
Upright piano with flute and harmonium	SALTINI, Leopoldo		
<i>1861: National Exhibition</i> ⁷⁹			(Florence, Italy)
Piano-melodium [organised piano]	FUMMO, Antonio		
<i>1892: Royal Aquarium, Westminster, First Musical and Art Exhibition</i> ⁸⁰ (London, England)			
Combination upright piano and 'Erbe' Harmonium	KLITZ, C. (England)	KAIM & Sons (England)	
Pianos (2) with Patent Orchestrina (also called 'Orchestrina Bozza')	MALDIFASSI, R. D. (England)		

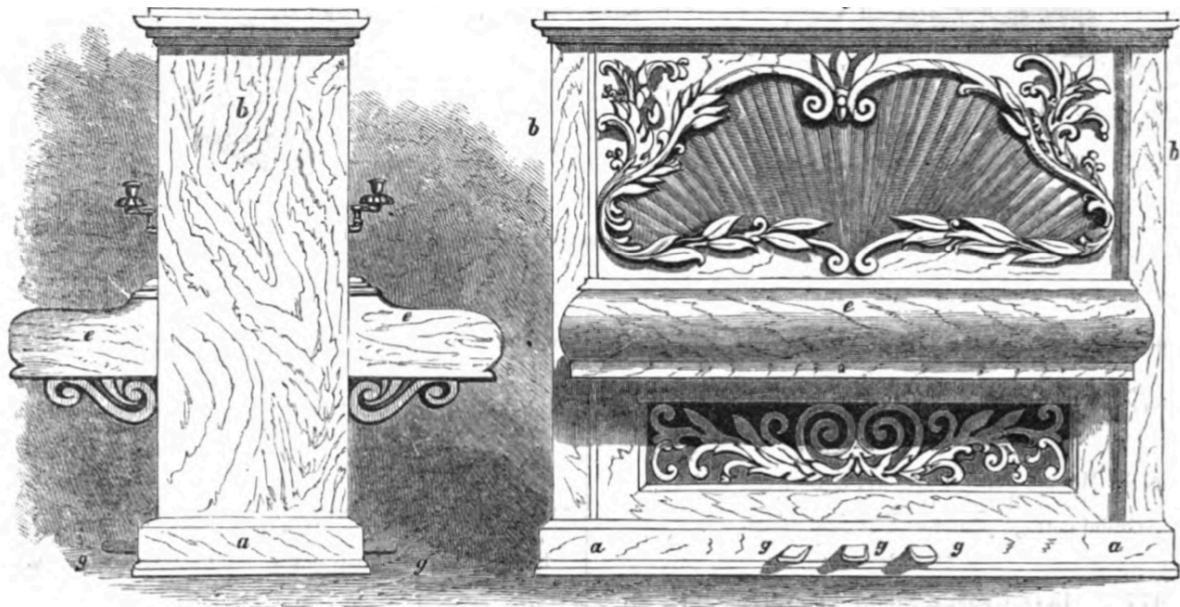
⁷⁶ *Glasgow International Exhibition: The Official Catalogue*, (Glasgow: T & A Constable, 1888), transcribed in Kirby, “Exhibiting Music”, 507–8.

⁷⁷ Montanari, “Florentine Claviorgans”, 255–7.

⁷⁸ Ibid.

⁷⁹ Montanari, “Florentine Claviorgans”, 257.

⁸⁰ *Royal Aquarium, Westminster, London, 1892: First Musical and Art Exhibition, September 13th to October 18th*, Catalogue compiled by Mr. E. A Duplait, (London: R. E. King, 1892).



Jones's Twin Semi-cottage Pianoforte.

FIGURE 3.7: JONES' TWIN SEMI-COTTAGE PIANOFORTE, CLASS X, GREAT BRITAIN, OFFICIAL DESCRIPTIVE AND ILLUSTRATED CATALOGUE OF THE GREAT EXHIBITION OF THE WORKS OF INDUSTRY OF ALL NATIONS, 1851, (LONDON: SPICER BROTHERS, 1851): 453.

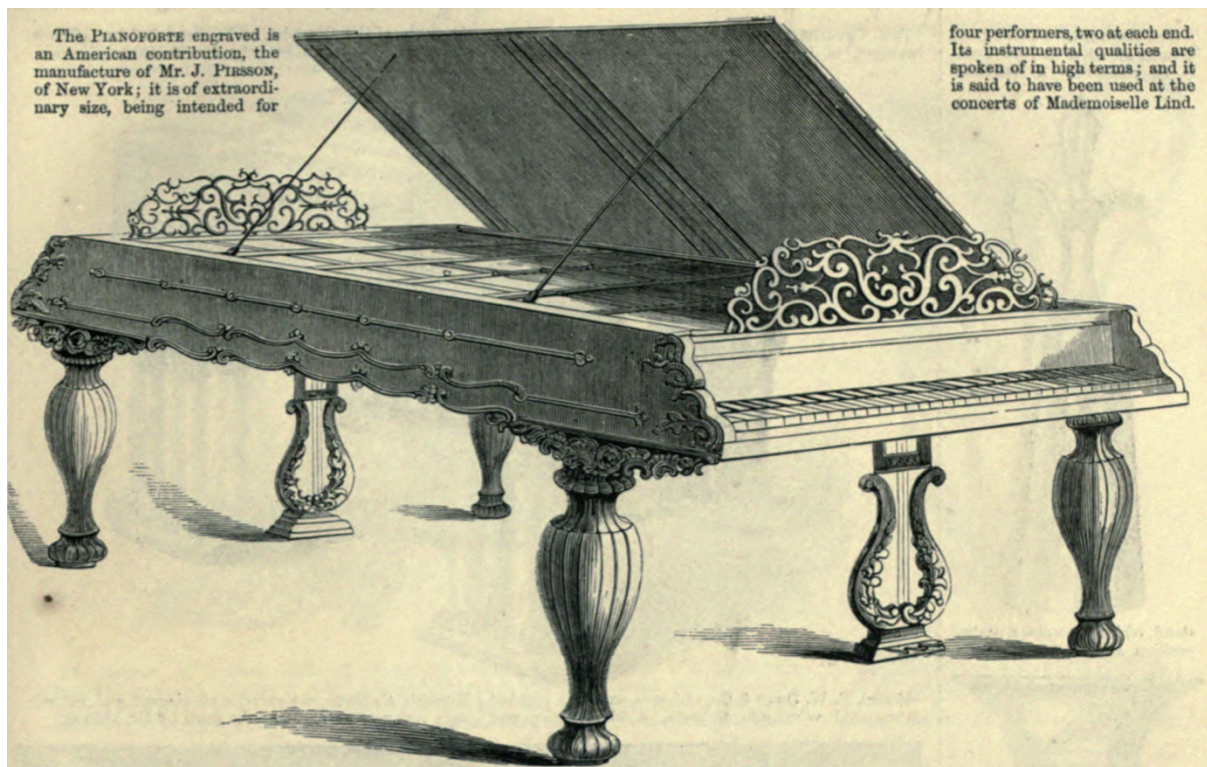


FIGURE 3.8: PIRSSON'S DOUBLE GRAND PIANOFORTE. THE ART JOURNAL ILLUSTRATED CATALOGUE. THE INDUSTRY OF ALL NATIONS, 1851. (LONDON: G. VIRTUE, 1851): 245.

Special Exhibitions of Historical Instruments

During the period in which exhibitions enjoyed high levels of popularity, and combination keyboards were presented alongside other more commonly occurring types of keyboard instruments, ‘historical’ or ‘ancient’ musical instruments (“made before 1800”⁸¹) were also represented to the public in a similar manner. Three exhibitions stand out as having included ‘ancient’ keyboard instruments: the Special Exhibition of Ancient Musical Instruments (1872, South Kensington Museum), the Division II of the International Inventions Exhibition (1885, South Kensington), and the Edinburgh International Exhibition of Electrical Engineering, General Inventions and Industries (1890, Edinburgh).⁸² Of these, only the 1872 and 1885 exhibitions are recorded as having shown combination keyboards, which were included in the ‘loan collections’, donated by individuals and institutions who had ownership of the instruments.⁸³

The catalogue for the 1872 exhibition lists two combination keyboard instruments: the 1579 Theewes claviorgan, and an English organ-hurdygurdy, ca. 1750 (also referred to by its French name: *Vielle organisée*).⁸⁴ Appearing in Class VI, ‘Organs, and other Instruments Containing Organ Pipes, or Tongues of Metal’, both of these listings are accompanied by a brief description of the instruments’ conditions: of the Theewes, an “interesting relic,” there was “scarcely more than the outer case remaining,” and of the organ-hurdygurdy, “some portions ... [had] been restored.”⁸⁵ In contrast to the descriptions provided for the other non-combination instruments listed—which vary in levels of detail, but consistently make note of the appearance and decoration of the instruments, or any significant mechanisms—those given for the two combination instruments provide no insight into any of the instruments’ features, nor which of their aspects may have invited interest.

⁸¹ South Kensington Museum, *Catalogue of the Special Exhibition of Ancient Musical Instruments 1872*, (London: John Strangeways, 1872), iii.

⁸² South Kensington Museum, *Catalogue of the Special Exhibition*, in Kirby, “Exhibiting Music”, transcriptions of catalogues for London 1885 and Edinburgh 1890, at pp. 458-591 and 515-22, respectively.

⁸³ The 1872 Special Exhibition featured donors such as the Duke of Edinburgh, the Marquesses of Exeter and Westminster, private citizens, and Ambrose Thomas, Director of the Paris Conservatoire, *Catalogue of the Special Exhibition*, iii; the 1885 Loans Collection was made up of instruments from donors such as the Earl of Ashburnham, John Broadwood and Sons, the Conservatoire Royal of Brussels, as well as private citizens, Alfred Hipkins, *Guide to the Loan Collection and List of Musical Instruments, Manuscripts, Books, Paintings and Engravings: Exhibited in the Gallery and Lower Rooms of the Albert Hall*, (London: William Clowes & Sons, 1885), transcribed in Kirby, “Exhibiting Music”, 458-491.

⁸⁴ The 1579 Theewes claviorgan was donated by Mrs. Luard Selby, and the organ-hurdygurdy was donated by Mr. Carl Engels. *Catalogue of the Special Exhibition*, 38.

⁸⁵ *Catalogue of the Special Exhibition*, 38. The *Vielle organisée* consists of a bowed hurdygurdy with an added organ component.

In Division II of the 1885 International Inventions Exhibition, the Loan Collection of Historical Musical Instruments and Appliances, Manuscripts and Printed Books, another two combination keyboards were displayed. Messrs. Chappell & Co. are recorded as having exhibited a ca. 1750 double spinet—a mother-and-child virginal—by Hans Ruckers the Elder, whilst Messrs. Kelly & Co. presented a 1745 organ-harpsichord, or claviorgan by Crang. The official guide to the Loan Collection describes the octave spinet component of the Ruckers mother-and-child virginal as “one of the expedients used to gain brilliancy of effect by an octave string before Hans Ruckers himself introduced it into the clavecin,” and the Crang claviorgan as a “not unfrequent combination in the 18th century.”⁸⁶ These descriptions locate both these instruments within the historical canon of keyboard instruments that gave rise to the new musical inventions displayed in the non-historical Division I of the Inventions Exhibition. This, in turn, serves to highlight the educational purpose of displaying ‘historical’ instruments within the same exhibitive context as contemporary ones, displayed with the intent of demonstrating new mechanical innovations and attracting commercial profit.

Industrialisation and the ‘Factory Instrument’: Standardisation, and What Art Demands of Craft

The extent of growth in British lower- and middle-class incomes during the 1860s to the 1890s allowed for the establishment of “a market for goods that had previously been so limited as to make them rare luxuries.”⁸⁷ The greater affordability and demand for such goods—primarily cultural capital “in the shape of libraries, pictures, solid furniture, and musical instruments,” promoted through the phenomenon of the international exhibition—together with the advent of widespread mass production, resulted in a proliferation of keyboard instruments available to a larger pool of consumers.⁸⁸

Whilst a range of combination keyboards, featuring redesigned, and in some cases patented, mechanisms and structures were marketed alongside other types of keyboard instruments such as pianos (both grand and upright varieties) and harmoniums, they experienced considerably less commercial success.⁸⁹ The failure of combination keyboards to thrive in this environment of increased commercialisation is recognised in current

⁸⁶ Hipkins, *Guide to the Loans Collection*, in Kirby, “Exhibiting Music”, 459, 466.

⁸⁷ Francesca Carnevali & Lucy Newton, “Pianos for the People: From Producer to Consumer in Britain, 1851–1914”, *Enterprise and Society*, 14.1 (2013): 41.

⁸⁸ Carnevali and Newton, “Pianos for the People”, 42, 50.

⁸⁹ Barbieri, “Violicembalos”, 130; Montanari, “Florentine Claviorgans”, 257.

musicological scholarship, however the reasons behind this underperformance are wide-ranging, with little definitive agreement between scholars. Analysis of the commercial success of other keyboard instruments—particularly the piano, which struggled to gain market recognition prior to its adoption by English and German instrument builders in the mid-eighteenth century⁹⁰—offers a well-grounded point of departure for examining the possible social and cultural reasons as to why combination keyboards endured contrasting outcomes.

In particular, two concepts arise from the works of James Parakilas, Cynthia Adams Hoover, and Laurence Libin that are just as applicable for considering the commercial non-performance of combination keyboards, as they are for explaining the success of the piano in nineteenth-century markets. The first of these concepts is that of industrialisation, which Parakilas views as “more than a means of production; it was also a way of thinking systematically about scale, efficiency, organisation, and control in any operation.”⁹¹ In this sense, Parakilas observes that industrialisation not only reshaped the way goods were manufactured, but had also wrought significant changes to the structure of society through the greater systematisation of social and cultural activities such as education and music-making.

In order to apply this view of industrialisation to the present examination of the disjuncture between the cultural meaning of combination keyboards and the changing nature of the contexts in which they existed, it is worth also considering Hoover’s reading of the impacts of industrialisation on the design, manufacture, and sale of pianos. Hoover provides a history of the keyboard workshop, illustrating the shift from small-scale operations of single craftsmen (and their apprentices) that produced harpsichords, clavichords, spinets, and combination instruments, to the more industrialised operations of nineteenth-century piano workshops, in which workers performed singular, highly specialised tasks that were small—yet significant—contributions to the finished instrument.⁹² This new approach to the manufacture of pianos, whereby a single worker was involved in a small part of the overall process, rather than being responsible for multiple aspects of the instrument’s construction, coupled with alterations to instrument design and

⁹⁰ Eleanor Selfridge-Field, “The Invention of the Fortepiano”, 81-94.

⁹¹ James Parakilas, “1820s to 1870s: The Piano Calls the Tune”, *Piano Roles: three Hundred Years of Life with the Piano*, James Parakilas et al., (Connecticut: Yale University Press, 2001): 151.

⁹² Cynthia Adams Hoover, “Designing, Making, and Selling Pianos”, *Piano Roles*, Parakilas et al., 36-39.

materials, resulted in workshops and factories being able to produce a greater number of instruments within a shorter timeframe.⁹³

As a result, the piano of the nineteenth century may be understood as the result of the successful industrialisation of keyboard instrument production, and the social contexts in which it was used (such as the use of musical education as a means of social ‘progression’ and the continued democratisation of keyboard music as a leisure activity), leaving combination keyboards, on the other hand, as objects retaining the connotations that they had held in previous centuries. This occurred despite the reiterations of claviorgans and bowed-keyboards that surfaced at international exhibitions, advertised for their new technologies and ability to offer consumers more versatile timbres.

Although the ‘redesign’ of combination keyboards—such as the *vis-à-vis* piano, piano-harmonium (and similar attachments), and organised square piano—resulted in fewer unique or experimental instruments than had been encountered during the early modern period, it is not unreasonable to consider the possibility that, as a species, combination keyboards still offered too many structural and mechanical variables in the face of increasingly standardised instrument production.

The decline in production of ‘one-off’ combination keyboards that had been highly experimental and ‘curious’ additions to this instrument species during the seventeenth century (for example the instruments of Michele Todini) can not only be linked to the changing commercial environment in which musical instruments were marketed and (ideally) sold, but also to the increased standardisation of instrument design, which facilitated affordable mass production. Montanari explains the decline of the Italian instrument-building tradition in exactly this way, noting the growing popularity of “assembling pre-fabricated parts” throughout the years following 1860.⁹⁴

The greater complexity of the mechanisms and structures inherent in combination keyboards presents as a distinct complication in the face of this systematised approach to construction. The “vanishing” of the “classical figure of the antique instrument maker” and the replacement of “individual genius” with “general manual skills”—as Angiolo Filippi saw it—and the continued tuning problems encountered in pipe and string combinations (such as the piano-harmonium) that required the significant, ongoing involvement of a skilled

⁹³ Hoover notes that in the 1830s and 1840s, the Broadwood factory produced approximately 2500–3000 pianos per year, and employed three to four hundred workers, whose labour was divided across forty-two different ‘steps’ or manufacturing departments, “Designing, Making, and Selling Pianos”, 38.

⁹⁴ Montanari, “Florentine Claviorgans”, 258.

technician, were problems easily solved by the promotion of simpler instrument designs, which were cost-effective to produce, as well as more user-friendly.⁹⁵

The number of different types of combination keyboards available during the late-eighteenth and nineteenth centuries is another factor standing in opposition to the successful standardisation of instrument design and production. In comparison to pianos produced during this time, which, with the exception of minor differences in materials, size, and some parts of the internal mechanism, were by and large becoming more uniform in their sound production capabilities and appearance, combination keyboards encompassed a menagerie of characteristics deemed vital to their function.

However, the continued invention and manufacture of a range of varied types and designs of combination keyboards throughout the nineteenth century—despite the difficulties this presented to the desire for standardised production—can be understood in relation to attempts executed by instrument builders and mechanical inventors to engineer a mechanical “solution” to the problem that had plagued both the harpsichord and the early piano: the sustaining of its sound.⁹⁶ Whilst such attempts had been occurring “sporadically” throughout Europe, and particularly in Italy, since the sixteenth century, the nineteenth century saw a renewed focus on the ability of keyboard instruments (other than organs) to “emit a continuous sound.”⁹⁷ Combination keyboards represented the best chance for achieving this aim. The claviorgan—a mainstay in Europe’s early modern courts—and bowed-keyboard (e.g. the *Violicembalo*, or *Geigenwerk*, and the ‘organised’ iterations of these instruments) are two very different examples of instrument builders attempting to achieve this singular goal.⁹⁸ As such, we see the continued propagation of both of these types of combination instruments (and their respective variations) well into the nineteenth century, with notable examples of bowed-keyboards including Enrico Marchesi’s *Orchestra-Cembalo* (1853-55) and Luigi Taparelli D’Azeglio’s *Violicembalo* (1827-62).⁹⁹

Commenting on the design alterations that many Western instrument families underwent during the late-eighteenth and nineteenth centuries, Curt Sachs identifies “modern

⁹⁵ Angiolo Filippi, ‘*Sopra alcune questioni della Liuteria Italiana. Memoria letta nell’Adunanza del dì 7 Dicembre 1890*’, *Atti dell’Accademia del R. Istituto Musicale di Firenze*, (Florence: Tipografia Galletti e Cocci, 1891), translated in Montanari, “Florentine Claviorgans”, 259.

⁹⁶ Barbieri, “Violicembalos”, 117.

⁹⁷ Ibid.

⁹⁸ Barbieri discusses in-depth the different variations of bowed-keyboard instruments that emerged throughout the eighteenth and nineteenth centuries, “Violicembalos”, 118-20.

⁹⁹ Barbieri also examines possible evidence indicating that Franz Liszt may have used Taparelli’s instrument in public performance, “Violicembalos”, 199.

orchestration” as the primary cause for instruments being “developed to the greatest possible technical efficiency and musical effectiveness.”¹⁰⁰ Sachs’ statement, whether entirely accurate or not, is reflective of a view central to nineteenth-century attitudes towards musical instruments (as physical objects): that “craft [was] subservient to art.”¹⁰¹

This idea was reflected not only in approaches to the manufacture of instruments, but also manifested in the ways musical instruments (particularly historical instruments) were displayed, as exemplified through the Crosby Brown Collection of Musical Instruments—assembled during the late-1800s, by Mrs. John Crosby Brown (1842–1918)—at the Metropolitan Museum of Art (New York). Containing a large variety of both Western and non-Western instruments, ranging from historical to contemporary, the Crosby Brown Collection aimed to present a “comparative display” of instruments, to “trace the development of ... distinct types of musical instruments from the first rude beginning to the finished forms now in use.”¹⁰² The construction of this teleological narrative of musical instruments’ development incorporated populist interpretations of evolutionary theory, for instance, that the idea of ‘natural selection’ was synonymous with “continuous betterment.”¹⁰³ In turn, this served to promote the idea that instrument design arbitrarily followed a path towards objective ‘perfection’, suggesting that types of instruments (such as earlier iterations of combination keyboards) that had “become outmoded” or viewed as “ancestral”, were somehow less valuable in a performance context.¹⁰⁴

However, this supposed imbalance between the capabilities of an instrument, and the musical needs of composers, performers, and audiences that was promoted so widely in the nineteenth century as the reason for continuing to ‘improve’ musical instruments, can, as Libin argues, only “partly explain the phenomenon of evolution” as it relates to keyboard instruments.¹⁰⁵ As expressed in Libin’s quote at the start of this chapter, there are many factors beyond this that may influence the relative success of a particular instrument type.

¹⁰⁰ Curt Sachs, *The History of Musical Instruments*, (New York: W. W. Norton & Co., 1940), 389, in Libin, “Progress, Adaptation, and the Evolution of Musical Instruments”, 189.

¹⁰¹ Libin, “Progress, Adaptation, and the Evolution of Musical Instruments”, 189.

¹⁰² *Catalogue of the Crosby Brown Collection of Musical Instruments of All Nations*, vol. 1, *Europe* (New York: The Metropolitan Museum of Art, 1904), xv, in Libin, “Progress, Adaptation, and the Evolution of Musical Instruments”, 191.

¹⁰³ Libin, “Progress, Adaptation, and the Evolution of Musical Instruments”, 194.

¹⁰⁴ Libin discusses the influence of Herbert Spencer’s widespread “survival of the fittest” attitude (despite Charles Darwin’s partial rejection of this assertion) on the development of organology during the nineteenth century, and thus the impact that such attitudes continued to have on perceptions of historical instruments well into the present day. “Progress, Adaptation and the Evolution of Musical Instruments”, 194.

¹⁰⁵ *Ibid.*, 197.

Whilst the commercial non-success of the eighteenth and nineteenth century's combination keyboards may have historically been explained in terms of their perceived suitability for purpose (i.e. they were not 'fit' enough to survive), greater awareness of the broader social and cultural shifts occurring around these instruments renders such an explanation unsatisfactory. Rather, it is through the examination of these social, political, and cultural changes, and the impact that they had on the musical, social, and economic contexts of combination keyboards that offers us greater insight into their decline in popularity following the dawn of the nineteenth century.

CONCLUSION

Combination keyboards fulfilled varied and complex roles as both musical instruments and objects of art and curiosity in sixteenth- to nineteenth-century Europe. Through the cases examined in this study, it becomes apparent that combination keyboards were not only perceived in terms of their ability to make music, but were also interpreted in relation to their physicality, or objecthood. Chapter One revealed that the popularity of combination keyboards was largely dependent on their ability to represent the financial wealth and cultural tastes of monarchs and the nobility, through their dual nature as both musical instruments, and objects of acute technological and visual complexity.

The value of the mechanical and aesthetic aspects of combination keyboards is further highlighted in Chapter Two. The status of these instruments as ‘curiosities’ in seventeenth- and eighteenth-century cabinet collections is identified in relation to their ability to intrigue visually, and communicate their owners’ appreciation of skilled craftsmanship. Analysis of Todini’s highly experimental combination keyboards and their comparison with French musical automata further supports the notion that these instruments were understood in this context primarily as mechanical and artistic objects capable of producing music, rather than explicitly musical instruments.

The broader social and political changes that resulted in increased democratisation and commercialisation of keyboard instruments, are identified in the final chapter as the primary factor leading to the decline and eventual obsolescence of combination keyboards in late nineteenth-century Europe. Through case examples such as the forced confiscation and repurposing of organised pianos during the French Revolution, and the attempts of instrument makers to reinvent and market combination keyboards at international exhibitions, the detrimental impact of larger-scale societal and cultural phenomena (particularly the rise of the ‘middle-class consumer’) on the popularity of these instruments is evident.

By investigating the cultural roles occupied by combination keyboards over the course of approximately four centuries, encompassing both the early modern and industrial periods in Europe, this thesis offers a wider perspective on the significance of a relatively under-represented species of historical keyboard instrument. The use of a critical organological approach to this research has allowed consideration not only of the musical significance of combination keyboards, but also their significance as objects of visual art and mechanical innovation within their historical contexts. As a result, this thesis engages with the

emerging scholarly discussion about combination keyboards, and contributes to the growing interest into the musical and cultural history of a hitherto overlooked species of keyboard.

Highlighting the significance of approaching the study of historical instruments from a critical organological perspective, and providing some insight into the historical roles occupied by combination keyboards, this research lays a foundation for future investigation into contemporary perceptions of these instruments, and the factors influencing their marginalised position in the historiography of early music. A similar approach may also be applied to other species of keyboard instruments that occupy a more mainstream position within the early music canon, resulting in new investigations into both individual instruments and instrumental families, that focus on the cultural and social meanings of their visual and structural components, and the influence this had on their musical impact, both in the past, and in modern encounters with historical music making.

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