



## Bartolomeo Cristofori

DURING THE RENAISSANCE and Baroque periods it clearly had been a great desire among European musicians and instrument makers to invent a stringed keyboard instrument with a louder tone than a clavichord and capable of dynamic flexibility comparable to the human voice or a violin. In the fifteenth century, Henri Arnaut of Zwolle (in his treatise from 1440) had designed and described a *clavisimbalum*, and one of his designs shows a harpsichord mechanism that apparently was supposed to strike the strings with hammers rather than pluck them.<sup>1</sup> Thus, *cum grano salis*, it could be called a kind of forerunner of the piano; unfortunately, no such instrument has been preserved. Perhaps it was never built or used. During the next two centuries there were other attempts to tackle the abiding problem of how to construct a harpsichord capable of dynamic shadings or how to get a clavichord to become a louder instrument. Many sixteenth- and seventeenth-century attempts are known that might have been temporally considered useful, but only toward the very end of the seventeenth century was this desire finally realized. An invention by Bartolomeo Cristofori of a new *arpicimbalo che fa il piano, e il forte* (a wing-shaped cembalo that can make [allows] soft and loud) was described in an inventory dated 1700 and listed as belonging to the collection of musical instruments of Prince Ferdinando de' Medici.<sup>2</sup> In principle it was already the successful hammer mechanism allowing dynamic changes: the *cembalo con martelli*, or harpsichord with hammers, in its first stage. The actual date of the invention of this action seems to have been the year 1697.<sup>3</sup>

1. See Konstantin Restle, *Bartolomeo Cristofori und die Anfänge des Hammerklaviers: Quellen, Dokumente und Instrumente des 15. bis 18. Jahrhunderts* (Munich: Editio Maris, 1991). The most informative modern collections of data that led to the sources of these early attempts to construct keyboard instruments with flexible dynamics are found in this book of Restle's and in article book by Stewart Pollens, *The Early Pianoforte* (Cambridge: Cambridge University Press, 1995).

2. Pollens, *The Early Pianoforte*, 238–243.

3. See K. Restle, *Die Anfänge des Hammerklaviers in Italien*, in: *Jahrbuch des Staatlichen Instituts für Musikforschung Preussischer Kulturbesitz* (Stuttgart: Metzler, 1998), 71.

A hundred years earlier, the organ and instrument builder Hippolito Cricca, alias Paliarino, wrote in 1598 several letters in Ferrara to his employer, the Duke of Modena,<sup>4</sup> in which he mentioned not only an *istromento piano e forte* but also two combined instruments with different mechanisms to produce the tones. One of these interesting keyboard instruments was a combination of an organ with an *istromento piano e forte*, an innovative creation not otherwise known to us from that time; the other instrument was apparently a kind of harpsichord-piano. The relevant passage at the beginning of Cricca's letter from the last day of December 1598 reads:

A.S.A.S.<sup>ma</sup> Serenissimo Signor Mio.

L'Altezza vostra sappia che mi ritrovo del suo che io ricuperatto da' questi Pretti l'horggano di cartà l'istromento piano e' forte co' l'horggano disotto, un altro l'istromento di dua registri et il piano e forte, quello che adoperava il ser.<sup>mo</sup> S.<sup>r</sup> Duca Alfonso buona memoria., et così li sonno andatj mantenento, et sonno benissimo al hordine così piacesse a Dio.

Da Ferrara di Ultimo Dicembre 1598

D.V. Altezza Ser.<sup>ma</sup> Ubidentissimo Ser.<sup>re</sup>

Hippolito Cricca ditto Paliarino.<sup>5</sup>

(To my most serene and most respected Patron, the most serene Duke of Modena

May Your Highness know that in light of your letter I have reclaimed from these priests the organ with paper pipes, the *istromento* with the organ below, [and] another instrument with two registers and the *piano e' forte*, that which was used by the Most Serene Lord Duke Alfonso of good memory, and they have been well maintained and are very well in order: may it please God that all the others that were taken from me should be in the same state as these [ones], for they are [in] very bad [shape], and if Your Highness does not give some order will go from bad to worse. I also make known to Your Highness that the Chapel organ is never looked after by anyone, so that it, too, will come to harm, and in a short time some pipe of importance might be stolen; and because on my departure I claim to Your Most Serene Highness that I have always been good and most faithful to the Este line.

From Ferrara, the last day of December 1598

Most Obedient Servant of Your Serene Highness

Hippolito Cricca, called Paliarino)

Though all the known extant letters from Cricca to the Duke were first published by Valdrighi, the original text of this most interesting letter and also a translation into English is fortunately reproduced by Konstantin Restle<sup>6</sup> and also in Stewart Pollens's book *The Early Pianoforte*, from where the quotation above stems. The letter excerpt hints at the most interesting probability that one of Cricca's two combined instruments was a

4. First published by Luigi-Francesco Valdrighi, *Nomocheliurgografia antica e moderna*, Modena 1884, p. 273–276.

5. Document No. LV. Reproduced by K. Restle, *Bartolomeo Cristofori und die Anfänge des Hammerklaviers*, (pp. 30–37) and also by Stewart Pollens, *The Early Pianoforte*, Cambridge 1995, Appendix 1 and p. 28. Text here quoted after Pollens.

6. See K. Restle, *Bartolomeo Cristofori und die Anfänge des Hammerklaviers*, Munich 1991 (Editio Maris).



combination of a quilled harpsichord with a piano e forte instrument as Pollens advocates: “The description of the second instrument is most intriguing, as it suggests that *piane e’ fortte* is an additional resource of a two-register harpsichord.”<sup>7</sup>

Did Cricca consider the piano e forte instrument indeed as an “additional resource?” If this was the case and if it was known to Cristofori and he shared this view, it might explain the mysterious name Cristofori later gave his *cimbalo* (he always wrote *cimbalo* instead of *cembalo*): “*cimbalo con un solo registro*.” Unfortunately, Cricca’s instruments are all lost and no other documents mentioning these instruments in more detail are known. Many questions regarding the early piano e forte built by Cricca come to our mind, and most intriguing is this one: How much did Cristofori know about Cricca and his instruments? We shall probably never know the answer, but Cricca’s surviving letter confirms what is known from other sources, namely, that combined keyboard instruments were built at the very beginning of the Baroque period, not only in the eighteenth but also in the seventeenth century. Cristofori may very well have heard of the existence of such instruments and of Cricca. Therefore, he might have called his first piano in 1700 *cimbalo che fa il piano e il forte*, though it is not certain that he ever saw an instrument of Cricca.

In the seventeenth century, other interesting keyboard instruments with dynamic gradation possibilities using tangents for striking the strings (Franciscus Bonafinis) or combined keyboard instruments (Michele Todini; see plate 1) were built, but apparently they had no lasting effects. An unfortunately incomplete description of the highly complicated Todini instrument, discussed first by Athanasius Kircher in 1650 in Rome, and a painting of it (plate 2) are the only surviving remembrances.

In his book *Bartolomeo Cristofori und die Anfänge des Hammerklaviers*, Restle discusses in detail the few known descriptions of early attempts at building such keyboard instruments from Arnaut de Zwolle to the Ferrarese *strumenti pian’ e forte* mentioned above and the Todini combined instruments. Todini’s combination of four keyboard instruments is another example of apparently interesting but lost instruments of which we simply do not know enough. Following Restle’s footsteps, Stewart Pollens also reviewed all the little known predecessors of Cristofori’s harpsichord with hammers. In addition he discussed the interesting extant *spinettino* by Franciscus Bonafinis, which probably was turned into a tangent piano as early as 1632.<sup>8</sup> Both authors discuss and analyze these predecessors of Cristofori in detail and evaluate their achievements. Prior to both books and unknown to Restle, a 1988 article by Hubert Henkel appeared in Leipzig, East Germany, with the title “Cristofori als Cembalobauer.” It was translated in 1992 into English by Howard Schott and appeared as “Bartolomeo Cristofori as Harpsichord Maker.”<sup>9</sup> This study offers an especially

7. See S. Pollens, op. cit., p. 29.

8. Stewart Pollens, “The Bonafinis Spinnet: An Early Harpsichord Converted into a Tangent Piano,” *Journal of the American Musical Instrument Society* 13 (1987): 5–22.

9. Hubert Henkel, “Bartolomeo Cristofori as Harpsichord Maker,” trans. Howard Schott, in *The Historical Harpsichord*, ed. Howard Schott, vol. 3 (Stuyvesant, NY: Pendragon, 1992).

detailed discussion of all Cristofori instruments kept in the *Musikinstrumenten-Museum* belonging to the University of Leipzig. This museum owns not only two Cristofori harpsichords with quills but also one with hammers and various spinets, and Henkel rendered an account of the unique mechanical and aesthetic achievements of Cristofori.<sup>10</sup> Reading all the descriptions of these competent museum curators and restorers yields abundant information about Cristofori and his Italian “predecessors.” Anyone interested in piano construction in general and in Cristofori’s outstanding solution of mechanical problems in particular should study Restle, Pollens, and Henkel. Though it may turn out that one day more “forerunners” of Cristofori’s piano will be discovered, surely none will be found whose hammer action could compete with Cristofori’s ingenious sophisticated invention.

To sum up, in 1697 or 1698 Bartolomeo Cristofori may have invented his first promising mechanism for a harpsichord with hammers striking the strings, and he finished his very first piano one or two years later; it was described in the inventory of 1700 and listed as Medici property. A confirmation of this date 1700 is given by a marginal note from Federico Meccoli, a Florentine court musician (it was found in an edition of Gioseffo Zarlino’s book *Istitutioni harmoniche*:

Questi sono gl’andament che si possono adattare in su l’Arpi Cimbalo del piano e forte inventato da M.ro Bartolomeo Christofani Padovano, l’Anno 1700, Cimbalaro del Ser.mo Gran Principe Ferdinando di Toscana.<sup>11</sup>

(These are the ways in which it is possible to play the *Arpicimbalo del piano e forte*, which was invented by the master Bartolomeo Christofani of Padua in 1700.)<sup>12</sup>

The text of the inventory of 1700 (plate 3) starts with the words:

Un Arpicimbalo di Bartolomeo Cristofori di nuova invenzione, che fa il piano, e il forte à due registri principali unisono.

(A newly invented harpsichord of Bartolomeo Cristofori that allows the piano and the forte [playing] with two registers [*sic*] strings of the same pitch.)

The scribe obviously did not understand the functioning of Cristofori’s new invention.

Probably only after continuous improvements, Cristofori’s mechanism of a reliably working action proved itself eventually as being the solution of the century-old desire of instrument makers. Cristofori’s pianos of the 1720s eventually became the much-admired model for later successful instruments of this type. An odd disagreement among German writers in the nineteenth century as to whether the first successful invention of a piano e forte had been built in Italy or in Germany ended around 1850, and it was generally understood

10. Besides technological explanations and comparisons, Henkel offered also a fascinating—though possibly erroneous—theory about Cristofori’s very first arpicimbalo che fa il piano e il forte claiming that it must have been built as a quilled harpsichord with an additional hammer action.

11. Quoted in Luisa Cervelli, “Noterelle Cristoforiane,” *Quadrivium* 22, no. 1 (1981): 159.

12. Ibid.

everywhere that it was doubtless Bartolomeo Cristofori who invented the first hammer action that served as a model for later mechanisms (and not the ambitious young German Christoph Gottlieb Schroeter after 1717).

Around 1900 nearly all twentieth-century musicians and many music historians took it for granted that a *cembalo* or *harpsichord* or *clavecin* had always been nothing else than a harpsichord with quills. Cristofori, however, considered his new instrument with hammers throughout his life simply as a special kind of *cembalo*. Regardless of whether it was a *cimbalo con penne* (quills) or a *cimbalo con martelli* (hammers), he always was convinced that it belonged to the “family of *cimbalo* instruments” and thus was a *cimbalo*. Many modern musicians and musicologists still fail to understand the eighteenth-century terminological practice of calling *all* wing-shaped keyboard instruments *harpsichord* or *clavecin* or *cembalo* (*cimbalo*) or *Flügel* (*fliegl, flüge*), terms that only referred to the wing-shape form of these string instruments regardless of whether their strings were plucked or struck by hammers or tangents. In chapter 2 we shall discuss in detail the terminological problem that started in Italy with the first naming of Cristofori’s *nuovo cimbalo* with a too-long string of words: *che fa il piano e il forte*.

Cristofori (Cristofani, Cristofali, Christofori) was baptized under the name Bartolomei Christofani on May 6, 1655, in the Church of St. Luke in Padua. It may be assumed that he was born the usual two days earlier and thus on May 4, in the parish district where he was baptized. Apart from this baptismal record in the relevant parish book, practically nothing is known about his childhood, his education, and the first decades of his professional life in Padua. Eventually he must have become known and highly regarded as a harpsichord builder (*cembalaro*), a good tuner (*bonaccordaio*), a mechanical inventor and probably also as a trained musician.<sup>13</sup> How the Grand Prince of Tuscany, Ferdinando de’ Medici, became acquainted with Cristofori and learned to value his talents is also not known.

This Grand Prince Ferdinando (1663–1713) was a highly intelligent, well-educated, and enlightened personality who soon became famous as patron of the arts. He was not only interested in music but also active as a musician who apparently enjoyed playing the *cembalo*. He liked to cultivate friendships with artists and was keenly interested in collecting musical instruments, especially those with keyboards. The prince also loved opera, added a theater to his villa in Pratolino near Florence and engaged important opera composers and equally well-known singers to compose and perform operas and ballets there. All kinds of artisans, including inventors such as Cristofori, interested the prince. He was also a famous collector of paintings.

13. A certain Christoforo Bartolomei, who lived as a resident in 1680 in the house of the old Nicolo Amati in Cremona had been thought for a while to be identical with Bartolomeo Cristofori from Padova; but though it is possible that the latter was also interested in the manufacture of violins and lutes—there exist several larger string instruments with questionable labels using his name—it is now certain that this Bartolomei of Cremona was another person and only a coincidence of similar names suggested a connection. Pollens, *The Early Piano-forte*, 50–51.

According to his first biographer, Leto Puliti, the prince needed another cembalaro after the death of the Florentine harpsichord maker Antonio Bolgioni in February of 1688.<sup>14</sup> Bolgioni had been responsible for the tuning and maintenance work of keyboard instruments at the Medici court. Perhaps Prince Ferdinando became acquainted with Cristofori while traveling through Padua before or after the carnival in Venice in 1687 or 1688. The prince could of course have chosen any Florentine instrument maker and tuner as Bolgioni's successor, but perhaps he had already heard of Cristofori's experiments to construct the generally desired new kind of cimbalo che fa il piano e il forte, one with dynamic shading possibilities; and, when meeting him he might have been impressed by Cristofori's musical, mental, and mechanical abilities. In any event, the prince persuaded the reluctant Cristofori to join the artisans in Florence, and Cristofori's first salary was paid from the prince's *Guardaroba* account in 1688.

A renowned literary figure, the Marchese Scipione Maffei, apparently soon became one of the Cristofori's great admirers. He wrote an article about the new cembalo con martelli that was published in 1711 in the *Giornale dei Letterati d'Italia* and eventually was read in and outside of Italy. Extant notes regarding a 1709 conversation between Cristofori and Maffei, preserved in an archive in Verona, have been found recently and published by Laura Och.<sup>15</sup> According to these notes, Prince Ferdinando had considerable difficulty in persuading the highly gifted and rather independent and proud Cristofori to move from Padua to Florence and to join the many artisans working there for the Medici court. As Cristofori told Maffei, he initially did not like the idea of leaving Padua but finally could not resist accepting the prince's generous offer. Because of exceptionally favorable conditions he decided to move to Florence in April 1688, where on May 6—the day he had been baptized thirty-three years earlier—he received his first payment from the Florentine court as “Bartolomeo Cristofori Padovani, nuovo strumentaio del Serenissimo Principe Ferdinando.” Records of this payment and of many other documents concerning Cristofori are mostly kept in the state archives in Florence, and some of them were only recently discovered and published by Giuliana Montanari.<sup>16</sup> A survey of source materials for Cristofori's biography apart from those documents that Puliti had already made known during the nineteenth century are also found in Michael O'Brien's dissertation,<sup>17</sup> but what we know today about Cristofori's stay in Florence has been best and comprehensively

14. Leto Puliti, *Della vita del Serenissimo Ferdinando dei Medici Granprincipe di Toscana e della origine del pianoforte* (Florence: Accademia del R. Istituto Musicale di Firenze, 1874), 12: 130.

15. See Laura Och, “Bartolomeo Cristofori, Scipione Maffei e la prima descrizione del ‘gravicembalo col piano e forte,’” *Il Flauto Dolce* 14–15 (April–August 1986): 16–31. An English translation of the notes is in Pollens, *The Early Pianoforte*, 232–237.

16. Giuliana Montanari, “Bartolomeo Cristofori: A List and Historical Survey of His Instruments,” *Early Music* 19, no. 3 (1991): 383–398.

17. Michael K. O'Brien, “Bartolomeo Cristofori at Court in Late Medici Florence” (PhD diss., Catholic University of America, 1994).

documented and published in various articles mainly by Giuliana Montanari, by Vinicio Gai, and by Stewart Pollens (see selected bibliography).

The notes from the 1709 conversation between Maffei and Cristofori tell us also that Cristofori initially felt ill-at-ease in his new position in Florence. In 1688 he had been given a working place in the Galleria dei Lavori that was located in the Uffizi. Here, as he told Maffei, it was hard for him to be in the big room with all the noise, but he also admitted that working there among nearly a hundred craftsmen brought with it certain advantages, and he learned a lot from some of the artisans. He managed, however, to keep a rather special position; unlike other workers, he was not dependent on the administration of the galleria but was in direct contact with—and responsible to—the prince, who allowed him a monthly payment, initially of ten scudi. This special court position permitted Cristofori a certain degree of freedom and the complete independence from the guild of instrument makers in Florence, a fact that probably not only saved him money but relieved him also from unpleasant guild restrictions. His duties at court included—besides restoring or supervising necessary restoration work—the construction of new keyboard instruments with the help of assistants. He also had to oversee the transport of instruments to and from the Palazzo Pitti or the opera theater in Pratolino. He probably also participated in some musical performances as a *cembalista*, an assumption suggested by the fact that after the death of Prince Ferdinando, Cristofori's name was mentioned alongside two dozen other musicians as a “virtuoso of the Chamber,” a title given otherwise only to musicians. Maffei called Cristofori in his article not only *cembalaro* (harpsichord maker) but also *cembalista* (harpsichord player).

Obviously, Cristofori's first steps to invent a more powerful keyboard instrument with dynamic shading possibilities than the clavichord were based on a conviction favored by his many Italian predecessors as well, that what was needed was another kind of *cembalo* action, a mechanism different from the one of harpsichords using quills to pluck the strings. Thus, Cristofori may have considered it most natural to begin his work with the construction of a harpsichord corpus, and he may have remembered previous experiments using *martelli* (Latin: *marculi*) or *martellini* instead of tangents, because of the more forceful motion of hammers in moving not perpendicular to the strings but with more strength, taking the longer throw of a hammer. These ideas were probably not new and may have constituted Cristofori's initial considerations. Definitely new, however, and a more important decision was Cristofori's ingenious idea of inventing and supplying his action with an escapement mechanism and a backcheck as well as an intermediary lever so that keys and hammers were not in direct contact. And because he understood that the strings of a harpsichord with a hammer action needed to be thicker to resist the striking hammers, he decided to relieve the soundboard from having hinged the strings to it and fastened them somewhat higher to the frame.

The year 1698 is mentioned by Mario Fabbri as the year in which Cristofori had solved the major problem of constructing a model of the hammer action with an escapement



mechanism, thus avoiding a rebounding of the hammer.<sup>18</sup> Fabbri claimed that he found an entry in a diary of the court musician Francesco Manucci and considered 1698 as the actual year of Cristofori's invention. According to Fabbri, in this diary passage Manucci wrote that Cristofori had shown him a model hammer of the newly invented action mechanism, saying that he was on his way to Prince Ferdinando de' Medici to demonstrate it to him. Unfortunately, Manucci's diary (a document belonging to the Florentine Archivio Laurenziano) cannot be located at present. That caused doubts about the truthfulness of this story because some of Fabbri's other remarks are apparently wrong or in any case unexplainable; therefore the authenticity of Fabbri's story has been questioned.<sup>19</sup> What can be documented, however, is the fact that in the year 1698 Cristofori felt himself in a position to request an increase of his salary from the prince: twelve scudi instead of ten as a monthly payment plus the rent for his house and an additional payment for some needed repair of it, seems to have been his demand. This demand speaks *inter alia* for the assumption that he presumably owned already the house where (ca. 1695) he had established his own independent workshop. Although all his requests apparently were granted by Prince Ferdinando, it seems that subsequent payments were delayed or canceled—perhaps caused by the prince's own severe financial difficulties.<sup>20</sup> Probably a new and different financial arrangement between the prince and Cristofori might soon have been worked out. It obviously allowed Cristofori far more freedom and independence to work on his own but included perhaps no regular income. This may have been the main reason why in later years Cristofori was obviously in the position to work in complete independence and to sell privately his newly constructed *cimbali che fa il piano e il forte*.

In 1700 an "Inventario di diversi sorte d'instromenti musicali in proprio del Serenissimo Sig. Principe Ferdinando di Toscana" (Inventory of different types of musical instruments belonging to His Highness Prince Ferdinando of Tuscany) was compiled. It contained a description of what was apparently Cristofori's first version of a *cimbalo che fa il piano e il forte* (as noted, Cristofori wrote always *cimbalo* instead of *cembalo*). This inventory list (see plate 2) is not preserved in Cristofori's handwriting, and we do not know whether the text was drafted by him. He probably was not responsible for its wording.

The original text in Italian is reproduced in Pollens's valuable book *The Early Pianoforte*.<sup>21</sup> The English translation of the inventory text by Pollens reads

18. Mario Fabbri, "Nuova luce sull'attività fiorentina di Giacomo Antonio Perti, Bartolomeo Cristofori e Giorgio F. Haendel: Valore storico e critico di una 'Memoria' di Francesco M. Mannucci," *Chigiana* 21 (1964): 143–190.

19. Michael K. O'Brien, "Dark Shadows across the 'Nuova Luce' of Mario Fabbri" (paper presented at the American Music Society Annual Meeting, Bethlehem, PA, 1991). O'Brien questions the authenticity of Fabbri's remarks of the lost Manucci diary.

20. O'Brien, "Bartolomeo Cristofori at Court in Late Medici Florence."

21. Pollens, *The Early Pianoforte*, 238–243.



A grand harpsichord of new invention by Bartolomeo Cristofori, which can play piano and forte, with two registers at the same pitch, with a soundboard of cypress without rose, with sides and halfround moldings similarly inlaid with ebony strips, with some jacks with red cloth [dampers] that touch the strings and with hammers that produce the piano[s] and the forte[s]; and the entire mechanism is part of and covered by a sheet of cypress wood inlaid with ebony, with keys of boxwood and ebony without split sharps, which begin at *ci* [*sic*] *sol fa ut* in the low octave and end at *cisolfaut* [at the high octave] with 49 black and white keys, with two black end-blocks with one to position [the keyboard] and two black knobs above; length three *b[racci]*a and seven *ottavi* [= 217.6 cm], width of the front one *b.* and six *soldi* [= 98.6 cm], with its music desk of cypress wood, and its outer case of white poplar, and its red leather cover lined with green taffeta and edged with gold ribbon.

From this description in the inventory of 1700 we learn that the new *cimbalo con martelli* had forty-nine keys and a range of four octaves (C–c<sup>3</sup>), and we may guess that the instrument most likely had bichord stringing, which the scribe of the inventory associated with quilled harpsichords as “*due registri principali unison.*” It seems no question that the word *registro* in this phrase is understood to refer to the bichord stringing. This perception reinforces the impression that not only the case construction was taken over from harpsichord building but probably also the bichord stringing of normal Italian one-manual quilled harpsichords.<sup>22</sup>

The original meaning of the term *registro*, however, is a stop for a sound change (see chap. 2). In remembrance of the letter of Cricca and the fact that combined instruments previously were not only known but common (Todini), Cristofori could have imagined right at the beginning the hammer mechanism as becoming eventually a stop of a normally quilled harpsichord; in this case *registro* could have referred to the hammer mechanism as an additional register. The second “register” could have been perhaps then an *una corda* stop. Such an *una corda registro* Cristofori added indeed later to his pianos, for example, the extant piano dating from 1720 was built with such an *una corda* stop.

The Veronese Marchese Scipione Maffei (1675–1755), known as a writer and poet, was one of the editors of the Venetian journal on literature, the *Giornale dei Letterati d'Italia*. When visiting Florence he was highly impressed by Cristofori's new hammer-harpsichord and apparently wanted to support Cristofori in making the new *cimbalo con piano e forte* better known. Maffei apparently fully grasped the importance of Cristofori's invention. Probably after having started to write his article, in 1709 Maffei visited Florence once more, this time together with the journal's main editor Apostolo Zeno (1668–1750). His purpose

22. Hubert Henkel had another suggestion. In his article, quoted above, he came to conclude that Cristofori wanted to add to a normal harpsichord with quills a second register, a new stop, namely that of a hammer action with which the desired dynamic nuances *piano* and *forte* were possible; in other words he thought that Cristofori had initially invented what later was called a compound instrument or *harpsichord-piano*. It is a fascinating idea but Henkel abandoned it in later years because it was hardly a correct interpretation of the text—nowhere in Maffei's description (see below) are hints that Cristofori's new *cimbalo* was a combined instrument. (See Laura Och, “Bartolomeo Cristofori”).

may have been to get a better understanding of Cristofori's invention. Of this conversation he made notes. His article finally appeared in 1711 in volume 5 of the *Giornale dei Letterati d'Italia* (144 f.) under the title "Nuova invenzione d'un gravecembalo col piano e forte; aggiunte alcune considerazione sopra gli strumenti musicali," (A new invention of a large harpsichord with *piano* and *forte*; with added considerations about musical instruments). Eight years later it was reprinted in Italian,<sup>23</sup> and the German translation appeared in 1725 in Hamburg; another one in Dutch followed later in Amsterdam.

Maffei's article is a long essay, containing first an elaborate introduction. It is followed by a lengthy description of the construction of the new cembalo con martelli, after which a short discussion of another curious keyboard instrument with five manuals follows, and finally Maffei commented on ideas about problems of tuning systems for keyboard instruments—an important issue in Cristofori's day. These problems remained to be relevant for many musicians throughout the eighteenth century.

The introduction of Maffei's article and the relevant parts of the description of Cristofori's invention read as follows in an English translation by Stewart Pollens (for the original complete Italian text see the appendix 3 of his book):

If the value of an invention is judged according to its novelty and difficulty, the one of which we shall give an account here is certainly not inferior to any other one reported in a long period of time. Every lover and expert of music knows that the main delight in listening to music concerns the soft and the strong, the piano and forte; it is comparable to light and shadow in painting, and it is the principal source from which skillful performers draw the secret to create a special pleasure for their listeners. Whether in a statement or its repetition or whether the voices diminish little by little in an artful diminuendo and then return suddenly to full power again—which artifice is frequently and to marvellous effect used in the great concerts in Rome, and it is an incredible delight for those who have the proper taste for this art and gives them great pleasure. This diversity and alteration of sound volume, however, in which among others the bowed instruments excell, is entirely absent from the harpsichord; and a person who claims that he could create such a harpsichord [capable of dynamic shadings] would be considered a vain talebearer. Nevertheless, in Florence such a bold invention has not only been conceived but also excellently executed by the Padovani cembalario Bartolommeo Cristofali, who is a *cembalista* employed by the Most Serene [Grand] Prince of Tuscany. Thus far he has made three cembali of the size of ordinary harpsichords which perfectly succeeded. To produce a louder or softer sound on them depends upon the differing force with which the player presses the keys, and the diverse grades of pressing result not only in forte and piano but also in the diminishing and the [increasing] alteration of sound, similar to what can be done on a violoncello.

Some professors have not given this invention the applause which it deserves, firstly because they did not understand how much ingenuity was required to overcome all the mechanical difficulties and with what marvelous delicacy of touch his [Cristofori's] hands needed to work to get so accurately and correctly a result; secondly it had appeared to them

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23. *Rime e prose del sig. marchese Scipione Maffei* (Venice: Coleti, 1719).

as though the sound of the instrument, being different from the ordinary, is too soft and dull; but this is an impression which comes to those who for the first time put their hands on the instrument and expect the silvery tone of the other gravecembali; the ear, however, adapts itself to it in short time and then becomes so charmed that it will never tire of it, and the common gravecembali no longer please; and we should add that it [the new cimbalo] sounds even more sweet from some distance. Other critics complain that this instrument does not have such a powerful tone and is less loud than other gravecembali. To this, one may answer that firstly it does have more power than at first one may give it credit for, and secondly if someone knows how to play it, he can strike the keys with force. Besides, one has to accept things for what they are and should not demand something from one [instrument] for which it was not invented but which was designed for another. This is really a chamber music instrument and not adaptable for church music or a forceful orchestra. How many instruments exist which are used in chambers and which nevertheless are considered to be among the most delightful ones? It is certain that to accompany a singer or to support an instrument or even join a small ensemble, it sounds strong enough. But this is not the principal reason why it was invented but rather that it will be played alone, like the lute, the harp, the viola with six strings, and other most sweet-sounding instruments. But clearly, the greatest opposition under which this instrument suffers comes from the general lack of knowing how to play it when playing it for the first time. It is not enough to be able to play ordinary keyboard instruments quite well because, being a new instrument, it needs to be played by a master who understands its strength and who diligently practices on it and makes a particular study of the varied pressure on the keys needed to achieve a graceful diminuendo and crescendo at the proper time and place; and to find out which delicate pieces suit it best, and to play especially arpeggiando and to separate the parts [dynamically] so that a main subject can always be heard when it appears.

But turning to the particular structure of this instrument, if the maker who invented it knew how to describe it as well as he perfectly knew how to build it, it would not be difficult to explain the artifice to the reader. But as he has not succeeded in that [clear description], I am afraid it is not possible to describe it properly so that one can fully understand the idea and the skill with which it has been brought to function; moreover, I no longer have the instrument before my eyes but only those notes made while examining it, apart from a rough drawing [*disegno rozzamente*] done from scratch.

From Maffei's essay and his notes we learn interesting details, for instance, that Cristofori had been soon confronted not only with praise but also with serious criticisms. Some musicians who tried to play his new instrument apparently found it too difficult to control the touch of the keys with the necessary subtlety, while others complained that the sonority of the instrument was not at all brilliant and loud enough to compete with a normal cimbalo. It is obvious that Maffei, who admired Cristofori's invention, wanted to emphasize its importance and considered it necessary to defend the invention. He certainly helped promote the new *cimbalo con piano e forte* with his article.

It seems probable (and Maffei's report indirectly suggests this) that Cristofori was not completely satisfied with his first hammer-harpsichord and after 1700 continued to experiment with details and invent new or better solutions for remaining problems. Apparently he built soon another cimbalo action with perhaps a simpler hammer mechanism. Maffei in his article of 1711 tells us of such a different construction:

Quest' invenzione è stata dall' artefice ridotta ad effetto anche in altra form, avendo fatto un altro gravecembalo pur col piano e forte con differente, e alquanto più facile costrutta, ma nondimeno è stata più applaudita la prima.<sup>24</sup>

(This invention has also been developed by the maker in another form, since he has built another *gravecembalo*, likewise with piano e forte in a different and somewhat simpler construction, but nevertheless, the first has been more applauded.)

At this time a new expressive *cantabile* style in instrumental music had developed in Italy. Keyboard music composers wrote melodically charming cantilenas structured in short periods and tended to like simpler textures with characteristic motifs often combined with their echo repetitions. Compositions in this style were in need of many dynamic gradations. Therefore, the new harpsichord con piano e forte must have aroused the interest of many musicians in Italy. However, this new instrument demanded a new playing style, a new subtle touch with all gradations of finger pressure, yet also a far more forceful one than those touches musicians used on a clavichord. Apparently, this kind of a careful control of touching the keys was not at all easy for organists and harpsichordists to achieve. Actually, it also became a problem and a cause for criticism later in Germany.

Maffei's preserved notes from 1709 were indeed neither clear nor comprehensive enough to immediately understand mechanical details of Cristofori's invention, but nevertheless they provide some valuable information. He demanded from Cristofori a design of his action with explanations in 1709, which he finally managed to get, but only in form of a rough drawing. In spite of his reluctance to approach the difficult task, Maffei did attempt a description of the action of the new instrument. Pollens offers the best detailed analysis of his efforts and supplies an explanation of the terms he uses. The text in Maffei's article (again quoted here based on the English translation of Pollens) continues:

In the first place we can state that instead of the usual jacks [*salterelli*] that sound with the help of quills, there is a row of little hammers [*martelletti*] that strike the strings from below. On the tops the hammers are covered with buckskin. Every hammer's end is inserted into a circular butt or *rotella* that renders it movable, and these butts are strung together and embedded in a rack. . . . To prevent the hammers when falling back after their blow should not rebound and strike the string a second time, they are made to fall and rest upon crossed little cords of silk, which receive them without noise. But because, in instruments of this type, it is necessary to suppress, that is to stop, the sound, which by continuing would confuse the notes that follow, for which purpose spinets have cloth at the ends of the jacks, since it is also necessary in this

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24. Ibid., 241.

new instrument to deaden it entirely and quickly, therefore each of the aforesaid levers has a little tail-piece, and on these tail-pieces is placed a row, or rather a register, of jacks, which from their use might be called dampers (*spegnitoi*). When the keys are at rest, these touch the string with cloth, which they have on their top, and they prevent the vibration which would be caused by the vibration of other struck [strings]; but when the key is pressed, and the point of the lever is raised, the tail-piece is consequently lowered, and with it the damper, so as to leave the string free to sound, which then dies down as soon as the key is released, with the damper rising again to touch the string. However, in order to understand more clearly every movement of this mechanism, and its internal contrivance, examine the diagram and observe its components item by item.

In his next paragraph Maffei tries to explain why and how the wrestplank is turned around, and he mentions the important fact that the strings had to be thicker than normal. He also explains that Cristofori used thin leather and cloth at all points of contact wherever any disturbing noise or rattle might otherwise occur. As mentioned above, Maffei then reports that Cristofori had also made a second cembalo with hammers with a different action, simpler but altogether less satisfying. Afterward, in a long paragraph, Maffei says that Cristofori pointed to the necessity of a hole to let the air out of the corpus, which, however, he considered to be not necessarily the usual rosette; he also pointed to the important fact that Cristofori freed the soundboard from being fixed to the side wood, and finally he described some few additional necessities.

It is understandable that in the main part of his article, the Marchese found it desirable to offer his readers this lengthy detailed description of Cristofori's new cimbalo. Pollens rightly has pointed to "the fact that this distinguished literary figure [Maffei] undertook the remarkable challenge of describing a new and complex mechanical device," and considers it a sign that "provides some indication of the broad interest generated among intellectual circles over Cristofori's piano."<sup>25</sup> Indeed, Maffei's article contradicts the still widely held impression that there was a lack of interest in Italy in Cristofori's new instrument among musicians and *dilettanti*.

Marchese Maffei's motivation to write in detail about Cristofori's invention of the hammer-harpsichord was certainly caused by his genuine personal enthusiasm for the new cimbalo, which he had probably heard demonstrated by Cristofori himself. But the motivation could also have been aroused by compassion with the inventor when hearing of immediate and perhaps really unjust criticisms and by noticing Cristofori's disappointment that his new cimbalo apparently did not get the praise it deserved.

In preparing his article, Maffei obviously wanted all readers to understand the enormous difficulties Cristofori had managed to overcome, and he pointed to the great merit this invention deserved. It is questionable, however, whether the published rough design allowed other instrument builders to imitate Cristofori's invention. Perhaps Cristofori was

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25. *Ibid.*, 56.





dynamic flexibility. Furthermore, the new instrument demanded from the musicians—apart from the necessary practice to achieve an especially subtle touch—the acceptance of a new kind of sound, softer and darker and more neutral in timbre than that of the normal harpsichord with quills.

The fact is well-known that in Italy, as in France and England, clavichords were built as simple instruments and in general not highly valued by professional keyboard players. Hardly anybody played them for private enjoyment or performances. In these countries their use was limited to mere practical purposes mainly by singers. This is one of the reasons why a refined touch on the new piano was most likely more difficult to achieve for Cristofori's Italian colleagues, who were accustomed to the constantly strong strokes needed to play organs and quilled harpsichords. For them, a challenging amount of practice time as well as special efforts were necessary for harpsichordists to master the new keyboard technique with soft touch gradations. Even today, trained harpsichordists usually have more problems with learning to master the *fortepiano* touch than trained pianists, while at the same time pianists used to Steinways or Bösendorfers sometimes struggle for weeks to get the needed "light weight" arm that an eighteenth-century pianoforte needs to sound at its best. This was easier for those German musicians during the eighteenth century who used to play clavichords to get the necessary touch control needed to play the new instrument.

Maffei's remark that in 1709 Cristofori had made no more than three pianos should probably not be taken literally; it is likely that in 1709 Cristofori had made only three pianos to his own satisfaction, pianos that he found good enough to give them out of his hands and to sell them. One of these three instruments was probably the one acquired in 1702 by the castrato Carlo Antonio Zanardi from Bologna, because in his will of 1703 he left a *cimbalo con martelli* made by Cristofori to the castrato Francesco de Castris, who was in the service of Prince Ferdinando.<sup>27</sup> Another piano was apparently purchased by the Grand Prince Ferdinando with the intention to present this new "raro cimbalo" to Cardinal Pietro Ottoboni in Rome; this fact we learn from a preserved repair document of 1716, when Ottoboni's piano was sent back to Florence to be repaired. The third *cimbalo col piano e forte* Cristofori probably sold to Prince Ferdinando—the prince had acquired it for his musical instrument collection.

As mentioned above, between 1688 and 1698 Cristofori received a regular salary from Prince Ferdinando's *Guardaroba* plus eventual extra payments. However, no regular payment can be documented afterward, and only a few documents, which apparently always concerned special repair services, exist that refer to any extra payments after 1700. All this speaks for a new arrangement of the employment ties between Grand Prince Ferdinando and Cristofori after 1698. The prince may have been forced to dismiss Cristofori due to his

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27. Pollens, *The Early Pianoforte*, 53. See also *The New Grove Dictionary of Opera*, s.v. "Zanardi."

own—by then disastrous—financial situation, as O'Brien has discovered.<sup>28</sup> It is also possible that Cristofori, after finishing his first *nuovo cimbalo*, felt naturally proud and perhaps took care himself to regain his complete freedom. By then he owned a house and his independent workshop and, as a home owner, he probably had become automatically a citizen of Florence. As David Sutherland has stated,<sup>29</sup> it may well have been the case that Cristofori preferred to make his own way in the open market, "if only because the Medici purse had proven not to be entirely reliable."<sup>30</sup> According to O'Brien, after Ferdinando's death unpaid invoices for repair work had accumulated to an enormously high sum. He writes: "As late as 1720 Cristofori's unpaid balance of 300.4.7.4. scudi on his invoices to the Grand Prince was recorded in the volume of Ferdinando's debtors and creditors as still outstanding."<sup>31</sup>

It seems therefore plausible that after 1700 Cristofori had indeed the freedom to build and sell his instruments in complete independence. When Cristofori regained this independence, he first may have worked with only one assistant, but later he must have had at least two helpers. It is not known in which year his most famous pupil, Giovanni Ferrini, started to work for him—perhaps first as an apprentice and, after the training years, the usual three more years as journeyman. Eventually he became a master himself. A picture of his perhaps earliest instrument is a beautifully decorated large harpsichord with quills, signed "Giovanni Ferrini Florentinus fecit anno Domini 1699." It is preserved in a museum in Stuttgart/Germany.<sup>32</sup> When Cristofori became seriously ill, Ferrini worked independently and creatively as master instrument builder, able to take over all the tasks and orders of his teacher. Finally, after Cristofori was too old for any kind of work, Ferrini first inherited his workshop and finally continued there to build and sell his own instruments. Pollens's article "Three keyboard instruments signed by Cristofori's Assistant Giovanni Ferrini" refers to an advertisement in "The Public Adviser" of May 7, 1774, offering a "Piano Forte harpsichord made in Florence."<sup>33</sup> (It is likely that "Piano Forte harpsichord" meant a combined instrument.)

In the late summer of 1702, at the invitation of Prince Ferdinando, Alessandro Scarlatti and his son Domenico came to Florence. Alessandro Scarlatti had agreed to compose an opera for the theatre in Pratolino. For that purpose and to supervise its staging, he remained in Florence until the spring months of 1703. However, his seventeen-year-old

28. O'Brien, "Bartolomeo Cristofori at Court in Late Medici Florence."

29. See David Sutherland, *Bartolomeo Cristofori's Paired Cembalos of 1726*, in: *Journal of the American Musical Instrument Society*, vol. XXVI/2000, p. 30.

30. David Sutherland, "Bartolomeo Cristofori's Paired Cembalos of 1726," *Journal of the American Musical Instrument Society* 26 (2000): 30.

31. O'Brien, "Bartolomeo Cristofori at Court in Late Medici Florence," 85.

32. See F. J. Hirt, *Meisterwerke des Klavierbaus. Geschichte der Saitenklaviere von 1440 bis 1880*, Olten 1955, p. 225.

33. Stewart Pollens, "Three Keyboard Instruments Signed by Cristofori's Assistant Giovanni Ferrini," *Galpin Society Journal* 44 (1991): 93.

son Domenico, already known as a gifted keyboard player and employed in Naples as an organist, had to return to Naples in November of 1702, so his sojourn was shortened to three or four months.

Domenico Scarlatti was the first great keyboard composer-performer, it has been generally assumed, who not only met Cristofori in Florence but also tried out the new *cimbalo che fa il piano e il forte* and learned to play it properly. Obviously he was fascinated by the new possibility of flexible dynamics because apparently it was Domenico Scarlatti who introduced the new Cristofori instruments in Portugal after 1719. During those months Scarlatti spent at the Medici court in 1702, there certainly was enough time at his disposal to become intimately familiar with Cristofori's new *cimbalo con martelli*.

In some of what are probably Scarlatti's early sonatas, we find various hints that he experimented with new technical possibilities. Obviously, the pianoforte inspired his creative mind. He must have become an enthusiastic admirer of Cristofori's invention because, in all probability, it was that enthusiasm for the piano that prompted the king of Portugal to order several new instruments from Cristofori when he engaged Scarlatti. The king's daughter, Princess Maria Barbara, became Scarlatti's pupil in Lisbon, and when she married the Spanish crown prince and moved to Seville in 1729, Scarlatti followed her and, except for a few trips to Italy, spent the rest of his life in her service in Spain (see chap. 3). Arriving with Scarlatti in Seville in 1729, Crown Princess Barbara apparently immediately ordered a hammer-harpsichord from Florence. Scarlatti's personal great interest in Cristofori's new instruments explains best the acquisition of pianos at the royal courts in Portugal and Spain. It cannot have been a mere coincidence that Scarlatti took great care to see that at least half a dozen of Cristofori's and Ferrini's new pianos were exported to Portugal and Spain.

Prince Ferdinando's admiration of Scarlatti as a brilliant keyboard player in Florence in 1702 is confirmed by a letter from Alessandro Scarlatti to Prince Ferdinando, written in 1705, in which Alessandro referred to the prince's knowledge of the virtuoso abilities of his son. Domenico was about to visit Florence again in 1705, this time without his father, and Alessandro apparently hoped that the Florentine court would offer Domenico a position. That did not happen, but Prince Ferdinando's letter to a nobleman in Venice recommending Domenico as a virtuoso musician makes it obvious that the prince highly valued the keyboard playing of Domenico.

As observed above and reported by Maffei, Cristofori must have been disappointed that at first his newly invented *cimbalo con piano e forte* did not generally meet with great enthusiasm. It may have taken him some time to understand that musicians missed the bright sound of a normal harpsichord with quills, and he had to admit that the sound of his new *cimbalo* without quills and with only a hammer action was indeed softer, darker, and not at all as brilliant as that of a normal harpsichord. Being a performer himself, he himself may have missed the brilliant sound of quills. Evidently, his understanding of this lack as a defect may soon have given him the idea to consider the construction of a combined instrument,

the combination of a harpsichord with quills and an action with hammers, an instrument that allows the enjoyment of brilliance and dynamic flexibility as well. Today we call these instruments harpsichord-pianos.

It is possible and likely that Cristofori remembered the old tradition of combining instruments, and perhaps he even had heard of Cricca's or Todini's instruments. Probably shortly after 1711, and thus in the second decade of the century, he may have started to consider the invention of a combined instrument, and he may have worked on solving the construction problems of such a combination of the two kinds of harpsichord, perhaps with the help of his assistant Giovanni Ferrini.<sup>34</sup> The text of an entry on Ferrini in a dictionary (that appeared anonymously in the second half of the eighteenth century and once was in the possession of Padre Martini in Bologna) hints at Ferrini's involvement and collaboration:

Ferrini Giovanni morto in Fiorenze sua patria nell' anno 1758 fu celebre artefice di graveceembali, ne fu ottimo resarcitore, fu il migliore di due scolari di Bartolomeo Cristofori da Padova; costruì graveceembali a martelli sulla norma e invenzione del suo maestro con aggiungervi di più il poterli sonare ancora di penne, e fu il primo a costruire graveceembali con le corde di minugia.<sup>35</sup>

(Ferrini Giovanni, who died in his birthplace, Florence, in the year 1758, was a famous harpsichord artisan, an excellent restorer, and the better of the two students of Bartolomeo Cristofori from Padua; he made harpsichords with hammers according to the standards and invention of his master and added to them so that they also could be played with quills, and he was the first to build harpsichords with gut strings.)

It is obvious that Ferrini had learned from Cristofori how to make hammer-harpsichords, and it seems likely that under the guidance of his teacher, he already learned how to construct the first combined instruments with quills and hammers in those years after 1711. Such a considered early existence of combined harpsichord-pianos in Florence is not an absurd assumption; verifiable evidence suggests that in Cristofori's lifetime combined harpsichord-pianos were built in his workshop. The notion that an instrument of this kind was in the possession of Princess Maria Barbara of Asturia (later Queen Barbara of Spain), was once proposed by Hubert Henkel and by John-Henry van der Meer<sup>36</sup> (although I was told that after protests in Italy born of linguistic differences, both authors became insecure

34. Unfortunately, no document proves clearly that Cristofori or Ferrini built combined harpsichord-pianos before 1715; it is likely, however, because the French guild members spoke of a foreign invention that might hinder Jean Marius's pursuit of a patent for his inventions. Albert Cohen, "Jean Marius' *Clavecin brisé* and *Clavecin à maillets* Revisited: The 'Dossier Marius' at the Paris Academy of Sciences," *Journal of the American Musical Instrument Society* 13 (1987): 23–38.

35. Quoted in Montanari, "Bartolomeo Cristofori," 387–388. This anonymous dictionary was found among the papers of Padre Martini of Bologna.

36. See John-Henry van der Meer, "Cristofori und Ferrini als Hersteller von Kombinations-Instrumenten," in *Studien zur Aufführungspraxis und Interpretation von Musik des 18. Jahrhunderts*, vol. 29: *Zur Weiterentwicklung des Instrumentariums in 18. Jahrhundert*, ed. Thom Eitelfriedrich (Michaelstein, 1986), 86–87.



and doubted the correctness of their observation). But as early as 1712 or 1713 Cristofori and Ferrini may well have considered building combined cimbali (harpsichord-pianos in modern terminology) as the by far best response to the demands of most musicians, because harpsichords with both qualities—the brilliance (due to quills plucking the strings) and the expressiveness and sonority of increased melodic sweetness along with flexible dynamic nuances—addressed the main criticism with which Cristofori's nuovo cimbalo had been confronted in the earliest years of its existence: the lack of brilliance. And if Cristofori considered the hammer action to be a new register for the quilled harpsichord, then his way of listing his cimbalo col piano e forte in 1716 as “Cimbali con un solo registro” (see chap. 2) certainly becomes understandable and even likely if one considers the argument of the French Guild against Marius claiming that his action models were copies of a foreign invention.

Fortunately, a compound instrument in its final mature form and manufactured considerably later by Ferrini has survived the times: it is dated 1746; thus, it was built long after Cristofori's death. It shows a fully developed and refined mechanism, perfectly functioning, and thus, it displays a perfection that was achieved probably after many revisions of details; it is “ein ausgereiftes Produkt” as its proud owner Pier-Luigi Tagliavini observed some years ago (plate 4). The fact that it is from such a comparatively late time does not exclude the possibility that the very first instruments of this kind could have been invented three decades earlier. This harpsichord-piano previously was part of the famous instrument collection of Luigi-Ferdinando Tagliavini in Bologna and belongs now to a museum of that city.<sup>37</sup> The important question of when a combined instrument actually was built in Florence needs some more thought and consideration. Was it only a matter of chance that in 1716 in Paris Jean M. Marius sketched also a combined harpsichord?<sup>38</sup> The Parisian guild members may have known of an invention Cristofori and/or Ferrini had built.

In Vienna in 1725 the organ builder Christoph Leo from Augsburg advertised “*Flügel mit und ohne Kiele*” (harpsichords with and without quills),<sup>39</sup> a wording that apparently meant that he offered normal harpsichords with quills as well as other harpsichords with hammers or tangents. But perhaps Leo meant and offered a combined harpsichord-piano and thus a *flügel mit und ohne kiele* (the term *flügel* referred only to the wing-shaped form of a keyboard instrument—see chap. 2). Leo like Marius might have received a message from Italy that in Florence not only hammer-harpsichords but also combined harpsichord-pianos were built; or perhaps he heard from Paris that Marius designed such an instrument with quills and hammers. He then might have taken such reports as a hint to construct a combined harpsichord-piano as well. Reports and rumors of this kind may

37. This instrument can be seen and heard on Eva Badura-Skoda, *The History of the Pianoforte: A Documentary in Sound* (Bloomington: Indiana University Press, 2013), DVD.

38. “Quatrième clavecin à maillets e à sautereaux” (see below).

39. These *flügel* and other instruments were offered for sale in the “Wiener Diarium” in 1725 (see below).

well have traveled around Europe. It seems at least possible that the manufacturing of a combined harpsichord-piano started in Cristofori's workshop and existed in Florence even before 1715. The late Howard Schott wrote in 1989 in *The New Grove Early Keyboard Instruments* a revised version of some of Edwin Ripin's articles for *The New Grove* (Papermac, MacMillan London 1989). On page 183 of this little book we find the following text:

The earliest experiments [to combine harpsichords with quills and hammer-harpsichords] must predate 1716, when Jean Marius submitted models of four different "hammer-harpsichords" (*clavecins à maillets*) to the Académie Royale des Sciences in Paris, one of which was a combined piano and harpsichord with both hammers and jacks. An "arpicembalo" by Cristofori (listed in a Medici inventory, apparently from 1700) also had hammers and a jack mechanism.<sup>40</sup>

Where Schott learned that such an arpicembalo existed in 1700 or whether Schott personally had discovered a document in Florentine archives telling this fact are unknown to me. But it is probable that the idea of a combined instrument was first that of Cristofori and Ferrini and then taken up by Marius (and later copied by Leo and perhaps also by other instrument builders still unknown to us). The Parisian guild members insisted that foreign inventions existed prior to 1716. Therefore, it seems unlikely that the idea of a combined instruments was developed independently by Marius.

A celebrity by 1712, Cristofori apparently continued to experiment in his own workshop in Florence with his two trained assistants. Maffei's article in the *Giornale dei Lettere d'Italia* and perhaps correspondence between European courts and "men of letters" contributed to his fame. Whether Jean Marius read Maffei's article in Paris or whether a direct connection to the Florentine court (the Medici family acquired a perhaps genuine clavecin brisé made by him) gave him the impulse to design not only a piano action but also a combined keyboard instrument (harpsichord-piano), we do not and probably shall never know, unless correspondence between him and Prince Ferdinando or a Florentine official is discovered and supplies an answer to this question. Albert Cohen studied the "Dossier Marius" in the archives of the Academy of Sciences in Paris.<sup>41</sup> In an excellent article, he reported a dispute between Marius, an independent instrument builder, and the Parisian guilds of instrument makers (*Communauté des maîtres faiseurs d'instruments de musique*). When around 1710 Marius petitioned to receive a letters patent from the French king granting him a 20-year privilege to produce clavecins brisé, the guild protested. In this fight, however, Marius remained successful, the king apparently supported the patent, and the parliament in Paris granted it. In March 1716 Marius submitted to the Academy of Sciences first two designs of pantaleón actions (harpsichords without dampers) and in June 1716 two more designs

40. Edwin Ripin, Howard Schott, John Barnes, G. Grant O'Brien, William Dowd, Denzil Wraight, Howard Ferguson, and John Caldwell, *Early Keyboard Instruments* (London: Macmillan, 1989), 183.

41. See Albert Cohen, "Jean Marius' Clavecin brisé and Clavecin à Maillets," in *Journal of the American Musical Instrument Society* XIII/1987, pp. 23–38.

of hammer actions. The description of the last two designs read in Cohen's translation as follows:

In the report, one action is described as having hammers (*maillets*) entirely replacing the jacks, and the other as providing a portable hammer action keyboard that can be placed on an existing instrument, giving the harpsichordist a choice of hammer or quill action during performance.<sup>42</sup>

The described design of a quilled harpsichord into which a portable hammer action can be placed reminds us not only of Ferrini's extant instrument of 1746 but also of German inventions of later times and of John Merlin's instrument described in a London patent of 1774 and an advertisement (see plate 5) and of those German *pantolon* instruments, which were supplied with keyboards. When Marius in 1716 applied for a letters patent, the guild masters protested, and Marius, in his conflict with the Parisian guild, was not successful. After years of fights with Marius, the guild masters prevented his patent from being registered by the parliament.

Among relevant old reports Cohen found an interesting remark written by a disappointed Marius and wrote about it:

The letters patent for Marius' new hammer action was never registered in parliament, and while available official documents do not specify the reason for this, a statement found in the Dossier Marius does. It is a bitter statement, charged with emotion, in Marius hand. It reflects Marius reaction to the rejection of his hammer action as a new invention, because (it was declared) the idea had been conceived earlier by a foreign builder.<sup>43</sup>

Is this not a document that proves an early invention of combined harpsichord-pianos in Florence?

Due to his untimely death in 1713, Grand Prince Ferdinando never became the ruler of Tuscany. Although Cristofori lost his mentor in that year, he apparently was no longer tempted in 1713 to move back to Padua. In 1716 Cristofori was appointed officially the keeper of the late Prince Ferdinando's musical instrument collection, and Duke Cosimo III requested that Cristofori compile a list of the late prince's collection of instruments. The list exists, written by Cristofori himself and with the following title:

Inventario di tutti gli instrumenti da Sonare di corde, e fiato, pervenuti dall' Eredità del Ser.mo Principe Ferdinando di G.M. consegnati di comandamento di S.A.R. a Bartolomeo Cristofori Custode dei medesime.

(Inventory of all the string and wind instruments from the inheritance of His Highness Prince Ferdinando, delivered at the order of His Highness to Bartolomeo Cristofori, guardian of the same.)

According to Giuliana Montanari, the inventories from both 1700 and 1716 are located in the Florentine State Archive (Guarderoba Medicea 117 and 1241 resp.) and have been made

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<sup>42</sup>. Ibid., 30.

<sup>43</sup>. Ibid., 34.

available through modern publications.<sup>44</sup> The inventory of 1700, from which the excerpt about the “Arpicimbalo di nuova invenzione” was quoted above (plate 3), listed seven instruments as being built by Cristofori, including the first described hammer-harpsichord, a number that included several harpsichords with quills and a spinettone. It was first published by Leto Puliti in 1869 and recently published again by Vinicio Gai.<sup>45</sup>

Thanks to Giuliana Montanari, today we know more about the incompleteness of both inventories of 1700 and 1716. Montanari wrote:

They list 38 and 47 keyboard instruments respectively. Such inventories usually record those objects found at the date the inventories were made and apply to one specific place; however, and indeed, the 1700 and 1716 inventories do not take account of those instruments that were in other ducal residencies, or of other instruments that were on loan to musicians, court functionaries or other members of the ducal family. For this reason, neither the 1700 inventory nor that of 1716 can be taken to represent the Prince’s entire collection. Nevertheless, a collation of these two inventories with other unpublished ones of various dates shows that the collection included a total of 60 keyboard instruments in 1700, and 79 in 1713, the year Prince Ferdinando died.<sup>46</sup>

In the inventory of 1700, Prince Ferdinando’s collection lists about 130 instruments, among them only thirty-eight keyboard instruments. The Medici family owned, however, many more keyboard instruments, namely, sixty instruments, many of them valuable and made by famous makers. These sixty keyboard instruments, Montanari counted in 1700, comprised twenty-two harpsichords, twenty spinets, two *clavicytheria*, eight organs, three *claviorgana*, two clavichords, one hammer-harpsichord (Cristofori’s first piano), and two *Geigenwercken*.

Montanari rightly pointed to the possibility that in 1702 Domenico Scarlatti saw and admired in Florence not only the first cimbalo con martelli but also many of the other interesting instruments of the Medici collection. It was a collection of an encyclopedic character, as all the different known ways of sound production on keyboard instruments were represented: dynamic flexibility could be achieved not only on clavichords but also on the so-called *geigenwercken*, acquired by the Medici family. Interestingly, also “experimental examples of harpsichords” were listed—a proof of the interest in developing a harpsichord with flexible dynamics.

Between 1701 and 1713, Prince Ferdinando added an additional nineteen keyboard instruments to his collection, among them a valuable old clavichord, but then also three

44. Giuliana Montanari, “The Keyboard Instrument Collection of Grand Prince Ferdinando de’ Medici at the Time of Alessandro and Domenico Scarlatti’s Journeys to Florence, 1702–1705,” in *Domenico Scarlatti in Spain: Proceedings of FIMTE Symposia 2006–2007*, ed. Luisa Morales (Almería, Spain: Asociación Cultural LEAL, 2009), 136 n4.

45. Vinicio Gai, *Gli strumenti musicali della corte Medicea e il Museo del Conservatorio Luigi Cherubini di Firenze* (Florence: Licosa, 1969), 6 ff.

46. Montanari, “The Keyboard Instrument Collection of Grand Prince Ferdinando de’ Medici,” 119.

instruments listed in 1716 as *cimbali con un registro*, instruments that also were mentioned as having been made by Cristofori. The curious wording Cristofori used for listing these three instruments has created a puzzle for modern organologists and led to many disputes. Tagliavini, Pollens, and other organologists could not believe that pianos were meant by this curious name. Montanari was the first scholar who dared in writing to express her assumption that Cristofori meant and named his pianos this way (see chap. 2).

We are confronted with a riddle and a number of questions when comparing the lists from 1700 and 1716. At first glance, it seems that in 1716 not even one *cimbalo che fa il piano e il forte* is listed, and no *cimbalo con martelli* is found in the list. Why was not at least the very first *arpicimbalo che fa il piano e il forte*, described in the inventory of 1700 as belonging to Prince Ferdinando, mentioned in the list of 1716? That Prince Ferdinando did not own at least this very first *cimbalo con piano e forte* or one of the improved *piano-forte* instruments from a later year is quite unbelievable. Elsewhere it is documented that Cristofori made his best instruments for Prince Ferdinando. In the 1716 inventory, only a large number of *cimbali* (without explaining words whether the harpsichord strings were struck or plucked) were listed together with these three *cimbali con un registro*. Thus, the most important problem concerns the answer to the question: what instruments are meant with three *cimbali con un registro* and are these instruments not the missing pianos? The prince died in 1713. Cristofori was appointed curator of the instrument collection in the years after Ferdinando's death and personally wrote and signed this inventory list of 1716. There exists more than one reason for assuming that the Medici court still owned at least one if not more Cristofori pianos in 1716 and thereafter; at least the one mentioned in the inventory of 1700 should have been part of Prince Ferdinando's Musical Instruments Collection. But apparently no such *cimbalo* can be identified if we do not count these latter instruments as pianos—neither in this inventory list of 1716 or in the later inventory of 1732, where, however, four instead of three *cimbali con un solo registro* are listed. In the next chapter we shall answer positively the question “Are these three *cimbali* the missing pianos” and offer a new explanation why Cristofori choose this odd name for them.

The inventories of 1700 and 1716 of Prince Ferdinando's collection had already received a special discussion by Montanari in her article in *Early Music* of 1991.<sup>47</sup> In one of her more recent articles, Montanari expressed more clearly her conviction that *cembali con un registro* meant *hammer-harpsichords*. Her commentary reads

Between 1700 and 1713 the Prince added to his collection another clavichord, again by Domenico da Pesaro, another small organ, a large positive organ by Lorenzo Testa with seven stops, and three *cembali a martelletti* by Cristofori [with these words Montanari clearly refers to the “*tre cimbali con un registro*”] . . . These additions to the collection clearly point to the Prince's interest in a variety of instruments and in a variety of different sounds. . . . Variation in volume was available in many of the Prince's instruments, either by adding and excluding stops in harpsichords,

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47. Ibid.



organs and claviorgana, or by modifying the pressure of the touch in clavichords, pianos and Geigenwercken. . . . The gathering of all the possible timbres including the sounds of a variety of harpsichords with differing sets of stops, harpsichords with plectra and some with hammers, the sounds of clavichords, organs and Geigenwercken, . . . seems indeed to have been the fundamental principle on which the Prince built his collection.<sup>48</sup>

Cristofori died in 1732 (1731, according to the Julian calendar). The entry on Cristofori in the anonymous mid-eighteenth-century dictionary (found among the papers of Padre Martini and already mentioned above in connection with Ferrini) reads like a necrologue.<sup>49</sup>

Christofori Bartolomeo da Padova morto in Firenze . . . fu celebre artifice di gravecembali, ne fu insigne resarcitore, rendendo ottimi i buoni già costruiti da' migliori antichi autori, e fu inventore da gravecembali a martelli, i quale producono diversa qualità di voce sì per il colpo de martelli nelle corde, sì ancora per l'interna diversa struttura del corpodello strumento, ma questa é non visibile nell'esterno . . . i migliori strumenti, que egli fece, furono per Ferdinando de' Medici Gran—Principe di Toscana suo protettore e figliuolo del Granduca Cosimo III.<sup>50</sup>

(Christofori Bartolomeo of Padua died in Florence. . . . he was the famous harpsichord maker, a distinguished restorer rendering even better good instruments made by other past masters, and he also was the inventor of large harpsichords with hammers which produce a different quality of sonority both on account of the hammers striking the strings and the completely different internal structure of the body of the instrument, not visible from the outside. . . . The best instruments that he made were for Prince Ferdinando de' Medici Great Prince of Tuscany, his protector and son of the Grand Duke Cosimo III.)

At the end of his article, the anonymous author of this dictionary mentions that he owns a piano made by Cristofori dated 1720.

As stated, in 1716 Cristofori identified only seven keyboard instruments in his inventory list as made by him, among them spinets and quilled harpsichords besides the “tre cimbali con un registro.” What happened to the “best instruments that he made . . . for Prince Ferdinando” mentioned in this dictionary article if we do not identify them with those three cimbali con un registro? It is the merit of Giuliana Montanari to insist when writing her articles that her understanding of the mysterious wording Cristofori used for listing his pianos in 1716 is the only plausible explanation of an otherwise insoluble riddle—an opinion that I fully share.

Today only three pianos built by Cristofori are extant, and these three pianos were built and dated long after Maffei's article appeared in 1711. The oldest one stems from 1720 (only theoretically it could have been identical to the one in the possession of the anonymous dictionary writer), the others are from 1722 and 1726, and all three are preserved now in museums. They were signed on the nameboard with the inscription

48. Montanari, “The Keyboard Instrument Collection of Grand Prince Ferdinando de' Medici,” 134.

49. Early Music 1991, 383.

50. Quoted in Montanari, “Bartolomeo Cristofori,” 383.

BARTHOLOMAEUS DE CHRISTOPHORIS PATAVINUS INVENTOR  
FACIEBAT FLORENTIAE

and afterward each of the proper dates follow in Roman numerals. The oldest of these pianos has been in the possession of the Metropolitan Museum of Art in New York since 1895. This piano once could have been the property of Prince Ferdinando's widow Violante Beatrice of Bavaria, who after the death of her husband became *governatrice* of Siena in 1717.<sup>51</sup> Only slightly younger is the extant Cristofori piano dated 1722. It is found today in Rome in the *Museo Nazionale Strumenti Musicali*; the rich decoration and perhaps other details caused the suspicion that it once had been the property of Alessandro Marcello (see below). The third extant piano, signed and dated by Cristofori with 1726, is now in the possession of the *Musikinstrumenten-Museum* of the University of Leipzig in Germany. Apart from these three surviving pianos, there exists a single hammer action of Cristofori that Pollens dated "ca 1725";<sup>52</sup> it was kept in private possession in Vancouver, Canada.

Important construction details of the extant hammer actions of Cristofori's pianos differ considerably, and these differences make it obvious that Cristofori constantly, and probably right from the beginning in 1700, continued to experiment and work on improvements. Pollens offers the best explanation in English of all these construction details, starting with a description of Cristofori's invention and Maffei's incomplete explanations of 1711 and finishing with the studies of the differences found in the extant piano actions of the 1720s. Pollens's thorough investigations allow an evaluation also of Cristofori's final achievements and show the main differences among the extant actions that Cristofori built.<sup>53</sup> As restorer of the New York Metropolitan Museum of Art's Musical Instruments Department in the 1980s, Pollens was responsible for a careful restoration of the Cristofori piano from 1720 owned by this museum, and it was admirable how successfully he reconstructed original parts and brought the piano into a playable condition.<sup>54</sup>

In 1726 an unknown Florentine painter made a portrait of Bartolomeo Cristofori. It eventually came into the possession of the Prussian State Library in Berlin. During World War II, it was destroyed, but fortunately it had been reproduced and published by Georg Schünemann in the early 1930s. It shows a drawing of the hammer action in Cristofori's hand, and this is described by Schünemann<sup>55</sup> and Pollens as well.

During the late 1720s Cristofori probably became seriously ill. When in 1729 the Spanish Crown Princess Barbara from Seville ordered at least one if not two pianos in Florence, it

51. Pollens, *The Early Pianoforte*, 89.

52. *Ibid.*, 67.

53. *Ibid.*, 62–63.

54. The beautiful sound of this instrument can be heard on a DVD by Badura-Skoda, *The History of the Pianoforte*.

55. Georg Schünemann, "Ein Bildnis Bartolomeo Cristoforis," *Zeitschrift für Musikwissenschaft* 16 (1934): 534–536.

seems that Cristofori was already too ill to work himself on building or finishing an instrument—he had to leave this task to his assistant Ferrini, who took care of this prestigious order and sent the piano(s) to Spain. Toward the end of his life it is obvious that Cristofori considered Ferrini his best pupil and assistant and a worthy successor as master in his workshop. In Cristofori's first will, dated March 25, 1728, Ferrini was mentioned as his successor and heir to his workshop with all the tools.

In a second will from 1730, however, Cristofori left nearly all his possessions to the "sisters Del Mela in gratitude for their continued assistance lent to him during his illnesses and indispositions, but also in the name of charity."<sup>56</sup> According to this second testament, Ferrini received only five scudi:

per ragione di legato e per qualche recognizione per la buona servitù prestatagli<sup>57</sup>

(for the reason of the bequest and in appreciation of his accomplished good services)

In this second will Cristofori left even all workshop tools to the sisters Del Mela, who sold them to Ferrini. Why? Had Cristofori become dissatisfied and felt perhaps disappointed about Ferrini's financial behavior and his possible decision to keep the payments from Spain for himself? However, in changing his will, it seems that Cristofori's main purpose was to show his gratitude to the Del Mela sisters Anna and Margherita. They were rewarded properly through the fact that Ferrini had to pay them probably a considerable amount of money for getting back the workshop tools.

The Del Mela sisters probably were related to Domenico Del Mela (1683–after 1751), who must have been—at least temporarily—also a pupil of Cristofori. He is known as the maker of an extant upright pianoforte dated 1739, currently kept in the Museo del Conservatorio in Florence. This instrument used the mechanism of Cristofori's action.

After Cristofori's death, Ferrini succeeded in continuing to work in Cristofori's workshop, which is still exhibited in the Palazzo Vecchio in Florence,<sup>58</sup> and he did so until his own death in 1755. But unlike Cristofori, Ferrini neither was appointed curator of Prince Ferdinando's instrument collection nor did he become a member of the Medici household. After Cristofori's death "Pietro Mazzetti occupa il luogo vacante di strumentario della Real Casa."<sup>59</sup> Occasionally, however, Giovanni Ferrini was asked to repair some instruments of the court collection. He remained working as an independent freelance craftsman and teacher of his two sons, Giuseppe and Filippo, who later also were asked to repair some instruments of the court collection.<sup>60</sup>

<sup>56</sup> Pollens, *The Early Pianoforte*, 55.

<sup>57</sup> Ibid.

<sup>58</sup> This is also seen on the DVD of Badura-Skoda, *The History of the Pianoforte*.

<sup>59</sup> Pierluigi Ferrari and Giuliana Montanari, "Giovanni, Giuseppe e Filippo Ferrini: Cembalari della corte del granducato di Toscana—Uno studio documentario," in *Musicus perfectus: Studi in onore di Luigi Ferdinando Tagliavini* (Bologna: Pàtron, 1995), 29–48.

<sup>60</sup> Ibid., 30.

Cristofori was seventy-six years old when he died in Florence on January 24, 1732 (1731, according to the Julian calendar). On this occasion, Niccolò Susier, a lutenist employed at the Medici court, wrote in his diary,

Mori Bartolomeo Cristofani detto Bartolo Padovano famoso strumentaio del ser.mo gran principe Ferdinando di felice memoria et questo fu un valente huomo in fabbricare clavicembali, ed anche inventore del cimbalo del piano e forte che si è fatto conoscere per tutta l'Europa servitore ne di esso, la maestà del re di Portogallo con pagare detti istrumenti per insino 200 luigi d'oro.<sup>61</sup>

(Bartolomeo Cristofani, alias Bartolo Padovani, famous instrument maker of the serene Grand Prince Ferdinando, died; highly regarded and memorable he was a worthy personality for the building of *clavicembali* and the inventor of the *cimbalo di piano e forte*, a fact for which he became known all over Europe. His majesty the king of Portugal paid for those instruments two hundred gold ducats.)

Susier's interesting remark that the king of Portugal had purchased pianofortes from Cristofori for as much as two hundred louis d'or, an enormous sum at that time, is informative as it confirms the assumption that when Domenico Scarlatti was offered a position in Lisbon in 1719, he probably demanded that Cristofori's new instruments should be ordered. The Portuguese king may have received as many as three *cimbali col pian' e forte* instruments for such an amount. This note also confirms that, toward the end of his life, Cristofori was considered a famous celebrity, known as inventor of the *cimbalo del piano e forte* (or *cimbalo con un solo registro*) who—at least according to his musician colleague Susier—"has become known all over Europe."

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61. Niccolò Susier, *Diario di tutto quello che è seguito nella città di Firenze*, ms., Biblioteca Ricciardiana, Florence, Acquisti diversi 54, vol. 8, no. 3, quoted in Pollens, *The Early Pianoforte*, 54–55.