

Zeitschrift: Publikationen der Schweizerischen Musikforschenden Gesellschaft. Serie 2 = Publications de la Société Suisse de Musicologie. Série 2

Herausgeber: Schweizerische Musikforschende Gesellschaft

Band: 44 (2004)

Artikel: The combination of the harpsichord and the piano in the eighteenth century

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DOI: <https://doi.org/10.5169/seals-858767>

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The combination of the harpsichord and the piano in the eighteenth century

Michael Latcham

Introduction

Harpsichords and pianos were both prized throughout the eighteenth century; Bartolomeo Cristofori, Giovanni Ferrini, Manuel Antunes, Gottfried and Johann Heinrich Silbermann, Johann Andreas Stein, Pascal Taskin, Joseph Kirkman, John Broadwood and Sébastien Érard are the most famous among the builders who made both.¹ The harpsichord and the 'harpsichord with hammers' coexisted peacefully; they were not so much seen as opposites, but as two sorts of compatible harpsichords, two *Clavier* with different stops, one using plectra, the other hammers. The decoration of the two magnificent 1726 *cembali* by Cristofori in the Musikinstrumenten-Museum in Leipzig, one with hammers and the other with quills, shows that they were originally made as a pair.²

Harpsichord-pianos are special manifestations of the idea of combining different instruments to create a single expressive *Clavier*. Reports of eighteenth-century keyboard instruments combining organs, regals, pianos, clavichords, bells, glass harmonicas, *Geigenwerke*, harpsichords and others, abound, reflecting the mechanical ingenuity of their makers and a delight in placing a rich variety of musical timbres at the disposal of a single player. The range of sounds produced by the actual combined instruments was often augmented by effects which were designed to imitate still more instruments. In 1783, for instance, P. J. Milchmeyer announced in C. F. Cramer's *Magazin der Musik* that he had designed an instrument which gave the player more than 250 combinations of sounds.³ He emphasized that his instrument only used strings, that is, there were no additional organ pipes, and yet could imitate woodwind instruments including the flute, the clarinet and the bassoon, as well as stringed instruments like the guitar, the viol and the lute. Milchmeyer's instrument was a two-manual harpsichord combined with a piano and could be played by two people at once.

1 I would like to thank Thomas Steiner for his patience and for his many useful suggestions while editing this work.

2 See David Sutherland, 'Bartolomeo Cristofori's paired cembali of 1726', *Journal of the American musical instruments society*, vol. XXVI, 2000, 5–56. The inv. nos. are: 85 (with jacks) and 170 (with hammers).

3 *Magazin der Musik*, I/2, ed. C. F. Cramer, Hamburg 1783, 1024–8.

The harpsichord may have had different types of plectra; in any case there must have been additional stops affecting the vibration of the strings like a buff stop or to modify the hammer blow in the piano action, for instance a moderator. Milchmeyer called the piano a *Pantalon*, and described the combination of the harpsichord and the *Pantalon* on one keyboard as particularly special.

The term *Pantalon* needs some explanation.⁴ It was derived from the name Pantaleon Hebenstreit, the maker and player of a huge hammered dulcimer. He was born in 1667 and died in 1750. His performances attracted considerable attention among musicians, including the lutenist Count Logi and the composers Kuhnau and Telemann, and among instrument makers such as Fickert, Christoph Gottlieb Schröter and Gottfried Silbermann. Hebenstreit showed his instrument at some of the major courts in Europe. In 1705 Louis XIV is said to have been so impressed by Hebenstreit's playing that he gave the instrument the name *Pantalon*, in honour of its maker.⁵ Hebenstreit himself probably had *Pantolons* made with keyboards. Such instruments, as well as other small pianos, also came to be known as *Pantolons* or *Pantaleons*, sometimes corrupted to other names like *Bandaleons*. The word *Pantalon* was still used in the nineteenth century; in Poland it appears to have been used for all types of piano, even the grand.⁶

Against the background of Cristofori's brilliant invention in about 1700 of an *Arpicimbalo ... che fa il piano, e il forte*, the forerunner of the modern grand piano, the lasting importance of Pantaleon Hebenstreit's dulcimer may perhaps have been over-estimated.⁷ But the *Pantalon* does provide clues for understanding some of the additional stops available on various early pianos. Two salient features of Hebenstreit's dulcimer in this context were, first, the *Pantalon* or dulcimer was in principle not damped except by using the hand or arm to silence the strings, and, second, the *Pantalon* was played either with bare wooden beaters or with beaters covered with a soft material, wool or leather. In the history of the piano the absence of dampers is reflected in those early pianos which

4 Heinrich Herrmann was probably the first writer to realise the importance of Hebenstreit and his dulcimer in the development of the piano. See H. Herrmann, *Die Regensburger Klavierbauer Späth und Schmahl und ihr Tangentenflügel*, Erlangen 1927, 2. See also Christian Ahrens, 'Pantaleon Hebenstreit und die Frühgeschichte des Hammerklaviers', in *Beiträge zur Musikwissenschaft*, XXIX/1, 1987, 37–48.

5 One cannot help wondering if Louis XIV was making a joke. However, the term *Pantalon* was used in French and Italian comedy for a clown. See Sarah E. Hanks, 'Pantaleon's Pantalon: an 18th-century musical fashion', in *The Musical Quarterly*, LV/2, April 1969, 217. The name Pantaleon means 'the all-compassionate'.

6 See Jean-Jacques Eigeldinger, 'Chopin and Pleyel', in *Early Music*, XXIX/3, August 2001, 388–407, especially 389–90. Eigeldinger uses the form *Pantalion*.

7 For instance by H. Herrmann in *Die Regensburger Klavierbauer Späth und Schmahl und ihr Tangentenflügel*, Erlangen 1927, especially 2–4.

have no dampers at all and in other pianos in which the strings were normally not damped.⁸ In the latter instruments a knee lever was often used to engage the dampers, the converse of the way in which the sustaining pedal is used in the modern piano. Second, bare wooden piano hammers, frequently found before about 1785, and even occurring in instruments made as late as 1802, reflect Hebenstreit's use of bare wooden beaters. Stops called moderators, with which cloth or leather tabs are inserted between the hammers and the strings, produce an effect similar to that made by Hebenstreit's covered beaters. In the Viennese tradition, the moderator was usually included in the pianos built from about 1785 until at least 1820. After about 1800, it was known as a *Pianozug* and was principally used to alter the dynamic range. But in the earlier German tradition, perhaps starting as early as the 1740s and going on to about 1800, the moderator was often used to alter the timbre in those instruments which, with their bare hammers, otherwise produced a harpsichord-like sound.

Harpsichord-pianos

Harpsichord-pianos can be divided into four categories:

- 1) The first category comprises harpsichords using plectra but with an additional means of imitating the sound of the piano.
- 2) The second category comprises pianos using hammers but with a stop imitating the sound of the harpsichord.
- 3) Instruments in the third category have one soundboard but two actions, one with plectra, the other with hammers.
- 4) Instruments of the fourth category contain two complete instruments, a harpsichord and a piano, each with its own action, strings and soundboard.

Harpsichords with a stop imitating the sound of the piano

i) Leather plectra

Instruments of the first category include those with leather plectra, which, in the eighteenth century, were considered by some to make a sound which imitated that of the harpsichord and by others to make the harpsichord more expressive than the piano. Pascal Taskin is said to have been the first to use

8 Sabine Klaus has described several smaller pianos, many with plain wooden hammers and some with no dampers, in her pair of articles 'German square pianos with *Prellmechanik* in major American museum collections ...' and 'German square and harp-shaped pianos with *Stoßmechanik* in American collections ...' in the *Journal of the American Musical Instrument Society*, respectively XXIV, 1998, 27–80 and XXVII, 2001, 120–182.

jacks with plectra of soft buffalo leather, the *peau de buffle*.⁹ In a letter written on 20th December 1773 to the editors of the *Journal de Musique, par une Société d'Amateurs*, M. Trouflaut describes Taskin's invention.

[...] the *peau de buffle* stop, which Taskin has been using since 1768, renders the harpsichord capable of expression, including dynamic shading. The *buffle* obeys the pressure of the finger; it does not pluck but caresses the string; the touch of the *Claveciniste* is enough to produce charming differences without changing either keyboards or stops.¹⁰

In their original disposition, two-manual Flemish harpsichords had four rows of jacks, two for the single set of 8' strings and two for the single set of 4' strings. Taskin enlarged (*mis en ravalement*) such harpsichords by adding a second set of 8' strings. He then used three of the four rows of jacks for the new French disposition, that is, two rows for jacks plucking the two sets of 8' strings and one row for the jacks plucking the 4' strings. The fourth row he used for a set of jacks with *peau de buffle* plectra to pluck one of the sets of 8' strings, thus giving an alternative timbre to the sound made by the quill plectra. It is this use of the *peau de buffle* with which we are most familiar. Richard Repphann, however, has presented evidence to suggest that in one of Taskin's own double-manual harpsichords, which had just three rows of jacks, the jacks for the 4' strings had quill plectra as usual, but that the two rows of jacks for the two sets of 8' strings each gave the player a choice of two alternative plectra, one of *peau de buffle*, the other of quill. Each of the two plectra had its own tongue, but the two tongues in one jack pivoted on the same axle. In the jacks of one of these rows, the *peau de buffle* plectra pointed left and thus, if selected, plucked the long 8' strings. The quill plectra in the jacks of the same row pointed right and could thus be chosen, instead of the leather plectra, to pluck the short 8' strings. In the jacks of the other row it was the other way round, the *peau de buffle* plectra pointed right to pluck the short 8' strings and the quill plectra pointed left to pluck the long 8' strings. The instrument could thus be played with the two rows of jacks so disposed that the jacks all plucked the strings with quill plectra or so that the jacks all plucked the strings with *peau de buffle* plectra. To put it

9 All translations to the English are by the author. Words like *Forte Piano*, *Clavier*, *peau de buffle* &c. have been left as found in the original text but put in italics. Where such foreign language words have been used in my own text I have also put them in italics. This leads to some confusion. Stein, for instance, sometimes declines his word *Poli-Toni-Clavichord* (perhaps best translated as 'stringed keyboard instrument of many timbres') with forms like *Poli-Tono-Clavicordio*. I have left these in his texts but restricted myself to *Poli-Toni-Clavichord* in my own text.

10 M. Trouflaut, 'Lettre aux auteurs de ce journal, sur les clavecins en peau de buffle, inventés par Mr. Pascal', in *Journal de musique, par une société d'amateurs*, 1773, V, 10–19. The quotation is on p.13. One instrument by Taskin of 1769, in the Sigal Collection, Boston, has three registers, 8' and 4' quilled and 8' *peau de buffle*.

succinctly, the options on the lower manual were 2 x 8' (quill) or 2 x 8' (*peau de buffle*). The 4' stop (quill) remained as an optional addition to either of these dispositions. The 4' stop could not be played alone, however, unless there was a middle position for the double jacks whereby neither the leather plectra nor the quill plectra plucked their appropriate strings. The instrument in question is the 1770 double-manual harpsichord by Taskin now in New Haven.¹¹

Rephann also noted that such double jacks are found in a single-manual harpsichord of 1745 by Johannes Daniel Dulcken and in a large two-manual harpsichord of 1778 by his pupil Johann Peter Bull, although in both instruments only the jacks of one row have both quill and leather plectra.¹² In such instances the choice of the leather plectra obviously excludes the use of the quill plectra in the same jacks. But the quill plectra in the second set of jacks are also excluded; the latter use the same strings as those plucked by the leather plectra in the first set of jacks. In short, the options were 2 x 8' (quill), or 1 x 8' (leather), or 1 x 8' (quill). There is no 4' stop in the single-manual harpsichord (1745) by Dulcken. In the double-manual harpsichord (1778) by Bull, however, there is a 4' stop which can be used as an optional extra. Furthermore, in Bull's instrument the double jacks are so-called dog-leg jacks, that is, jacks which can be played from either keyboard.¹³ The options are thus 2 x 8' (both quill) on the lower manual with 1 x 8' (quill) on the upper manual, or 1 x 8' (leather) on both manuals. To both these dispositions the 4' (quill) can be added on the lower manual.¹⁴ An additional buff stop operates on the upper-manual 8' strings.

In another harpsichord by Bull, a single-manual instrument he built in 1779, there are three sets of strings, 8', 8' and 4'. One of the sets of jacks for the 8' strings has double plectra, leather and quill. Here the possibilities are limited to 2 x 8' (quill) or 1 x 8' (leather), in both cases with the optional addition of the 4' (quill). Both the 1745 harpsichord by Dulcken and the 1779 harpsichord by Bull have knee levers for selecting the leather plectra in preference to those in

11 Richard Rephann, 'A fable deconstructed: the 1770 Taskin at Yale', in *The historical harpsichord*, ed. Howard Schott, New York 2002, 215–41, see especially 230.

12 The leather may have been sole leather rather than the softer *peau de buffle*.

13 The name dog-leg comes from the shape of the jacks. The foot rests on the appropriate lower-manual key lever. At the height of the upper manual the jack stem becomes twice as wide. The end of the upper-manual key lever engages the jack where it becomes wider. The knee of the dog's leg is presumably imagined to be at this point.

14 Rephann remarks that the use of the 4' (quill) together with the 8' (leather) is an 'unlikely possibility', perpetuating the idea that leather plectra and quill plectra should not be used together. The historical evidence points to the idea that the two were combined and that even hammer actions were combined with quill actions to sound at the same time. Our modern sharp distinctions between the harpsichord (with quill) and the piano or other expressive instruments (using leather) probably prevent us from accepting the combination of the two.

quill.¹⁵ In the 1745 harpsichord by Dulcken the knee lever was fitted by Bull. It then seems likely that the double jacks in Dulcken's instrument were also fitted by Bull.¹⁶ If this is so, the occurrence of leather plectra in these instruments did not predate Taskin's reported invention of plectra of *peau de buffle* in 1768.

The anonymous description of the *Cembalo Angelico*, published in Rome in 1775, is translated in its entirety in Raymond Russell, *The harpsichord and clavichord, An introductory study*.¹⁷ Rather than presenting one particular instrument, various improvements to the harpsichord are described. The most essential of these is the use of leather plectra, made of a core of sole leather with the plucking tip cut at an angle from the top surface, away from the jack body, down to the bottom. The tip of the plectrum, including the sloping surface, is then covered with soft glove leather, flesh side out and glued to the core of sole leather. The resulting velvety surface, we are told, strokes the brass strings like a bow drawn across the strings of the violin, producing an angelic sound, hence the name *Cembalo Angelico*. In the description, the author does not compare the angelic sound directly with that of the 'harpsichord with hammers' except in so far that the special leather plectra make dynamic variation possible.

When one touches the key lightly the sliding of the velvet-like plectrum on the brass string gives a soft and extremely sweet tone, with very little attack; when one touches the key with strength and energy the same leather produces a tone three times louder and stronger.

The author tells us that normal harpsichords, those with two sets of unison strings, can be converted with ease to accommodate such plectra, either for both sets of strings or just for one. Alternatively, jacks with two tongues can be substituted for the normal ones. These double jacks again have quill plectra pointing in one direction and the leather plectra pointing in the other.

Another improvement to the harpsichord described in the same source is the provision of pedals to change stops while playing. A single pedal can be incorporated to change from 2 x 8' (quill) to 2 x 8' (leather) in those harpsichords which have both stops with double jacks. Two pedals, one to engage the quill plectra and one to engage the leather plectra can be incorporated in a harpsichord with the two different stops. A stop called the *sordino* could also

15 The 1745 harpsichord by Dulcken is in the Sigal collection, Boston. The 1778 Bull is privately owned in the U. S. A. The 1779 Bull is in the Vleeshuis, Antwerp, inv. no. VH 2114.

16 Jean Tournay wrote that the double jacks in the Dulcken harpsichord and the knee lever for alternating between the two types of plectra are later. See Jean Tournay, *Archives Dulcken*, Brussels 1987, 71–84.

17 See Raymond Russell, *The harpsichord and clavichord, An introductory study*, London 1973, 131–42 and plate 17 for a translation of *Lettera dell'autore del nuovo Cembalo Angelico inventato in Roma*, Rome 1775, 21–7. Russell translates *sordino* with *sordine*. In the copy of the *Lettera* stamped *Biblioteca Nazionale di S. Marco Venezia*, the words *dal Sigre. Giovanni Christiano de Miller*, after the words *inventato in Roma* on the title page.

be added. It comprised a roll of soft woollen material, 'like a snake in shape', and of the same thickness as a little finger. This roll was pressed against the strings near the nut to damp the vibrations. Pedals could also be added to engage this *sordino* and could be so arranged that the *sordino* acted only on the treble strings, or only on the bass strings, or on all the strings at once. In a *Cembalo Angelico* set up with one row of jacks with leather plectra and one row with quill plectra, six possibilities were available. First, the combination of the leather plectra with those of crow quill (1 x 8' leather, 1 x 8' quill) gave a strong enough tone to accompany 'Symphonies' played by an orchestra. Second, the same two stops sweetened by adding the *sordino* gave a medium tone for the accompaniment of airs in chamber music. The third possibility was that of the single stop with the quills; the fourth was same quill stop with the *sordino* added. The fifth was the true angelic sound, made by using the leather plectra alone, and suitable for the accompaniment of delicate voices and for solo performances in chamber contexts. The final possibility was that of the leather plectra used with the *sordino* engaged, creating a sound which imitated the tone of the most delicate lute.

One final remark by the author of the text on the *Cembalo Angelico* may provide a clue to the claim made by Milchmeyer and others that the strings alone, without additional organ pipes, could give the sounds of woodwind instruments. By cutting the tip of the core of the plectrum in the more usual way, that is, from the bottom and away from the jack body, and then again using glove leather (scraps from the glove maker or pieces from old gloves) to cover the tip, the author of the article tells us that

... one can obtain the harmony of a middle tone, in between the angelic and the quill tone [...]

This gives a sound which

... will have the delicacy of a recorder in the higher tones, and in the middle ones will give a natural imitation of a hunting horn heard in the distance. And, by varying the angle and the leather of the plectrum, many other different tones can be obtained at the option of the music lover.

An Italian harpsichord with two sets of double jacks was acquired by the National Music Museum, South Dakota, in 2001. It was made by Vincenzo Sodi in Florence in 1782. Each jack has two plectra, plucking in opposite directions, one of soft leather like *peau de buffle*, and one now of sole leather, but possibly originally quill. The choice here is thus 2 x 8' (soft leather) or 2 x 8' (hard leather). It seems that a single hand-operated lever was used to change from one of these dispositions to the other.¹⁸

18 I am grateful to John Koster for providing me with additional information on this instrument. He also pointed out a reference reporting that Ferrini used soft leather plectra in conjunction with gut strings to produce a harp-like sound in the harpsichord. See Luigi Ferdinando

Leather plectra were thus more widespread than is sometimes supposed. John Barnes has also shown that some English harpsichords, notably those by the firm Shudi and Broadwood of between 1778 and 1793, also had one 8' stop using quill plectra and the other using leather plectra.¹⁹ These leather plectra bear some relation to the leather plectra of the *Cembalo Angelico* in that both were made of two sorts of leather. But the English plectra were made of a thin layer of white leather, skin side out, glued only to the top surface of a thicker core of buff leather. Both layers were cut together at the tip from the underside up towards the top, away from the jack body.

One last example of the use of leather plectra, clearly linking them to the imitation of the piano, was reported by J. F. Reichardt in 1782. He described plectra of 'English leather', used by Oeberg in Stockholm in 1782, which gave 'all harpsichords the nature of the *Fortepiano* without using the *Crescendo* and *Decrescendo*'.²⁰ *Crescendo* and *Decrescendo* presumably meant either a device to gradually alter the number of stops in use, served by a knee lever or a pedal, or something akin to an organ swell box with which a cover or lid above the strings could be opened or closed. No such means were needed by Oeberg; the leather plectra themselves were enough to create dynamic variation.

ii) Crescendo and decrescendo devices

A crescendo or a decrescendo can be obtained using just a single set of jacks if a suitable knee lever, pommel or pedal is present. As the extent to which the plectra protrude under the strings is decreased (using the knee or the foot), so does the sound the plectra produce diminish. Usually, a system of springs ensures that the plectra return under the strings when the pedal, knee lever or pommel is released, producing a crescendo. Some of Taskin's instruments and others which he enlarged have knee pommels for individual stops, thus enabling the player to adjust the volume of a single stop while playing. It is worth remarking here that this sort of dynamic control involves neither a change from one type of plectrum to another, for instance from quill to leather, nor a change in the status of the strings, for instance, by engaging a buff stop or the Italian *sordino*, both of which partially damp the strings. In other words, there is no change in timbre. The *una corda* of the piano has the same advantage.

Many eighteenth-century harpsichords have more complex crescendo and decrescendo devices. In Bull's 1778 instrument, mentioned above, there was once a so-called 'machine stop' which enabled the player, while playing, to

Tagliavini, 'Giovanni Ferrini and his harpsichord «a penne e a martelletti»', *Early Music*, XIX/3, 399–400.

19 See John Barnes, 'Boxwood tongues and original leather plectra in eighteenth-century English harpsichords', *The Galpin Society Journal*, LIV, May 2001, 10–15. The 'back' 8', i.e. the one furthest from the player, is always the one with the leather plectra in these instruments.

20 Johann Friederich Reichardt, *Musikalisches Kunstmagazin*, I/1, Berlin 1782, 51.

gradually disengage the stops with quill plectra (8', 8' and 4') and to engage the stop with leather plectra (8'), thus making a decrescendo. Similar changes of stops could also be made on the lower manual in the harpsichords enlarged by Taskin.²¹ In such instruments, the three rows of jacks which can be played from the lower manual are disposed as follows: the jacks furthest from the player pluck the 8' strings with plectra of *peau de buffle*; the jacks of the next set nearer the player pluck the same 8' strings with quill plectra, while the jacks of the third row, also with quill plectra, pluck the 4' strings. The jacks of the fourth row, nearest the player, are also in quill. They pluck their own set of 8' strings and are played from the upper manual. With the two manuals coupled, all three stops (8', 8' and 4') using quill plectra can be played from the lower manual. Starting from this choice of stops, the careful use of a knee pommel disengages all three sets of quilled jacks in turn (4', lower-manual 8' and upper-manual 8') and engages the *peau de buffle* on the lower manual, giving a decrescendo. Releasing the same knee pommel provides a crescendo.

Érard's *Clavecin mécanique*, as described in a contemporary publication of 1783, was apparently similar to the instruments enlarged by Taskin.²² The 1783 publication describes one set of jacks with *peau de buffle* plectra and the usual three sets with quill plectra. One example of the *Clavecin mécanique*, a two-manual harpsichord dated 1779, survives in Paris.²³ It has two foot pommels and four knee levers, presumably once used to change stops and to make crescendos and decrescendos while playing.

Another decrescendo and crescendo device is the English machine stop, operated by a pedal, and most often found in later, two-manual English harpsichords.²⁴ With the 4', 8' and the dog-leg 8' engaged on the lower manual and the

21 For instance the harpsichord of 1764 enlarged by Taskin in 1783, now in the Russell collection, Edinburgh. See Grant O'Brien, 'The 1764/83 Taskin harpsichord', in *The Organ Yearbook*, V, 1974, 91–102. Another instance is the 1646 Andreas Ruckers two-manual harpsichord enlarged by Taskin in 1780, Musée de la Musique, Paris, inv. no. E.979.2.1.

22 Described in *L'Almanach Musical* of 1783. Some modern writers have described the *Clavecin mécanique* as comprising a combination of a piano and a harpsichord, that is, with a true hammer action alongside the jacks. This is not the case.

23 In the Musée de la Musique, Paris, inv. no. E.979.2.5, this instrument has been through considerable changes and is now not in a state which adequately represents the original.

24 John Haward is generally thought to be the inventor of the machine stop. See Thomas Mace, *Musick's monument*, 1676, 235–6, quoted extensively in Donald H. Boalch, *Makers of the harpsichord and clavichord 1440–1840*, 2nd ed., Oxford 1974, 65. Haward's invention appears to have been for a single-manual harpsichord. Mace makes no mention of decrescendo or crescendo effects, only of changes in dynamic level, 'either Soft or Loud [...] Louder'. Examples of instruments with the machine stop include: a single-manual harpsichord by Shudi, 1761 (Fenton House, London, cat. no. 3); a double-manual harpsichord by Shudi and Broadwood, 1770 (CC-f"), Fenton House, cat. no. 1); a double-manual harpsichord by Jacob and Abraham Kirkman, 1777 (Fenton House, cat. no. 6); two double-manual harpsichords by Joseph Kirkman, both 1798 (National Music Museum, South Dakota, inv. no. NMM 3328 and Boston Museum of Fine Arts, cat. no. 26).

dog-leg on the upper manual, pressing slowly on the machine-stop pedal, situated on the left under the instrument, gradually retracts the 4' plectra and then the dog-leg 8' plectra, leaving just the main 8', sometimes with leather plectra, on the lower manual, thus effecting a decrescendo.²⁵ The dog-leg is replaced at the same time on the upper manual by a stop sometimes confusingly called the lute stop. A better name for this stop, which uses jacks plucking the upper-manual 8' strings very close to the nut, would be nazard. With the machine stop pedal fully depressed, the player has two stops contrasting in timbre, the more rounded main 8' on the lower manual and the nazard 8' on the upper manual. Slowly releasing the pedal returns the instrument to 8', 8' (dog-leg) and 4' on the lower manual with the dog-leg 8' on the upper manual.

A special case of this machine stop occurs in a single-manual harpsichord of about 1769 by Ferdinand Weber, a maker of Saxon origins who worked in Dublin.²⁶ In this instrument, a knee lever first retracts the quill plectra for the 4' strings, then the quill plectra of the 8' strings and finally the leather plectra which normally pluck the other 8' strings. Before the leather plectra are completely withdrawn, another set of jacks, again with quill plectra, begins to advance. This last stop is a nazard. If the player continues to press the knee lever, the plectra of the nazard stop are gradually retracted, finally leaving silence.

Thomas Haxby of York patented a special machine stop for a single-manual harpsichord in 1770.²⁷ In the specification, his 'improvement' is described (without any punctuation) as the

Invention of a New single Harpsichord containing all the Stops of a Double One which by the use of one Pedal only produces every Increase Diminution and Variation of Tone that a Double One is capable of performing is described in the manner following (that is to say) a Single Harpsichord of two Unisons Octave Lute and Harp which by the use of One Pedal only (which said Pedal has a Connection with several sliding Tumblers Springs &c) produces Ten variations of Stops also an Increase and Diminution of Tone (either gradually or instantaneously) from the softest Stop to the full Harpsichord or from the full Harpsichord to the softest Stop [...].²⁸

One of Haxby's three surviving harpsichords has a similar mechanism.²⁹ It is dated 1777. There are two 8' stops and one 4' stop, all in quill, and a buff stop

25 John Barnes has shown that leather plectra were used in English harpsichords. See John Barnes, 'Boxwood tongues and original leather plectra in eighteenth-century English harpsichords', *The Galpin Society Journal*, LIV, May 2001, 10–15.

26 In the National Museum of Ireland, Dublin, registry no. 67–1924.

27 See *Patents for Inventions. Abridgments of Specifications Relating to Music and Musical Instruments. A.D. 1694–1866*. 2nd ed., London 1871, facs., London 1984, no. 977, 6–7.

28 The quote given here is taken directly from the original patent in the The National Archives, Kew, no. 977, signature c210/11. None of the original specifications, which are legal documents, have punctuation.

29 The harpsichord with this mechanism is found in the Castle Museum in York, acc. no. DA 1736. I am grateful to Katie Turner and Sherri Steel for allowing me to examine this instrument.

acts on the long 8' strings. Normally, the 8' stop for the short strings and the 4' stop are engaged, their jack slides held in position by springs, while the buff stop batten is held off by a spring. By depressing a pedal, attached to the front left leg of the trestle stand, the two sprung stops are slowly but simultaneously turned off and the buff is gradually brought to bear on the long 8' strings. The diminution is thus from 8', 8' and 4' to a single 8' with the buff stop on. By releasing the pedal the crescendo is obtained: the springs disengage the buff and reinstate the jacks for the short 8' strings and for the 4' strings. When the set of jacks for the 4' strings or either of the sets of jacks for the 8' strings are disengaged, their dampers no longer touch the strings, causing the latter to resonate sympathetically.³⁰ All the stops can also be engaged and disengaged manually. The 'Lute' mentioned in Haxby's description is not present.

Another crescendo device, used in England, lifts a wooden cover which normally closes the whole area of the soundboard above the strings.³¹ There are two types, the nag's head swell and the Venetian swell. The nag's head swell has its name from the shape of the single piece of wood, which, when lifted using the appropriate pedal, is shaped like the head of a horse in profile.³² The other type, the Venetian swell, was patented in 1769 by Burkat Shudi, a harpsichord maker of Swiss origins who worked in London.³³ The Venetian swell consists of a series of slats, each of which opens like the shutters of an organ swell case.³⁴ The specification of Shudi's patent includes the description of these slats; he called them 'Valves':

... Now the said Burkat Shudi doth hereby Declare That the said Piece of Mechanism or Machinery invented by him the said Burkat Shudi Doth consist of a Cover extending the Breadth of the Harpsichord and from the Front Board of the Harpsichord to the Ruler of an indefinite Number of Valves which with their Frame extend the breadth of the Harpsichord and the Length thereof from the Ruler to the small End which Valves are opened and shut by a Number of small Levers equal to the Number of Valves inserted or fixed in an Axis Spindle or Bar turned by a Pedal [...].

30 The dampers appear to be old although it should be added that the instrument was extensively repaired by Robert Morley in about 1962.

31 For a thorough description of such devices see Edwin Ripin, 'Expressive devices applied to the eighteenth century harpsichord', in *The Organ Year Book*, 1970, Vol. I, 65–80. Ripin noted that these devices are not so effective for crescendos but better for a sudden change in volume; opening the lid just a little already reaches most of the dynamic increase available.

32 An example of the nag's head swell is to be found in the double-manual harpsichord by Jacob and Abraham Kirkman, 1777, Fenton House, London, cat. no. 6.

33 The original patent is in The National Archives, Kew, London, signature c210/ 10.

34 The Venetian swell is often found in instruments with a machine stop. Examples of instruments with both include the double-manual harpsichord by Shudi and Broadwood, 1770 (CC-f", Fenton House, cat no. 1) and the two double-manual harpsichords by Joseph Kirkman, both 1798 (National Music Museum, South Dakota, inv. no. NMM 3328 and Boston Museum of Fine Arts, cat. no. 26), all mentioned above.

iii) Summary

Summing up this category of harpsichord-pianos we can say that between 1769 and about 1795, in Sweden, England, Flanders, Germany, Ireland, and Italy, there were harpsichords with plectra (and without hammers) which were considered capable of allowing dynamic expression at least equal to that available on the piano. The imitation of the piano came about in two ways. In the first, a nuanced touch by itself enabled the player to use leather plectra as hammers. In the second, the careful use of pedals or knee levers for separate stops and, where present, crescendo and decrescendo mechanisms, allowed dynamic shading. The development of these means of expression should not be seen as an attempt on the part of harpsichord builders to maintain their dignity in the face of a fashion for the new and expressive piano, as sometimes suggested. In the first place, the piano was not new; both the piano and the harpsichord had existed and been appreciated since about 1700. Secondly, not only were harpsichords provided with the means of imitating the piano; pianos were also provided with the means of imitating the harpsichord. Harpsichords with both crescendo and decrescendo devices and with leather plectra illustrate not a rearguard action but a change which gradually gained emphasis in the eighteenth-century development of the *Clavier* and of music. The increasing demand for expressive keyboard instruments led to experiments with both the harpsichord and with the piano. Some of these experiments, like Taskin's stop with plectra of *peau de buffle*, were highly successful, and, according to their protagonists, showed that the harpsichord could even be more expressive than the piano: '... I dare to add with confidence', wrote Trouflaut in 1773, 'that the harpsichord with the *peau de buffle* is very much superior to the *Piano-Forte*.'³⁵

Pianos with a stop imitating the sound of the harpsichord

i) The *Clavecin roïal* and other similar instruments

The *Clavecin roïal*, invented and made in Dresden by Johann Gottlob Wagner, belongs to the second category of harpsichord-pianos, those with a hammer action and with a stop imitating the harpsichord. Wagner first announced his 'new invention' in 1775.³⁶ The instrument had the form of a large square piano and a complex and refined action, a *Stoßmechanik* with an escapement mechanism, and so-called under dampers. The wooden hammers were bare but the

35 M. Trouflaut, 'Lettre aux auteurs de ce journal, sur les clavecins en peau de buffle, inventés par Mr. Pascal', *Journal de musique, par une société d'amateurs*, 1773, V, 10–19. The same letter is also quoted with obvious approval in Jean Benjamin de Laborde, *Essai sur la Musique*, I, Paris 1780, 346–8.

36 Wagner's 'Avertissement' first appeared in 1775 and was re-printed by J. N. Forkel in his *Musikalisch-Kritische Bibliothek*, Dresden 1779, 322–5.

sound they produced could be made gentler and rounder using a moderator. In the surviving examples of the *Clavecin roïal*, the moderator inserts tabs of leather between the hammers and the strings.³⁷ Other effects found on the existing examples of the *Clavecin roïal* and described by Wagner include a crescendo device. This works by gradually raising a hinged cover, consisting of cloth on a wooden frame, normally situated above the soundboard. As with the nag's head swell and the Venetian swell in English harpsichords, rapidly raising the cover gives a sudden *forte*. Similar devices were used in some English square pianos. For instance, four pianos by Adam Beyer, made between 1775 and 1778, have or had four pedals.³⁸ Three of these are found on the left under the piano and, from left to right, engage the bass dampers, the treble dampers and the buff stop. The fourth pedal, on the right under the piano, is for a swell, but lifts a large section of the lid rather than an additional internal cover like that in the *Clavecin roïal*. In 1788 and 1789 Thomas Haxby, already mentioned above as a harpsichord maker, built pianos with three pedals, one for the dampers, one for the buff stop and one for lifting the small lid flap.³⁹

According to Wagner's advertisement for his *Clavecin roïal*, the strings were normally not damped; that is, the dampers were normally not engaged, the opposite of the situation in the modern piano. In the detailed specification of his instrument, Wagner first tells us that without using any of the stops provided, the *Clavecin roïal* sounded like a harpsichord with a very resonant bass, in other words, the use of the bare hammers without the dampers gave the sound of a loud harpsichord. Wagner emphasized too that his instrument was one which made a special harpsichord sound, one which responded dynamically to the player's touch. It is clear that Wagner did not mean the piano, he meant an instrument which sounded like a harpsichord with quill plectra; it is as if it was not a piano with hammers, yet nonetheless an instrument on which dynamic gradation was possible.

37 The examples of the *Clavecin roïal* known to the author are: No. 324, 6th November, 1783, Museum für Kunst und Kulturgeschichte, Lübeck, inv. no. 1968; no number, 24th December, 1783, Muziekinstrumenten Museum, Brussels, inv. no. MI 1628; No. 533, 1st July, 1786, Germanisches Nationalmuseum, Nuremberg, inv. no. MIR 1701; No. 587, 10th July, 1787, Kunst Sammlungen, Dresden (Schloß Moritzburg); No. 640, 12th June, 1788, Staatliches Institut für Musikforschung, Preußischer Kulturbesitz, Musikinstrumenten-Museum, Berlin, cat. no. 1174; No. 652, 12th July, 1788, Gemeentemuseum, The Hague, inv. no. 1991-0007; No. 666, 12th December, 1788, Bachhaus, Eisenach, inv. no. I 85. No. 767, 20th December, 1794, Germanisches Nationalmuseum, Nuremberg, inv. no. MIR 1161 and No. 805, 6th July 1797, Reka Sammlung, Frankfurt/Oder, inv. no. IV/56/1(92) are by Johann Gottlob's brother, Christian Salomon.

38 1775: Staatliches Institut für Musikforschung, Preußischer Kulturbesitz, Musikinstrumenten-Museum, Berlin, cat. no. 4591; 1776: private ownership, England; 1777: Händel-Haus, Halle, inv. no. MS-4. The square by Beyer of 1778 in the Reka Sammlung, Museum Viadrina, Frankfurt/Oder, inv. no. Mk. 2 had the same four pedals but they have been replaced by knee levers.

39 1788: private collection, The Netherlands; 1789: Colt Collection, Kent, inv. no. S344H.

The four stops were engaged using pedals, three on the left and one on the right. Pedal No. 1, on the far left for the player, was for a harp stop, with which a fringe of cloth was brought down to touch the strings, giving a *pizzicato* effect. Pedal No. 2 engaged the dampers. We are told that '... when just pedal No. 2 is used, the sound is the same as that of the harpsichord'. This is the second mention of the imitation of the harpsichord. We can conclude that the use of the bare hammers, without engaging the moderator or the harp stop, was explicitly intended to create the sound of the harpsichord, whether the dampers were engaged or not. Pedal No. 3 was for the moderator. Wagner wrote that with the moderator on and the dampers off, the instrument gave the sound of the *Pantolon*, or hammered dulcimer. It is clear from the context that he used the word *Pantolon* here to mean the dulcimer, not the piano. The last possibility, he wrote, almost in passing, was the sound characteristic of those instruments belonging to the type generally called the *Pianoforte*. This sound was created by engaging both the moderator and the dampers.

In placing the harpsichord first and the piano nonchalantly last in his description, Wagner seems keen to have wanted to avoid both the impression that his instrument was in fact a piano with stops which imitated other instruments and the impression that his instrument was, primarily, either a harpsichord or a piano. Rather, Wagner seems to have wanted us to think of his *Clavecin roïal* as many instruments, including the harpsichord and the piano, combined in one. Nevertheless, it would have been impossible to hear the sounds of any two of the instruments at the same time. One could, however, have swapped from one sound to another by using the pedals while playing. Wagner wrote that one could change rapidly from the harp sound, which required engaging the harp stop (the dampers were disengaged), to the lute sound, by adding the moderator. He could also have mentioned alternating between the normal harpsichord sound, which required engaging the dampers, and the piano sound, which required the addition of the moderator. In general he remarked that the pedals

... enable all the changes of stops (*Veränderungen*) to be effected with the greatest speed in the middle of playing, without the artist having to remove a hand from the keyboard; indeed he can even make each individual sound loud or soft.

Some of the surviving examples of the *Clavecin roïal* have the dampers normally not engaged, as in the original announcement. It seems that those which now have the dampers normally engaged have all been changed at a later date. Even the 1794 and 1797 instruments built by his brother Christian Salomon, who continued the firm after Wagner's death, have the dampers normally not engaged. All the surviving instruments by the firm, the earliest of which is dated 1783, have knee levers rather than the pedals described in the announcement. Perhaps by that date the knee levers were thought to provide a more discrete means of changing stops while playing.

Samuel Kuhlewind's *claviorganum*, now in Berlin, combines a square piano with an organ.⁴⁰ The piano, which also has bare wooden hammers, is very similar to Wagner's *Clavecin roïal*. In Kuhlewind's instrument however, all but one of the stops are engaged by hand rather than using knee levers; the exception is the *crescendo* cover, raised using a pedal. A second pedal is used for pumping the organ bellows. The harp stop is unlike Wagner's in that it is divided. The single lever for bringing the dampers into action is marked 'Clav:', presumably meaning *Clavecin*. This perhaps indicates that the use of the bare wooden hammers with the dampers engaged was also thought by Kuhlewind to imitate the harpsichord, as described by Wagner for his *Clavecin roïal*. Kuhlewind's instrument has a single rank of stopped wooden pipes, divided bass and treble, engaged using hand levers.⁴¹ The piano action can be disengaged using another hand lever to raise the hammers out of the reach of the jacks which propel them towards the strings.

Kuhlewind's instrument thus combines a piano and an organ and has stops which allow the piano to imitate the undamped dulcimer (the *Pantolon*), the harp and the harpsichord. Each of these sounds separately can be combined with the organ sound at the same time. Instruments which have divided stops, such as the *Harfenzug* in Kuhlewind's instrument, also allow different stops to be contrasted simultaneously, some engaged for the bass, others for the treble. In this case, however, the moderator is not divided; it is therefore not possible to hear the piano sound (with the moderator) and the harpsichord (without the moderator) at the same time.

R. Jürgensen of Schleswig produced what he called a *Clavecin Royal*, according to an advertisement of 1783. It is not only the name of his instrument which suggests that Jürgensen imitated Wagner. Jürgensen's instrument also had four stops, although only two were engaged using pedals. The other two were engaged using hand levers.⁴² The stops could be variously combined to produce

40 1791, Staatliches Institut für Musikforschung, Preußischer Kulturbesitz, Musikinstrumenten-Museum, Berlin, Cat. No. 14. A similar instrument by Kuhlewind, dated 1800, is cited and illustrated in Hanns H. Josten, *Württembergisches Landesgewerbemuseum, Die Sammlung der Musikinstrumente*, Stuttgart 1928, 44–5.

41 Instruments combining a piano and an organ were not uncommon. Three interesting *Hammerflügel*-organs are: by Johann Andreas Stein (1781), Historiska Museet, Gothenburg, inv. no. GM 4478; Franz Xavier Christoph (c. 1790), Jevisovice Collection, Czech Republic, inv. no. E167; anon., Musikinstrumenten-Museum, Leipzig, inv. no. 231, attributed to the school of Anton Walter (c. 1800). There are numerous square pianos combined with an organ, for instance by John Joseph Merlin (1784) in the Colt Collection, Bethersden, inv. no. M514M; by Johannes Pohlman, (c. 1785) Musikinstrumenten-Museum, Leipzig, inv. no. 3905; by Samuel Bury, (c. 1785) in the Germanisches Nationalmuseum, Nuremberg, inv. no. MIR 1184; by Franz Xavier Christoph, (c. 1790) Kunsthistorisches Museum, Vienna, inv. no. SAM 625. Finally, there is a square tangent piano, attributed to C. F. Schmahl (c. 1790), combined with an organ, in the Bachhaus, Eisenach, inv. no. 1.5.1.1./I 92a.

42 *Magazin der Musik*, I/1, ed. C. F. Cramer, 1783, 661–3.

twelve different *Veränderungen*, changes of registration, each of which gave the sound of a different instrument, the 'harpsichord, the *Fortepiano*, the harp, the lute and other instruments'. Jürgensen's instrument also had a *Crescendo* pedal, raising a cover over the soundboard, presumably like that in Wagner's *Clavecin roïal*. The advertisement for Jürgensen's *Clavecin Royal* also described his *Bell-sonoreal*. It had five stops, two of which were engaged using pedals. No doubt one of the 48 *Veränderungen* claimed by Jürgensen for this second instrument, essentially a square piano, gave the sound of the harpsichord.

A report of an instrument which specifically made the sounds of the harpsichord, the piano, the harp and the lute, was given by Charles Burney in his *The present state of music in France and Italy*, first published in London in 1771.⁴³ Burney described a visit to Count Torre Taxis in Venice in 1770, a visit which pre-dated Wagner's first announcement of his *Clavecin roïal* in 1774 by four years. The count, an able harpsichord player, showed Burney

... a very curious keyed instrument which was made at Berlin, under the direction of his Prussian Majesty: it is, in shape, like a large clavichord, has several changes of stops, and is occasionally a harp, a harpsichord, a lute, or piano forte; ...

This list of available instrument sounds is the same as Wagner's except that that of the *Pantolon* is absent, and, furthermore, no mention is made of a *Crescendo*. The description of 'several changes of stops' seems to refer to combinations of stops engaged by hand levers; no reference is made to knee levers or pedals.

There are other German square pianos with a number of stops, similar to those in Wagner's *Clavecin roïal*, which were probably also intended to be combined to imitate a variety of instruments, including the piano and the harpsichord. One such square piano, in the Colt Collection in England, has an action very much like that in Wagner's instruments.⁴⁴ The hammers have no covering. Of the two hand levers, one now has no function but was probably once for a harp stop. The other hand lever is later and is used for disengaging the dampers. The evidence suggests that the arrangement of the dampers was formerly the same as in the *Clavecin roïal*, that is, with the dampers usually not engaged but with a pedal to engage them. In a type-written description of the instrument, C. F. Colt mentions a second stop, 'a sort of moderator whereby by shifting the action to the right the hammers hit the strings *through* little bits of leather stuck on the hitch pin block which protrude under the strings & when the action is shifted to the left the hammers just avoid hitting the

43 Charles Burney, *The Present State of Music in France and Italy*, London 1771, 181–2. His 'Prussian Majesty' was Frederick the Great.

44 Colt Collection, inv. no. S360WG. A similar instrument is found in the Neumeyer Collection, Bad Krozingen. It has a keyboard which can be shifted manually to position the hammers under leather strips (the moderator), and a hand-operated lever for lifting the dampers. There is however no harp stop. My thanks to Sally Fortino for providing this information.

leather' (Colt's italics). The keyboard does indeed shift, manually, using two knobs, one on each keyboard end-block, but the leather tabs described by Colt are now missing.

Another square piano like Wagner's *Clavecin royal* was made in 1787 by Johann Gottfried Zabel in Tangermünde; it is now in Frankfurt/Oder.⁴⁵ One knee lever (on the left) shifts the keyboard to the right so that the hammers strike through the leather tabs of the moderator, like those in the description by Colt. A second knee lever (once on the right but now missing) was intended to lift a soundboard cover like those in Wagner's instruments. One hand stop, also missing, was probably once for a *Harfenzug*. Another hand stop, still present, engages the dampers. Wagner's four stops were thus probably once all present but with knee levers for only two of them and hand levers for the others, as in Jürgensen's description of his *Clavecin Royal*.

ii) Lying-harp pianos

A variety of stops is almost universally found in the so-called *liegende Harfe* or 'lying-harp' pianos, small anonymous instruments made in Germany and elsewhere.⁴⁶ Some of these smaller instruments are beautifully made and were clearly intended for well-to-do clients.⁴⁷ Such pianos were no doubt also meant to imitate the sounds of different instruments, including the piano, the harpsichord, the lute and the harp. In the *liegende Harfe* instruments, the moderators, the harp stop and, when present, the dampers, are almost always brought into action using hand-operated knobs which protrude through the name board or are positioned below the keyboard. The hammers are usually not covered and give a sound like that of a weak harpsichord. By using the leather moderator

45 Reka Sammlung, Museum Viadrina, Frankfurt/Oder, inv. no. V 399 J.

46 See for instance the two *liegende Harfe* instruments illustrated in Gesine Haase and Dieter Krickeberg *Tasteninstrumente des Museums. Kielklaviere, Clavichorde, Hammerklaviere*, Berlin 1981, p. 79 and p. 81. The smaller of the two, cat. no. 8, has two moderators, each with two positions (for more or less of the relevant stop), and a harp stop, but no dampers. The larger one, cat. no. 336, has the same three stops, a fourth for disengaging the dampers, and a fifth, probably a soundboard muffler, although it is described as a drum. Sabine Klaus has discussed the authenticity of such instruments as the work of Schmahl in her article *Der Instrumentenmacher Johann Matthäus Schmahl (1734–1793) im Spiegel der Ulmischen Intelligenzblätter*, in: *Musica Instrumentalis*, I (1998), pp. 72–93. A number of small German pianos had no dampers. One anonymous example, single-strung and also in the shape of a lying harp, has a harp stop and a moderator but no dampers (Metropolitan Museum of Art, New York, acc. no. 89.4.3254).

47 See for instance the three *liegende Harfe* instruments in Halle (Händel-Haus, inv. no. MS 546) and Leipzig (Musikinstrumenten-Museum, University of Leipzig, inv. nos. 104 and 105). The stops on the Halle instrument are missing but were probably dampers, harp and moderator. No. 104 in Leipzig has five stops: silk moderator; leather moderator; dampers; harp; two pads which press up on the underside of the soundboard at the bridge (perhaps again the muffler). No. 105 has the same two moderators and a harp stop.

the sound is transformed into that of a small piano with leathered hammers. One unusual instrument, in The Hague, has two knee levers, one to lift the dampers and the other for engaging the moderator.⁴⁸

iii) Morellati and his *cembalo a martelli*

We now leave Germany and move to Italy. In the *Giornale Enciclopedico* of July 1775, a letter from Paolo Morellati was published describing an 'excellent harpsichord with hammers'.⁴⁹ The name of the instrument, a *cembalo a martelli*, and the presence of an *una corda*, mentioned in the description, both suggest that the instrument was a grand piano, not a square.⁵⁰ It was double-strung in brass throughout and the action had an escapement mechanism. The dampers, each one of which operated between the relevant pair of strings, are described as 'little pieces [of wood] covered in leather'; by contrast, no mention is made of any covering for the hammers.⁵¹ Twelve different instrumental sounds which the instrument could make, presumably by combining stops, are listed in the description. The first on the list is a sound which 'resembles the quilled harpsichord of great sonority', reminding one of the first sound Wagner claimed for his *Clavecin roïal*, that of a sonorous harpsichord, obtained by using the bare wooden hammers without the dampers. Other instruments which Morellati claimed could be imitated by his *cembalo a martelli* include the *mandolino* (either with brass strings or with gut strings), the clarinet, the harp, the French *chittarone* and the spinet. The spinet sound was probably obtained by using the *una corda* so that the bare wooden hammers struck only one string.

48 In the Gemeentemuseum in The Hague (inv. no. 1993x0005). It has a German action (no escapement mechanism) with bare wooden hammers. See Michael Latcham, 'The sound of some late eighteenth-century keyboard instruments', in *Jaarboek, Haags Gemeentemuseum*, III, 1993, 30–41. In Nuremberg another lying-harp instrument has a single knee lever for lifting the dampers (Germanisches National Museum, inv. no. MIR 1138).

49 The complete text of the letter is published in Maria Teresa Nardi, 'I «cembali a martellini» di Paolo Morellati', in *Rivista Italiana di Musicologia*, XXX, 1995/2, 359–84. Nardi understands the twelve *registri* as twelve separate stops. The original letter was published in the *Giornale Enciclopedico*, V, July 1775, 73–6 and later in the *Antologia di Roma*, XLI, April 1780, 324–7. In the latter source it is published under the title *LETTERA* with the subtitle '*Scritta dal Sig. Paolo Morellati celebre Maestro di Musica Vicentino intorno all'eccelesse cembalo a martelli da lui costruito*'. I am most grateful to Donatella De Giampietro for assisting me with the translation of the description.

50 In a few very rare instances, however, there is a true *una corda* in English square pianos.

51 Morellati's description of the dampers suggests the influence of the Cristofori-Ferrini tradition of piano building in which each wedge-shaped damper falls between the pair of strings of one choir. However, Morellati imported instruments from England and Germany. Some other parts of the description, especially the variety of stops and the inclusion of an *una corda* suggest the influence of the German Franz Jakob Spath. He also used the same type of dampers in the bass of his *Tangentenflügel*.

iv) Samuel Bury and Gottfried Silbermann

From Italy we move to England where Samuel Bury wrote in the specification of his patent of 1788 that his additions to the piano were intended to imitate the harpsichord and the dulcimer. The specification describes a moderator, perhaps the only one described or found in an English piano. The moderator had

... cloth leather or any thing that will produce a sweet mellow tone when struck by the hammer [...].⁵²

Unlike Wagner's bare wooden hammers Bury had

... Felt cloth wool or any thing elastic under the Leather upon the Head of the Hammer which strikes the Strings [...].

So there were no bare hammers with which to imitate the harpsichord. But the specification does describe

... a Sliding Board with Strips of Cloth Leather or parchment upon which are fixed small pieces of Whalebone or any hard substance that when the strings are Struck thereby the Harpsichord tone is produced [...].

The specification also mentions a

... slide which throws up the Dampers whereby the Tone becomes exactly similar to the Dulcimer and when drawn off by the Stopp the Instrument is then a perfect Pianoforte [...].

Although not explicitly indicated by their makers, there are other pianos with a stop which could be considered to imitate the harpsichord. An anonymous German *Hammerflügel* of about 1805 has a harpsichord stop similar to that described in Bury's patent. Small pieces of ivory are attached to leather tabs which function like those of a moderator, coming between the hammers and the strings but in such a way that the pieces of ivory strike the strings. This stop is engaged with a knee lever.⁵³ There are two other knee levers, one for a normal moderator and one to lift the dampers.

The three surviving *Hammerflügel* by Gottfried Silbermann can also give a harpsichord-like sound. They have ivory or brass plates positioned vertically above the strings behind the damper rail.⁵⁴ The player, using two hand-operated

52 See *Patents for inventions. Abridgments of specifications relating to music and musical instruments A.D. 1694–1866*, London 1871, facs. London 1984, 20–21. The quote given here is taken directly from the original patent in The National Archives, Kew, London, signature c210/31. The 1871 transcription inserted punctuation but contains some spelling errors, for instance Springs for Strings.

53 See Rosamond Harding, *A history of the pianoforte. Its history traced to the Great Exhibition of 1851*, Cambridge 1933, 52. See also Hanns H. Josten, *Württembergisches Landesgewerbemuseum, Die Sammlung der Musikinstrumente*, Stuttgart 1928, 46.

54 See Stewart Pollens, 'Gottfried Silbermann's Pianos', in *The Organ Yearbook*, XVII, 1986, 103–121, especially 116–7. The existing pianos by Gottfried Silbermann are: ca. 1746,

levers, can lower these plates down to touch the strings lightly, giving a buzzing, harpsichord-like sound. The plates seem to have been so devised that using the hand lever in the treble creates the sound of the harpsichord in the treble only while the hand lever in the bass creates the harpsichord sound only in the bass.

v) Double hammers

Some square pianos have two sets of hammers, one set producing a loud, harpsichord-like sound, the other a soft, piano-like sound. Those which produce a loud sound are of wood and either have no covering or just a very thin layer of leather over the wood. The hammers which give a soft sound each have a covering of a soft material over wood or consist simply of a block of a soft material like buff leather. Four anonymous instruments with such double hammers are to be found in the public collections in Brussels, Frankfurt/Oder, Nuremberg and Prague, while another, by Weber, was recently acquired by the Metropolitan Museum of Art in New York.⁵⁵ In these pianos, the two sets of hammers cannot be used together and are selected using hand levers, except in the New York instrument which, besides the original hand-operated lever, also has a later pedal for this purpose.

vi) The tangent action

The tangent action is today most often associated with the Regensburg organ and string keyboard instrument makers Franz Jakob Spath and his son-in-law Christoph Friedrich Schmahl.⁵⁶ In the tangent action each key propels a tall

Stiftung Preußische Schlösser und Gärten, Potsdam, Neues Palais, Berlin (inv. no. V 12); 1746, Stiftung Preußische Schlösser und Gärten, Potsdam, Sanssouci, Berlin (inv. no. V 13); 1749, Germanisches National Museum, Nürnberg (inv. no. MI 86).

55 Musée des instruments de musique, Brussels, inv. no. 3194; Reka Sammlung, Museum Viadrina, Frankfurt/Oder, inv. no. Mk 1; Germanisches Nationalmuseum, Nuremberg, inv. no. MINE 166; National Museum, Prague, inv. no. 4592. The New York instrument has a pedal, only recently adapted for changing from one set of hammers to the other. There is also a hand lever for this purpose with improvised connections to the pedal. The pedal was originally used for lifting part of the lid for a crescendo effect.

56 Spath's name at the bottom of his advertisement for his *Tangirung* (in *Musikalische Nachrichten und Anmerkungen*, 18, 30th April 1770, 142, see below) has no *Umlaut*. Not only Spath, but also Stein in his notebook (1749), Adlung in both editions of his *Anleitung*, (*Anleitung zu der musikalischen Gelahrtheit*, Erfurt 1758, and *Anleitung zur musikalischen Gelahrtheit*, Dresden and Leipzig 1783), an advertisement in the *Wiener Diarium* of 1779 (Spat), Forkel in his *Musikalischer Almanach für Deutschland auf das Jahr 1782*, Gerber in both editions of his lexicon (1792, 1814) and Fétis in his *Biographie Universelle* of 1844 used no *Umlaut* on Spath's name. The *Umlaut* was probably first used by Mozart in his letter of 17th October 1777 to his father in the adjective *spättischen*.

narrow stave of wood upwards towards the strings.⁵⁷ The so-called tangent strikes the strings with its top surface, usually rounded and with no covering of leather. Exactly when Spath first used such tangents is not known, but a *Clavier* by Spath, most likely with a tangent action but certainly with a variety of stops, was reported by Adlung in his *Anleitung zu der musikalischen Gelahrtheit* in 1758:

In 1751 Franz Jacob Spath, an instrument maker in Regensburg, presented to the Elector of Bonn a *Clavier* with 30 *Veränderungen*, which [...] included *forte*, *piano*, *pianissime*, an echo, a harp, a lute, a *Pandaleon*, and a proper flute.⁵⁸

In 1765 an advertisement appeared in the *Leipziger Zeitungen* describing Spath's instruments, again with no specific reference to the tangents. The author mentions some of the general problems of the *Pandaleon-Clavecin* at the time. Runs could not be reliably expressed *forte*, *piano* and *pianissimo*, and the instruments made extraneous noises. Spath, we are told, had rid the instrument of these evils. Furthermore,

... not only is his instrument even in its touch throughout, but also as light as a clavichord. All runs can be expressed most tenderly [...].⁵⁹

The author continues by praising the durability of Spath's instruments and mentions that they cost nothing to maintain. This strongly suggests the simplicity, reliability and durability of an action with bare wooden tangents.⁶⁰

There is little doubt that the next text about Spath's instruments refers to the *Tangentenflügel*. In a published advertisement of 1770 Spath himself described his *Tangirung*, an action which had 'neither hammers nor quills'.⁶¹ In the instruments made by Spath and Schmahl, surviving examples of which date from about 1780 until 1802, and those made by other makers, the tangents do not rest

57 The tangents are about 90 mm tall, 7 mm across, and 5 mm thick at FF and 3 mm thick at f". For a list of *Tangentenflügel* see H. Herrmann, *Die Regensburger Klavierbauer Späth und Schmahl und ihr Tangentenflügel*, Erlangen 1927. To Herrmann's list can be added numerous instruments including some by F. J. Spath (1714–1786) and C. F. Schmahl (1739–1814): Händel-Haus, Halle, inv. no. MS-30, c.1785; Shrine to Music Museum, Vermillion, Cat. No. 4145, c.1785; Private ownership, U.S.A., c.1785. By Schmahl alone: Kunsthistorisches Museum, Vienna, c.1785; Musikinstrumenten-Museum, University of Leipzig, inv. no. 211, 1790 (signed *Spath und Schmahl!*); Gemeentemuseum, The Hague, inv. no. 0011–1991, 1791; Technisches Museum, Vienna, inv. no. 39318, c.1792; Sibelius Museum, Turku, inv. no. 100, 1802.

58 Jakob Adlung, *Anleitung zu der musikalischen Gelahrtheit*, Erfurt 1758, 576–7.

59 *Leipziger Zeitungen*, 10th Sept. 1765, 564. I am most grateful to Christian Ahrens for providing me with the complete text of this advertisement.

60 It is my contention that the word *Tangentenflügel* did not come to be used to distinguish these instruments from the *Hammerflügel* with leathered hammers until after 1785. Up to that time *Hammerflügel* often had bare wooden hammers, were in the shape of a harpsichord and responded dynamically to the player's touch. In short, they were very like *Tangentenflügel*.

61 In *Musikalische Nachrichten und Anmerkungen*, 18, 30th April 1770, 142.

directly on the backs of the key levers but on intermediate levers. The tangents are not attached to any part of the action, but merely guided in a box slide, like the jacks of an Italian harpsichord. The tangents are propelled upwards to strike the strings, immediately rebound and return to the intermediate levers. The defining feature of a piano lies in its hammer action; the hammers rise towards the strings, at some point escape the action train and continue on, using the energy given to them by the player, to strike the strings. Having struck the strings the hammers immediately rebound, allowing the strings to sound. The tangents of the *Tangentenflügel* are thus elongated hammers and the *Tangentenflügel* is a piano by definition.

In the 1787 specification for his tangent piano, the English maker Humphrey Walton called his tangents 'perpendicular hammers'.⁶² But while Walton's tangents had a covering of some soft material, Spath's almost certainly did not. The bare hammers in the surviving *Tangentenflügel* by Spath and Schmahl give a harpsichord-like sound.⁶³ If the leather moderator is engaged, however, using a hand lever, the sound becomes that of a *Hammerflügel* with leather-covered hammers. A *Tangentenflügel* is thus a piano (with hammers) which can make the sound of a harpsichord by using the bare wooden hammers.

In the instruments by Spath and Schmahl there is also a *Harfenzug*, with which a silk fringe is brought up to touch the strings at the nut, giving a harp-like sound, especially with the dampers raised. Like the moderator, the *Harfenzug* is engaged using a hand-operated lever. As a rule, there are also two knee levers, one for lifting the dampers and one for the *una corda*. The four stops, the moderator, the *Harfenzug*, the sustaining stop and the *una corda*, are more or less standard in the surviving *Tangentenflügel* of Spath and Schmahl. Two instruments by Schmahl, however, have three knee levers, the extra one for the moderator.⁶⁴ As a rule, his instruments also have an extra knee lever for disengaging just the treble dampers. But without these extras, the four standard stops would have been enough to substantiate Spath's claim in his 1770 description that his

beautiful instrument, with its eight to ten different combinations of stops, must be more pleasant than the sound of the harpsichord or the *Pantaleon* [...].

By *Pantaleon*, Spath probably meant a piano rather than a dulcimer.⁶⁵ The four standard stops were probably included in the instrument Spath presented to

62 See *Patents for inventions. Abridgments of specifications relating to music and musical instruments A.D. 1694–1866*, London 1871, facs. London 1984, 20–21.

63 One *Tangentenflügel* by Spath, c. 1785, in the National Music Museum, South Dakota, inv. NMM 4145, has vertical inserts of ivory or bone in the tops of the tangents.

64 Kunsthistorisches Museum, Vienna, c.1785 and Deutsches Museum, Munich, 1800. The *Harfenzug* is also divided.

65 In an earlier advertisement (*Leipziger Zeitungen*, 10th September 1765, 564, see note 59) Spath's instruments are referred to as *Pandaleon-Clavecins*, implying a dulcimer with a keyboard, for us a piano rather than a dulcimer proper.

the Elector of Bonn in 1751. There must have been more, however. Four stops are not sufficient for the thirty combinations mentioned by Adlung.

The moderator and the *Harfenzug*, which effect changes of timbre, are thus usually engaged using hand-operated levers in the *Tangentenflügel*. The player must therefore make a choice between the various timbres, those of the harpsichord, the piano, or the harp, before playing. But having made a choice, the player can rely on the sustaining device, the *una corda* and his touch, all the means the player of the modern piano has at his disposal, for musical expression. The *Tangentenflügel* thus retained the variety of timbres favoured in the eighteenth century but also looked forward to the nineteenth century in which a single timbre, variable in its dynamic range, became the fashion. It is perhaps for this reason that the *Tangentenflügel* of Spath, almost certainly available in the 1770s and even perhaps in the 1750s, was still made in 1802.

vii) Summary

Summing up, we can say that in all the instruments mentioned in this category, ranging in date from about 1745 to about 1805, a hammer action could be used to give a sound like that of the harpsichord. In none of this group could the sounds of both the piano and the harpsichord be heard simultaneously, except perhaps in the *Hammerflügel* of Silbermann which have a divided 'harpsichord' stop. In some of the instruments presented above, the stops could only be altered by hand, in others there were knee levers or pedals for changing stops while playing. In some cases the imitation of the harpsichord is explicit, for instance in Burney's description of the instrument belonging to Count Torre Taxis (1770), in Wagner's description of his *Clavecin roïal* (1774–1802), in Morellati's description of his *cembalo a martelli* (1775) and in the piano described in the specification of Bury's patent (1788), but in many cases the idea that such instruments were originally intended to imitate the harpsichord is speculative, for instance in the *Tangentenflügel* of Spath and Schmahl and in the *Hammerflügel* of Silbermann. Nonetheless, it is certain that all the instruments in this group were intended to produce a number of different timbres using a variety of stops.

The different stops, which we might wrongly see as frivolous extras, were all equally important, judging from the descriptions. Wagner, for instance, seems to have laid equal emphasis on all the different sounds his *Clavecin roïal* could produce. At the same time, Spath, Wagner and Morellati emphasized the responsiveness of their instruments to the touch of the player. These were keyboard instruments which were not only capable of producing different timbres but which also responded dynamically to the player's touch.

A final example of a description which underlines these points is found in an advertisement of 1783 for a piano by Johann David Schiedmayer, a pupil of Stein and a famous piano maker in his own right:

The strings are brought into vibration not with quills but with hammers, and, simply using finger pressure, without using stops, one can make the sound grow from the softest pianissimo to the loudest fortissimo according to whether one strikes the keys strongly or weakly. [...] What is more, this instrument also has two stops which can be pressed with the knee while playing, without the listener being aware of it. The one stop changes the sound in such a way that a quilled harpsichord is closely imitated, and becomes so loud that with it an orchestra of fifty voices can be accompanied. The other stop lifts the damping so that the strings reverberate longer and the sound becomes supernaturally loud.⁶⁶

In Schiedmayer's pianos, there are two knee levers, one for lifting the dampers and one for disengaging the moderator, which, unusually, is normally engaged.

Harpsichord-pianos with two separate actions but with a single soundboard

i) Reports of the combination of the two actions

Instruments with free-flying tangents, as we saw above, technically fit the definition of a piano. We saw too that the tangents, the bare wooden hammers of the *Tangentenflügel*, give a sound like that of the harpsichord, and that with the moderator engaged they give a sound like that of a piano with leathered hammers. These two possibilities placed the *Tangentenflügel* itself in our second category, that is, those instruments with a hammer action and with a means of imitating the harpsichord. Instruments were also constructed which combined a tangent action with a harpsichord action, that is, a hammer action with a plucking action. These belong to our third category. Hippolito Cricca, in charge of the musical instruments of the Este court at Ferrara may have referred to such a combination in 1598.⁶⁷ One of Jean Marius's plans of 1716 for a *clavecin à maillets*, presented to the French Royal Academy of Sciences, combines the two actions.⁶⁸ Although Marius's plans were probably never fully realised, a model of one of his instruments was played in front of the Academy in 1717.

66 *Magazin der Musik*, I/2, ed. Cramer, Hamburg 1783, 1021–2.

67 See Stewart Pollens, *The early pianoforte*, Cambridge 1995, 27–32. Another interpretation of the text could be that the instrument in question, capable of producing 'piano and forte', was not combined with a harpsichord. Instead, the two separate instruments were played together. See Alain Roudier and Bruno di Lena, *Rifiorir d'antichi suoni*, Rovereto 2003, 15–16.

68 See Albert Cohen, *Music in the French Royal Academy of Sciences, A study in the evolution of musical thought*, Princeton 1981, 47. See also Stewart Pollens, *The early pianoforte*, Cambridge 1995, 215–23.

In 1758 Adlung described a *Pandoret* action which could be added to a clavichord or harpsichord.⁶⁹ This action comprised wooden tangents, presumably like those of the *Tangentenflügel*, which struck the strings. Adlung wrote that when the *Pandoret* was used in a harpsichord, the jacks of the harpsichord could not be used at the same time, presumably meaning that they would interfere with each other if played together.

In Paris, in 1759, Andries Weltman combined a tangent action with a harpsichord action. Changes of stops could be made without removing the hands from the keyboard, effecting 'diverse modulations of tone from *pianissimo* to *fortissimo*.'⁷⁰

Three sources refer to combination instruments by Spath. The first is in the advertisement for Spath's instruments in the *Leipziger Zeitungen* of 1765, cited above:

... Hr. Spath, who is well known for his *Clavecins*, especially their sound, silvery and majestic, [...] has, for even greater pleasure joined the *Forte-piano-Clavecin* with the quilled *Flügel* using two manuals, arranged for delightful changes.⁷¹

The second source referring to a combined instrument by Spath is his 1770 announcement for his *Tangirung*, also cited above. Not only did he offer an instrument with the *Tangirung* alone, but also a combination of the *Tangirung* with a harpsichord action in a two-manual instrument, placing at the disposal of the player '50 of the most beautiful changes of sound'.⁷² The third source is an advertisement from the *Wiener Diarium* of 1779 offering for sale

... an instrument with two manuals, the upper one the *Forto Piano* and the lower one with quills consisting of four mutations by Jakob Spat, organ and instrument maker in Regensburg.⁷³

The type of instrument to which all three of these sources refer is probably the same, one in which a tangent action was combined with a harpsichord action in a two-manual instrument. The 1779 advertisement is not clear about the stops. The four mutations may refer to the standard four stops (dampers, *una corda*, harp and moderator) found on *Tangentenflügel*, or possibly to four different harpsichord stops. The latter seems likely; with the four standard stops for the tangent action played from the upper manual, four different harpsichord stops on the lower manual, and a means of coupling both actions on one keyboard,

69 Jacob Adlung, *Anleitung zu der musikalischen Gelahrtheit*, Erfurt 1758, 575.

70 See Stewart Pollens, *The early pianoforte*, Cambridge 1995, 220.

71 *Leipziger Zeitungen*, 10th September 1765, p. 564.

72 *Musicalische Nachrichten und Anmerkungen*, 18, 30th April 1770, 142.

73 '... ein Instrument mit doppelten Manual, das obere Forto piano und das untere mit Federn aus 4 Mutationen bestehend, von Jakob Spat, Orgel- und Instrumentmacher in Regensburg'. *Wiener Diarium*, 10th November 1779. See Richard Maunder, *Keyboard instruments in eighteenth-century Vienna*, Oxford 1998, 149.

there would have been more than enough stops to give the 50 different combinations advertised in the 1770 source.

There are numerous other descriptions of instruments combining a piano action with a harpsichord action. These include instruments by Fickert in Zeitz (1742), Johann Wagner in Schmiedefeld (1763), Barthold Fritz in Braunschweig, who in 1766 was reported to have made many harpsichord-pianos, Joachim Hess in Gouda (1774), Van der Lugt in Amsterdam (two harpsichord-pianos by him were offered for sale, one in 1775, the other in 1791), Juan del Mármol in Seville (1779), P. J. Milchmeyer in Dresden (1783), Gottlieb Friederich Riedelen in Tuttlingen (1783), Diego Fernández in Madrid (1788), and others.⁷⁴

Exactly how the instruments of these makers functioned is not always clear; some give more details than others. Fickert is one of the most intriguing. His instrument had three keyboards, the top one for the piano and the lower two for the four-stop harpsichord. Milchmeyer's instrument, mentioned above, also had three keyboards, the two upper ones for the harpsichord and the lower one for the *Pantolon*.⁷⁵ Milchmeyer's two actions could be combined at one keyboard. It is not clear if his instrument had separate strings for the harpsichord and the *Pantolon* or indeed if there were separate soundboards for the two actions.

Beryl Kenyon de Pascual has found three newspaper reports of combination instruments by Juan del Mármol in Seville. The first, reported in a Madrid newspaper in 1779, could produce fifteen different combinations of stops and used both quill plectra and hammers.⁷⁶ The second, reported in the same Madrid newspaper, but in 1783, was a combination of a harpsichord and a piano, independent of each other in that they each had their own strings, but together in

74 Fickert: *Leipziger Postzeitung*, 22nd December 1742; Johann Wagner (not the same as Johann Gottlob Wagner of Dresden): *Leipziger Zeitungen* 28th April, 1763, 263 (both these quoted by Christian Ahrens in respectively 'Zur Geschichte von Clavichord, Cembalo und Hammerklavier', *Cembalo und Hammerflügel. 10. Tage alter Musik in Herne*, catalogue, Herne 1985, 44–72 and 'Vom Versuch zur Schöpfung – Musik in Deutschland zwischen 1750–1800', *Clavichord und Fortepiano, 14. Tage alter Musik in Herne*, catalogue, Herne 1989, 27–66); Barthold Fritz: *Wöchentliche Nachrichten und Anmerkungen die Musik betreffend*, ed. J. A. Hiller, Erstes Vierteljahr, 1766, 47–8; Joachim Hess, *Dispositien der merkwürdigste Kerkorgelen, welke in de zeven Verëenigde Provincien als mede in Duytsland en Elders aangetroffen worden*, Gouda 1774, 80–1; Van der Lugt: *Amsterdamsche Courant* No. 25, 28th February 1775 and No. 52, 30th April 1791; Gottlieb Friederich Riedelen announced 'instruments of a new invention with quills and hammers at the same time', *Magazin der Musik*, ed. C. F. Cramer, I/1, Hamburg 1783, 395–6; Diego Fernández: *Diario de Madrid*, 21st August 1788 (cited in Beryl Kenyon de Pascual, 'Harpsichords, clavichords and similar instruments in Madrid in the second half of the eighteenth century', in *RMA Research Chronicle*, 1982, 66–84).

75 *Magazin der Musik*, I/2, ed. C. F. Cramer, Hamburg 1783, 1025.

76 *Gaceta de Madrid*, 26th October 1779, quoted in Beryl Kenyon de Pascual, 'Carlos III: un rey protector de la música', in *Reales Silios XXV/3*, 1988, 33–8. I am most grateful to Beryl Kenyon de Pascual for all these Spanish references.

a single case, presumably meaning that they shared a single soundboard.⁷⁷ In the report it was stated that

By means of an almost imperceptible mechanism the player can pass from one instrument to the other on the single keyboard – all that belongs to the piano remains out of use when one plays the harpsichord, similarly when one plays the piano [...].

The third instrument by Mármol, announced in a Cuban newspaper of 1795, appears to refer to the same type of instrument as the one reported in Madrid in 1783.⁷⁸

Combined actions are also recorded in the specifications of patents taken out by three English makers, Stodart (1777), Geib (1786) and Davis (1792).⁷⁹ Robert Stodart's single manual instrument was

... a new sort of Instrument or of Grand Forte Piano with an Octave Swell and to produce various Tones together or separate [...].⁸⁰

The key to the accompanying drawing shows that the instrument had a normal English action with an adjustable escapement mechanism, that the left pedal, when pressed down, engaged the 8' harpsichord jacks and disengaged the piano hammers, and that the right pedal, when pressed down

... gradually makes the swell upon the Octave The last mentioned Pedal may be either Used to the Harpsichord or Forte Piano at the Pleasure of the Performer [...].

The combination of the hammer action with the 4' harpsichord stop should be noted. The instrument was not only played as a harpsichord or as a piano but also as an instrument combining the two sounds.

The drawing accompanying the specification of John Geib's 1786 patent shows a single keyboard which operates a row of harpsichord jacks and a set of hammers.⁸¹ A longer string with its own higher nut is shown for one of the harpsichord jacks. Geib's specification sets out to describe his

77 *Gaceta de Madrid*, 6th May 1783, cited in Beryl Kenyon de Pascual, 'Harpsichords, clavichords and similar instruments in Madrid in the second half of the eighteenth century', in *RMA Research Chronicle*, 1982, 66–84. It is of course possible that there were two complete instruments in which case this instrument belongs to our fourth category.

78 Beryl Kenyon de Pascual kindly sent me the reference (Alejo Charpentier, *La música en Cuba*, Mexico 1946) in which is cited an advertisement for one of Mármol's instruments in a Cuban Newspaper, the *Papel Periódico*, February 1795.

79 See *Patents for inventions. Abridgments of specifications relating to music and musical instruments A.D. 1694–1866*, London 1871, facs. London 1984. Stodart, p. 12; Geib, pp. 26–7; Davis, p. 27.

80 The original is to be found in The National Archives, Kew, London, signature c210/ 18.

81 The original is to be found in The National Archives, Kew, London, signature c54/ 6773.

... Invention of an entire new Improvement upon the Musical Instruments called the Piano Forte and Harpsichord by which the same will become Perfect and compleat Instruments of their kind which hath never before been discovered [...].

No improvement to a harpsichord action is shown in the drawings, however, nor is any such improvement discussed in the descriptions or in the keys to the drawings. The main thrust of the specification is for a new system for adjusting the hammer escapement mechanism. The only evidence in this patent for a combined harpsichord-piano is pictorial.

The 1792 specification (with minimal punctuation) of the patent of James Davis is for an instrument with two keyboards, one for the harpsichord and one for the piano.

... The Piano Forte has one Row of Keys for its own Action and the Harpsichord has also one Row of Keys for its own Action ./- the Upper Row of Keys is for the Piano Forte and the under Row of Keys is for the Harpsichord so that when a person plays either of these Rows he plays either a complete Piano Forte or a complete Harpsichord./.⁸²

The beautiful drawing which accompanies the original patent shows the instrument in plan view and in elevation. The case is shown in colour, with a dark red for the mahogany and a pink for the satinwood cross-banding. The two actions are shown sharing the same strings. Both the bridge and nut are shown divided and the instrument is triple-strung throughout. The hammers clearly struck all three strings while each pair of harpsichord jacks plucked the two outer strings of each choir of three. In the description Davis mentions the hammer heads

... each of which is also leathered and when struck with its velocity against the Strings produces the Tone [...].

There were two pedals for the piano, one for the right foot

... which Pedle by a lever lifts up the Dampers of the Piano Forte and Harpsichord. There is another Pedle placed in the like manner for the left Foot and which by another Lever removes the Piano Forte keys so that the Instrument can either be played Piano or Forte.

The pedals were thus for disengaging the dampers (mounted in their own jacks) and for an *una corda*.⁸³ No provision appears to have been made for coupling the two actions on one keyboard. In the drawing, two hand levers are shown protruding through the nameboard, left and right, for engaging the two 8' harpsichord stops.

82 The original is to be found in The National Archives, Kew, London, signature c54/ 7069.

83 The pedal normally reduces the number of strings from three to two although, as usual in many English grand pianos of the time, a small piece of wood let into the treble end block of the keyboard can be raised to extend the travel of the complete action to effect a true *una corda*.

ii) Instruments with the two actions

The earliest surviving harpsichord-piano with two actions was made by Giovanni Ferrini in Florence in 1746.⁸⁴ It has two sets of strings, both at 8' pitch, which can be played either with a hammer action from the upper keyboard or with a harpsichord action from the lower keyboard. By first releasing a locking device and then pushing the lower keyboard away from the player, one row of 8' harpsichord jacks can be disengaged. The jacks are engaged again by reversing this process. It is unlikely that this possibility was intended to be exploited by the player. The complexities involved in altering the number of stops in use are probably too great for making a change between movements, let alone while playing. It is more likely that this harpsichord *una corda* was intended to facilitate tuning. The tuner could disengage one set of strings in order to tune the other alone (from the lower manual) and then re-engage the first set to tune the unisons. Although the hammers and the plectra share the same two sets of 8' strings they can be used simultaneously, for instance if the same note occurs in the parts of both hands at the same time in a *pièce croisée*. The two actions cannot be combined on one keyboard.

We now leave Italy and move to Switzerland, where Johann Ludwig Hellen (1716–1781) worked in Bern as a keyboard instrument maker. Three unsigned and undated instruments *en forme de clavecin*, all attributed to Hellen, one now in Berlin, another in Paris and the other in Nuremberg, originally combined the two actions on a single keyboard.⁸⁵ The Berlin instrument has two sets of 8' strings, only one of which is plucked, but both of which are played by the piano action. There is a harp stop and a moderator. There are no knee levers or pedals, only hand-operated levers. The keyboard is pushed in to engage the piano action, a simple *Prellmechanik* without an escapement mechanism. The dampers, which serve both sets of strings, are mounted in their own jacks. They can be lifted by hand-operated levers, divided bass and treble.

The piano of the instrument in Paris has a moderator and a harp stop, both engaged using hand levers. The divided dampers of the piano can be disengaged either by using two separate hand levers or by using two separate knee levers, facilitating various combinations. The harpsichord jacks, which have their own dampers, are disengaged by hand. The single keyboard can again be pushed

84 In the collection of Luigi Tagliavini in Bologna, cat. no. 16. This instrument is described in Luigi Ferdinando Tagliavini and John Henry van der Meer, *Clavicembali e Spinette dal XVI al XIX Secolo: Collezione L.F. Tagliavini* (exhibition catalogue, Chiesa di San Giorgio in Poggiale), Bologna 1986, 186–200 and Luigi Ferdinando Tagliavini, 'Giovanni Ferrini and his harpsichord «a penne e a martelletti»', *Early Music*, XIX/3, 398–408. My own observations served as the basis for the brief description here.

85 Staatliches Institut für Musikforschung, Preußischer Kulturbesitz, Musikinstrumenten-Museum, Berlin, inv. no. 2167; private ownership, Paris; Germanisches Nationalmuseum, Nuremberg, inv. no. MINE 105.

in to enable the hammer beaks to engage the hammer action or withdrawn to allow the harpsichord action to be played alone.

The Nuremberg instrument, at some point converted to a *Hammerflügel*, was probably originally very like the Paris instrument. Most of the action, however, including the damper jacks, the harpsichord jacks, the hammers and their *Kapseln*, the upper and lower guides, the two extra stops, much of the trap work for the dampers and their knee levers, is now missing. Clearly, however, there was a single set of harpsichord strings, longer than the two sets of piano strings. One of the round hollow hammers has survived, secluded inside the case.

A fourth combination instrument, this time signed by Hellen and dated 1763, is in the Giuliani Collection in Briosco.⁸⁶ Now converted to a *Hammerflügel*, this instrument originally had both hammers and harpsichord jacks. Each hammer struck a choir of three 8' strings while the harpsichord jacks had their own 8' strings. Originally, there were probably no dampers.⁸⁷

Apart from the instrument shown in the drawing accompanying Geib's 1786 patent, the Paris, Nuremberg and Briosco instruments attributed to, or by, Hellen are unique in this third category of harpsichord-pianos in that the 8' piano strings are shorter than the 8' harpsichord strings. In each case there are two or three sets of piano strings and a single set of harpsichord strings with their own nut.

Another instrument combining the two actions was made (probably by converting an older harpsichord) by Joseph Glonner in Munich in 1765.⁸⁸ Here the jacks and the hammers played the same two sets of 8' strings. The two knee levers were probably for the piano dampers. Both actions could be played together from the single keyboard.

In 1774 John Joseph Merlin patented a complete combined harpsichord-piano and at the same time a down-striking hammer action which could be added to any harpsichord.⁸⁹ In the specification, his invention is described (again without punctuation) as

... a new kind of Compound Harpsicord in which besides the Jacks with Quills a Set of Hammers of the Nature of those used in the kind of Harpsicords called Piano Forte are introduced in such a manner that either may be played separately or both

86 I am most grateful to Fernanda Giuliani for enabling to examine this instrument and for providing me with photographs made during the restoration. These clearly show that it was once a combined harpsichord-piano with separate, longer strings for a single set of harpsichord jacks, now lost.

87 The *Hammerflügel* by Hellen, also dated 1763, now in the Cité de la Musique in Paris (inv. no. E.2000.16.1), has no dampers and also probably never had them.

88 Hubert Henkel, 'Identifikation eines frühen deutschen Cembalos?', in *Das Musikinstrument*, 38/9, September 1989, 34–40.

89 *Patents for Inventions. Abridgments of Specifications Relating to Music and Musical Instruments. A.D. 1694–1866*. 2nd ed., London 1871, facs., London 1984, 9f. The original is to be found in The National Archives, Kew, London, signature c210/ 15.

together at the Pleasure of the Performer and for adding the aforesaid Hammers to an Harpsicord of the Common kind already made so as to render it such Compound Harpsichord.⁹⁰

The combination of the leathered piano hammers with the quill (and leather) plectra of the harpsichord action should again be noted; Merlin specifically mentioned the combination of the two.

An example of the down-striking hammer action, added by Merlin in 1779, is found in a harpsichord built by Jacob Kirkman in 1758, now in Boston.⁹¹ From the single keyboard, the three sets of quilled jacks and the added down-striking hammers can be played simultaneously or separately, as described in the specification. As a harpsichord, the instrument only had hand-operated stop levers. Merlin added two pedals, like those shown in the drawing which is attached to the specification of his patent. One of these pedals produces a crescendo by gradually bringing on each of the three sets of jacks in turn; the second pedal engages the hammers. Releasing the crescendo pedal gives a decrescendo and releasing the other pedal disengages the hammers.

Late in 1774 a certain Samuel Gillespy took out a patent for what reads in the specification as a garbled version of Merlin's invention.⁹² Whether Gillespy actually added piano actions to harpsichords is not known. D. Francisco Flórez of Madrid also appears to have copied Merlin's idea.⁹³ Back in Spain, after a visit to London in about 1790 to study piano building, he advertised that he could add a row of piano hammers to 'any harpsichord, provided it is well made'.

Merlin also made complete harpsichord-pianos, the 'compound' harpsichords described in the specification of his patent. In a single-manual instrument made by him in 1780, now in Munich, the harpsichord has a 4' stop and an 8' stop in quill, and a 16' stop with leather plectra.⁹⁴ The hammer action not only plays its own set of 8' strings but also the 8' strings allotted to the harpsichord and

90 The words 'so as to render it such Compound Harpsichord' occur three times in the patent. In one case the word separately is spelled seperately.

91 See John Koster, *Keyboard Musical Instruments in the Museum of Fine Arts, Boston*, Boston 1994, 97–107. The instrument is no. 14 in the catalogue and has acc. no. 1977.56. The brief description here is based on my own observations.

92 *Patents for Inventions. Abridgments of Specifications Relating to Music and Musical Instruments. A.D. 1694–1866*. 2nd ed., London 1871, facs., London 1984, 10–11. The original is to be found in The National Archives, Kew, London, signature c210/ 15, on the same roll of parchment in which Merlin's patent is enrolled. There are no drawings accompanying Gillespy's specification.

93 *Gaceta de Madrid*, 26th October 1791 and 25 November 1795, cited in Beryl Kenyon de Pascual, 'Harpsichords, clavichords and similar instruments in Madrid in the second half of the eighteenth century', in *RMA Research Chronicle*, 1982, 66–84.

94 Deutsches Museum, acc. No. 1915–43872. See the detailed description in Raymond Russell, *The Harpsichord and Clavichord*, London 1973, 2nd ed., revised by Howard Schott, no. 79. A more recent description is to be found in Hubert Henkel, *Besaitete Tasteninstrumente*, 1994, 98–102. My own observations form the basis of the description given here.

the 16' strings, so that there are effectively three strings for each hammer. But the hammer action can also be shifted laterally so that the hammers strike just the two 8' strings and shifted again for an *una corda*. The pedals, including a crescendo, allow all these registers to be changed and combined on the single keyboard while playing. Hand-engaged stops imitate the 'Welsh Harp', a buff stop applied to the 16' strings, which are used by both the hammers and the jacks, and the 'Celestiale Harp', which raises the dampers of both sets of 8' strings, so that either the harpsichord or the piano can be played without dampers. A similar instrument, undated but probably a little earlier than the Munich instrument, is privately owned in Switzerland.⁹⁵

Following a contemporary description, Stein's *Saitenharmonika* also combined the two actions.⁹⁶ Stein's normal *Hammerflügel* of after 1783 had two sets of strings throughout.⁹⁷ In the *Saitenharmonika* there was an extra set of strings plucked using a harpsichord action. The plectra were of 'a very elastic material', probably buffalo leather. Stein was proud of the diminuendo possible: one played the hammer action more and more softly, finally disengaging the hammers to leave only the plectra in action. The diminuendo could then be continued, just using the plectra, until one only imagined one still heard a sound, but in fact there was silence. Stein is reported to have said:

At the last you still believe you can hear something but you hear nothing, really nothing, absolutely really nothing.⁹⁸

Presumably the leather plectra were gradually retracted using a knee lever.

A combination instrument like the one offered by Spath in his advertisement of 1770, containing both a tangent action and a harpsichord action, has survived in Norway in the Drammens museum.⁹⁹ It was made in 1786 by Carl Gottlob Sauer in Dresden. The harpsichord action is played from the upper manual; the tangent action, very like that of Spath and Schmahl, is played from the lower manual. The two actions can be coupled on the lower manual by pushing in the upper manual. There are two sets of 8' strings for the tangents and separate sets of 8' and 4' strings for the harpsichord. An extensive renovation was carried out in the 1960s and it is now not possible to see if the instrument originally had a moderator or a harp stop. One knee lever lifts the dampers while another

95 I am most grateful to Pierre Goy for bringing this instrument to my attention, for arranging for me to see it and for taking me to see it.

96 *Musikalische Real-Zeitung*, 45, 4th November 1789, columns 352–3.

97 See Michael Latcham, 'Mozart and the pianos of Johann Andreas Stein', in *The Galpin Society Journal*, LI, July 1998, 114–53.

98 "Sie glauben zuletzt noch immer was zu hören, Sie hören aber nichts, gar nichts, rein gar nichts." Johann Friedrich Reichardt, *Vertraute Briefe aus Paris geschrieben in den Jahren 1802 und 1803*, I, 2nd ed., Hamburg 1805, 335.

99 Inv. no. 2001. I am most grateful to Corinna Weinheimer for arranging for me to see the instrument and to Dr. Einar Sørensen for allowing me to examine it.

engages the *una corda* for the tangent action, as in the surviving instruments of Spath and Schmahl. Two other knee levers can be used to disengage the 4' and the 8' harpsichord stops.

An English harpsichord-piano is to be found in the Smithsonian Institution in Washington.¹⁰⁰ According to the spurious inscription, it was made in 1777 by Robert Stodart. In many ways the instrument matches the specification of the patent mentioned above granted to James Davis in 1792, for a combination instrument. The length of the instrument in Davis's patent is, using the scale on the drawing, just four centimetres shorter than the one in Washington. In the instrument in the drawing and in the actual one in Washington, there are two keyboards, one for each action. The harpsichord has two sets of jacks for the 8' strings, engaged using hand levers, both in the actual instrument and in the drawing. In both the instrument shown in the drawing and in the instrument in Washington there are two pedals for the piano, one for the *una corda* and one for raising the dampers. The unusual mechanism for the *una corda*, involving rollers and levers, is the same in the drawing and in the actual instrument. In both the instrument in Washington and the one shown in the drawing, the harpsichord jacks pluck the outside strings of each choir while the hammers strike all three. While both actions of the Washington instrument can be played on the two manuals simultaneously, they cannot be combined on either one. No means for combining the two actions on one manual are shown in Davis's drawing.

The divided bridge and nut (also shown in the drawing) and other features make it most unlikely that the Washington instrument was made in the 1770s. Furthermore, as described above, the specification of Robert Stodart's patent of 1777 for combining a harpsichord and a piano was for a single-manual instrument with a pedal for changing from one action to the other, not for a double-manual instrument with a sustaining pedal and a second pedal for an *una corda*. It seems likely that the previous owner of the Washington instrument did not know of the Davis specification but was aware of Stodart's and, without going into the details, assumed the instrument to be by Stodart. This could have led the owner to have the new nameboards inscribed with Stodart's name and the date 1777.¹⁰¹ This appears to have happened in 1920 when the instrument was renovated.

100 In *A Checklist of Keyboard Instruments at the Smithsonian Institution*, Washington D.C. 1975, 32 and 76, the name battens of this instrument (Cat. No. 315,718) and the date of 1777 are both questioned. I am most grateful to Elizabeth McCullough of the Smithsonian Institution in Washington for information on this instrument before I saw it.

101 The nameboards are illustrated in Donald H. Boalch, *Makers of the harpsichord and clavichord 1440–1840*, 2nd ed., Oxford 1974, plate 13. The similarity between the instrument in the Smithsonian and the one shown in the specification for Davis's patent is noted by Boalch. I am most grateful to Cynthia Hoover for making arrangements for me to see the instrument and to Steve Velasquez for all his kind help.

iii) Summary

Summing up this category we can say that numerous instruments were made with both a harpsichord action and a piano action between 1746 and about 1795. In some, either the harpsichord mode or the piano mode had to be selected before playing a particular piece of music, but more frequently the objective appears to have been to use both actions in a single piece, either through swapping from one keyboard to another, or by making use of devices like knee levers and pedals for changing stops while playing, or by combining the two actions simultaneously on one keyboard. This sheds new light on questions regarding the choice of the right keyboard instrument for particular compositions. It is refreshing to imagine that composers wrote not for the harpsichord or for the piano but for either, or indeed neither, and perhaps even for both in combination.

Harpsichord-pianos comprising a complete harpsichord and a complete piano

Instruments of the fourth category combine a harpsichord together with a piano, each replete with its own action, strings and soundboard. Only two eighteenth-century descriptions of such instruments exist, one in the specification for an English patent granted to John Geib and one as an announcement of an instrument by Johann Andreas Stein. Only three actual harpsichord-pianos in this category have survived, two by Stein and one by Joachim Swanen.

i) Swanen

We begin with the instrument built by Joachim Swanen in Paris in 1786.¹⁰² Now in Paris, it combines a two-manual harpsichord with a pedal piano. The harpsichord, with the large compass of EE to a''', has a 16' stop and an 8' stop, both with *peau de buffle* plectra, as well as an 8' stop and a 4' stop, both with quill plectra. The pedal board, like that of an organ, operates a shallow piano of two octaves, EE to e, the soundboard of which is contained in the skirting of the stand for the harpsichord and faces the floor. There are four extra pedals which serve the harpsichord stops, turning them on and off in the manner of the pedals of a single-action harp. The piano action and all the pedals are later. But there is no evidence of another means of changing the harpsichord stops and the piano soundboard looks old. Furthermore, such instruments were known in Paris in

102 Musée des arts et métiers, Paris, inv. no. 6615. Most descriptions of this instrument dismiss the piano part of this instrument, suggesting that it was added later. In my view however, while certain parts of the piano have been replaced, the soundboard is clearly old.

the last quarter of the eighteenth century. In 1779, the Parisian builder François-Balthazard Péronard presented a harpsichord to which he added a pedal using a hammer action. The pedal-board, of two and a half octaves, sounded a set of gut strings in its own separate case placed beneath the harpsichord.¹⁰³ Both Péronard and Silbermann, presumably Johann Heinrich, are mentioned as makers of such instruments in the *Encyclopédie Méthodique*.¹⁰⁴

ii) Geib

We now turn to the description of a harpsichord-piano of the fourth category found in the specification of an English patent. John Geib was already mentioned above as the patentee of an instrument which, from the drawing, appears to have combined a harpsichord action and a piano action in one instrument. In 1792 he took out another patent. The specification describes his

... Invention of a new Musical Instrument The End and intention of which is to play the Piano Forte Clavicord or Spinnett with two setts of Keys to which either of these three Instruments may be joined together and played agreeable to the annexed Plans.¹⁰⁵

The plans, beautifully drawn in ink with watercolour wash in blue and yellow, make clear that any two of the three instruments, all of the same size and rectangular shape, could be combined, hinged together on top of each other. The words 'either of these three' appears to be a succinct way of offering any combination of two of the three instruments, but not all three together. No provision is shown for coupling the actions of the two chosen instruments on one keyboard. Like Ferrini's instrument, the instrument in Washington, and the instrument described in Davis's patent of 1792, Geib's instrument offered the player no more than would two independent keyboard instruments placed one above the other.

103 See Albert Cohen, *Music in the French Royal Academy of Sciences, A study in the evolution of musical thought*, Princeton 1981, 56.

104 See *Encyclopédie Méthodique*, I, Paris 1791, 287 [through an error in the printing there are two pages numbered 287].

105 *Patents for Inventions. Abridgments of Specifications Relating to Music and Musical Instruments. A.D. 1694–1866*. 2nd ed., London 1871, facs., London 1984, 26–7. The original patent can be seen at the The National Archives, Kew, London, signature c210/ 39. I am most grateful to Rosemary Hall for making arrangements for me to see all the original specifications for the English patents (Haxby, Shudi, Stodart, Geib, Davis, Merlin, Gillespy and Walton) in the National Archives, Kew, London and to Hugh Alexander of the National Archives for his kindness and cooperation in providing copies and photos of the specifications.

iii) Stein's *Poli-Toni-Clavichord*

The most important description of an instrument of the fourth category, a newspaper announcement of 1769, is of Stein's *Poli-Toni-Clavichord*.¹⁰⁶ The anonymous description opens as follows:

The *Poli-Toni-Clavichord* is an ingenious combination of keyboard instruments which creates harmonies both soft and melancholy, joyful and languishing, sounds both gentle and tumultuous. Symphonies, concertos and solos can be played so gracefully and with such dynamic variation that one has the impression that a complete group of instruments is playing.

The combination of the piano and the harpsichord essentially consists in the possibility of coupling both instruments on one keyboard, even though each has its own case and strings. Accordingly, this work is not like those in which the hammers and the jacks share the same strings. These produce an unpleasant sound. This is because the blow of the hammer requires completely different string lengths and other strings than the jacks.

In what way were the strings served by the two actions of Stein's *Poli-Toni-Clavichord* different and why were they of different lengths? Except for the instrument shown in Geib's 1786 patent, two of the instruments attributed to Hellen, one signed by Hellen (1763) and perhaps the instrument by Mármol reported in Spain, all the instruments described above with two actions but only one soundboard, including those of Ferrini, Merlin and even Stein himself (in the *Saitenharmonika*), have the same string lengths for the two actions, in practically all instances because they share the same strings.

Stein's notebook contains stringing schemes for both harpsichords and pianos.¹⁰⁷ These show that he strung his pianos with thicker strings than he did his harpsichords. This must be what is meant by 'different' strings in the description of the *Poli-Toni-Clavichord*. But thicker strings cannot stand as high a pitch as thinner strings, other things being equal. So the thicker strings of the piano had to be shorter than those of the harpsichord if the two instruments were to be tuned to the same pitch without breaking strings. This must be why the piano and the harpsichord of the *Poli-Toni-Clavichord* required different string lengths.

The text describes the structure of the *Poli-Toni-Clavichord* clearly:

In the *Poli-Toni-Clavichord* there are two instruments together in one, separated from each other by a base board in the middle. The upper instrument is a normal four-choired instrument with three 8' unisons and a fourth register which produces an entirely gentle 16' tone. All four registers can be played together on the middle

106 The *Poli-Toni-Clavichord*, described in the *Augsburger Intelligenzblatt*, No. 40 (5th October 1769), no pagination. I am most indebted to John Koster for bringing this description to my attention and for providing me with a photocopy of it.

107 Unpublished manuscript, private ownership in Vienna.

manual while the upper manual commands only one of the 8' unisons. The lower instrument is the so-called *Pianoforte*.

From the outside the *Pianoforte* is built in such a way that it looks as if it is part of the stand of the harpsichord; the strings of the two instruments are thus placed under each other. The lid of the piano, when opened, slopes down such that it stands in a line at right-angles in relation to our ears, reflecting the sound-waves to us as well as if the instrument were above. The piano is played from the lower or third keyboard and plays so lightly that every hand can succeed on it with ease.

A knee lever for the dampers is then described:

The register which makes the damping or staccato, normally operated by hand stops either side of the keyboard, is here brought into action by a small and unnoticeable movement of the knee.

This, in 1769, is the first recorded mention of a means for controlling the dampers without moving one's hands from the keyboard. Stein can therefore be credited with the invention of the forerunner of the modern sustaining pedal. But it is clear from the text that the knee lever lowered the dampers rather than raising them.

This has a very great advantage in that one can play single notes, passages and ornaments with a clear staccato or articulation without taking one's hands from the keyboard.

The combination of the harpsichord and the piano of the *Poli-Toni-Clavichord* is praised:

The combination of this many-coloured instrument is so constituted in its construction that the most difficult things can easily be played, and then too with *piano* and *forte*, such that it is not dissimilar to a complete group of many instruments; it is the coupled mechanism of this *Poli-Tono-Clavicordio* which enables the player to create a sound now pleading and emotional, now gentle and fluent. The *Forte Piano* at the same time imparts to the harpsichord a most agreeable crescendo and decrescendo such that one can hardly believe it is not the harpsichord itself which possesses this quality, even though it actually originates in the fortepiano. On the other hand, the harpsichord gives the *Forte-Piano-Instrument*, if it is played undamped, a soft pleasantness, swirling from one level of the affects to another, even in distant keys, without upsetting the ear.

One can easily understand from this that by the selective use of the four upper registers, as well as through the choice of three keyboards, through swapping the hands, and through the damped and undamped *Forte-Piano-Instrument*, very many changes of registration can be made on this newly invented *Politono Clavichordio*. But a special art is to play a melody using the soft 16' sound coupled alone with the *Forte-Piano*, taking the bass on another keyboard, = = = something exceptionally impressive for a musical ear. = = = Enough! Whoever wants to be convinced must see it in all its parts and hear it played.

iv) The two *vis-à-vis* instruments by Stein

The two surviving instruments combining a complete harpsichord and a complete piano, both made by Stein, are among the most important keyboard instruments to have survived from the eighteenth century. Both are *vis-à-vis* instruments, combining a harpsichord at one end and a piano at the other, and sharing a common bentside rather than the common base board of the *Poli-Toni-Clavichord*. One is of 1777, the other of 1783.

The 1777 instrument, now in Verona, was originally intended to be a double-ended instrument comprising a two-manual harpsichord with four stops, a 16' and three 8' stops, at one end and a single-manual harpsichord with two 8' stops at the other.¹⁰⁸ On what is now the piano soundboard, glue marks and holes for positioning pins show the line of the bridge before the original harpsichord was re-cast as a piano by Stein. The new piano string lengths are shorter than the planned harpsichord string lengths would have been, presumably to accommodate the thicker strings required by the piano. This in any case bears out the remark made about the *Poli-Toni-Clavichord* that the strings for the piano were of different lengths compared with those of the harpsichord strings.

By moving the bridge of the single-manual instrument and substituting a hammer action for the plucking action, Stein converted the smaller harpsichord to a piano. By adding a third keyboard to the larger harpsichord and trackers connecting this new keyboard to the piano keyboard at the other end of the instrument, he enabled both the piano and the harpsichord to be played from the harpsichord end.¹⁰⁹

A contemporary source mentions a *vis-à-vis* instrument by Stein as newly invented in 1777:

In 1777 he travelled to Vienna with a newly invented large instrument with two keyboards, opposite each other, for two persons to play. There he made himself known at the imperial court and was a great success.¹¹⁰

The wooden hammers of the piano in the 1777 *vis-à-vis* have no covering but there is a moderator which can be engaged using hand-operated levers from either end. Except for the piano of the *Claviorganum* now in Gothenburg, no other piano by Stein has either the plain wooden hammers or the moderator.¹¹¹

In the 1777 *vis-à-vis*, both players can disengage the piano dampers with knee levers, also connected to each other under the instrument. These knee levers

108 Accademia filarmonica, Verona, on loan from the Museo di Castelvecchio, Verona.

109 For more details and photos see Michael Latcham, 'Mozart and the pianos of Johann Andreas Stein', in *The Galpin Society Journal*, LI, July 1998, 114–53.

110 Paul von Stetten, *Kunst- Gewerb- und Handwerks Geschichte der Reichs-Stadt Augsburg*, Augsburg 1779, 162.

111 The *Claviorganum* (Inv. No. GM 4478 in the Historical Museum) has a moderator, suggesting the hammers may once not have had leather.

thus have the opposite function of the knee lever in the *Poli-Toni-Clavichord*. In the *Poli-Toni-Clavichord* the knee lever engaged the dampers; in the *vis-à-vis* the knee levers disengage them. In many other ways the *vis-à-vis* of 1777 is very similar to the *Poli-Toni-Clavichord*. For instance, at the harpsichord end of the *vis-à-vis* there are three keyboards disposed in the same way as the three keyboards of the *Poli-Toni-Clavichord*. In both instruments the upper keyboard was designed for one 8' stop, the middle one for all four harpsichord stops (16', 8', 8' and 8') and the lower keyboard for the piano and for combining the harpsichord and the piano. In the *vis-à-vis* all the harpsichord registers are selected using hand-operated levers. The harpsichord is combined with the piano on the lowest keyboard using a push-pull coupler. The three keyboards give the player a remarkable choice of timbres. Particularly impressive is the combination of the harpsichord with the piano. With a light touch the harpsichord predominates; as the touch weight is increased, the sound of the piano comes more and more to the fore. The same effect was described for the *Poli-Toni-Clavichord*.

Although similar in some respects, Stein's 1783 *vis-à-vis* instrument, now in Naples, differs from the 1777 instrument.¹¹² The hammer heads of the piano action are of wood but round and hollow rather than solid and bare. Each of the 1783 hammers is surmounted by a thin layer of leather. At the harpsichord end there are two keyboards, the lower one for the harpsichord and the upper one for the piano. The harpsichord has an 8' stop and a 4' stop with quill plectra and a second 8' stop with leather plectra, reminding one of the 1769 harpsichord by Taskin now in Boston. The latter has these same three stops, including one 8' stop with leather plectra.¹¹³ The 1783 *vis-à-vis* has three knee-levers, one for lifting the piano dampers, one for retracting the two quilled harpsichord stops to leave the leathered stop (again reminding one of Taskin's work but also of that of Weber and Bull) and a third for coupling the harpsichord with the piano, this time on the upper keyboard, but again using trackers hidden in a false bottom. Unlike the stops on the 1777 instrument, which have to be pre-selected using hand-operated levers, the stops on the 1783 instrument can be changed while playing by using the knee levers.

Another difference between the two *vis-à-vis* instruments by Stein lies in their string lengths. In the 1777 instrument the strings of the piano are shorter than those of the harpsichord, apparently to compensate for the thicker strings required for the piano. In the 1783 instrument the string lengths of both the harpsichord and the piano are the same; both have the same short strings appropriate to a piano. It seems that by 1783 Stein had forgotten his own maxim that the harpsichord and the piano required different strings and scalings.

112 Conservatorio di Musica San Pietro a Majella, Naples.

113 Sigal collection in Boston. Stein undertook his second trip to Paris in 1773 and may then have seen such instruments with leather plectra.

Conclusion

Stein's 1777 *vis-à-vis* instrument, clearly designed along the same lines as his *Poli-Toni-Clavichord* of 1769, combines a full German harpsichord, including a 16' stop, with a piano with bare wooden hammers. One might say that the 1783 *vis-à-vis* instrument, by contrast, is a combination of two pianos, one of which has a plucked action showing French influence (leather plectra and a decrescendo knee lever) while the other has Stein's hammer action, the *Prellmechanik* with an escapement mechanism, incorporating leathered, ring-shaped hammers. We might then conclude that while the piano started off life as a hammered harpsichord, the harpsichord spent the last years of its life as a plucked piano. But in fact there was only a subtle change of emphasis. The *Clavier* gradually mutated, stimulated by ingenuity, by an enlightened delight in variety and, above all, by a steadily increasing need for expressive power. At the end of the eighteenth century and during the nineteenth century, the development of the piano was driven by grosser demands, by a search for more and more volume and by a sense of progress, a striving towards a single ideal sound.