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The 'harpe organisée', 1720-1840 : rediscovering the lost pedal techniques on harps with a single-action pedal mechanism

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Chapter 2

Single-action harps

The famous *Encyclopédie* of Denis Diderot¹ uses the term *harpe organisée*² as the title of one of the technical drawings of a harp with a single-action pedal mechanism.³ This drawing, and another three plates with detailed explanations of the mechanical parts of the harp, complement the article “Harpe” in volume eight (1765) and written by Prince Casimir Michael Oginski.⁴ Diderot first heard Oginski play the pedal harp in August 1760, so this meeting may have been the birth of this detailed article and technical drawings.⁵ The complete article is found as Appendix I and is translated into English for the first time.⁶

The harp described is a single-rowed harp with seven pedals at the base of the instrument. The idea of constructing a harp with a pedal mechanism was influenced by the *Hakenharfe* which has manual hooks. Each pedal corresponds to one note in the diatonic scale. The pedal consists of three separate parts, which are joined together with a vertical coupling pin and then a lateral swivel coupling pin. When the pedal is pressed upon, the lateral swivel coupling segment rises and sets in motion two further reciprocal load levers that are fixed to the base of the harp with two fulcrum screws. When the end point of the second load lever descends, it presses against the pedal rod coupling. The rod consists of a long piece of thin wire that is placed inside the column of the harp. There are seven pedals rods, corresponding to the seven diatonic notes of the scale. Each pedal rod ends with

¹See Appendix I.7.

²The word “harp” is used throughout this thesis to refer exclusively to a harp with a single-action pedal mechanism.

³Diderot and Le Rond d’Alembert, *Recueil de Planches*, LUTHERIE, Seconde suite, Planche XIX. Diderot also shows a single-rowed harp with twenty-one strings. Planche III. See Appendix I.7.3.

⁴“HARPE,” 45–46; Droysen-Reber, “Prototyp ‘Harfe’”: 139–48, is a comprehensive study on Diderot and the harp. See Appendix I.7.

⁵See this “Introduction” for discussion.

⁶This translation has been submitted to the “Encyclopedia of Diderot & d’Alembert-Collaborative Translation Project”. <http://quod.lib.umich.edu>. Barthel, *Au cœur de la harpe*, 24–35 explains the technical drawings in both French and English, but it is not a complete translation.

a cast V-shaped hinge. A series of linking rods, which run inside the neck of the harp are attached to this hinge. There is a total of seven linking rods hidden inside the neck. Each one has a series of links and rivets that attach to the final part of the mechanism that comes in contact with the strings. Each linking rod moves one note in each octave across the whole harp.

The final mechanism that is described by Diderot is called a *crochets* mechanism, where small hooks are screwed on to a spindle which juts out from the neck through the front-action plate. When the pedal is pressed, a *crochet* pushes a string against the semitone nut which results in the shortening of the vibrating length of the string by a semitone. The mechanical action of pressing down pedals may appear counter-intuitive to non-harpists, as this action results in a pitch that is a semitone higher. Before the pedal action is operated, the vibrating length of any string runs from the soundboard, which acts like a bridge, to a nut which is fixed to the neck. When the pedal is put in use, the *crochet* becomes the new nut and the pitch is consequently altered.

The seven pedals that alter the vibrating length of the strings are distributed at the base of the harp, three on the left-hand side, from left to right D, C, B, and on the right E, F, G, and A.

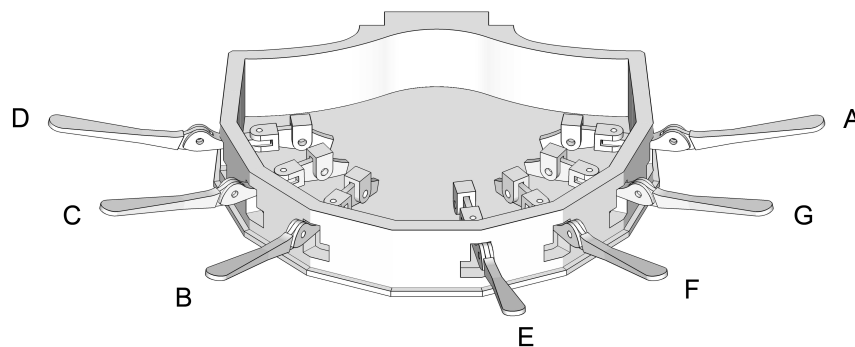


Figure 2.1: The positions of the pedals in the upper position.

2.1 Tuning the harp

The word tuning is commonly used to mean three different procedures on a harp. It can mean:

- putting a harp in a certain pitch like tuning at 405Hz, 415Hz or 430Hz. This is discussed below in 2.1.2.
- setting the harp up in a certain key before playing and where all the pedals are

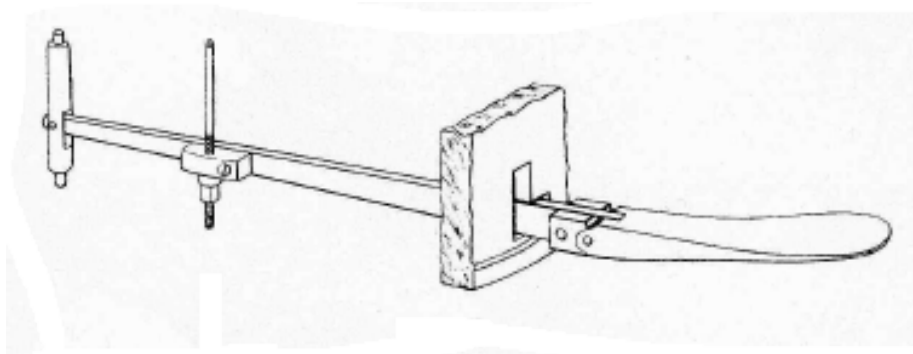


Figure 2.2: An example of a pedal in the lower position, held in the side notch. Erard, *The Harp*, Plate V.

in the upper position. The strings are then said to be in an open position. The author calls this key the “base” set-up key of the harp.⁷ The “base” set-up key determines what fourteen semitones are available to the harpist for an entire piece, or a movement of a piece in each octave.

- The final use of the term “tuning” means the adjustment made regarding the relationship between one pitch and another pitch, how a certain interval sounds. This depends on how the twelve notes of the chromatic scale are divided. This is referred to as temperament. Equal temperament means that the interval between each semitone is equal to 100 cents. It would appear to have been the most used temperament on the harp in the eighteenth- and early nineteenth-centuries.⁸ Other temperaments including 1/6 comma mean-tone and 1/8 comma mean-tone temperament are possible. It depends if the harp has fixed or a movable semitone nuts.⁹

2.1.1 The “base” key

The harp can theoretically be set-up in any “base” key but is usually tuned in E-flat major giving the possibility to play in some keys with flats and some keys with sharps. The action of the seven pedals on the harp result in an extra seven notes in addition to the seven open strings in the octave. A total of fourteen notes are therefore possible in each octave; two notes are doubled in each octave. When a harp is tuned in E-flat major as the “base” set-up key, the two notes that are doubled in the octave are A-flat/G-sharp and E-flat/D-sharp. This gives the harpist the possibility to use alternative strings for two notes per octave.

⁷See Glossary.

⁸No comprehensive research on temperament, pitch and strings exists for the single-action harp.

⁹Beat Wolf, “Timeline-Pedalharps,” accessed May 2, 2016, http://www.beatwolf.ch/Portals/14/pdf/Timeline_pedalharps_2012.pdf?ver=2014-09-12-140457-193.

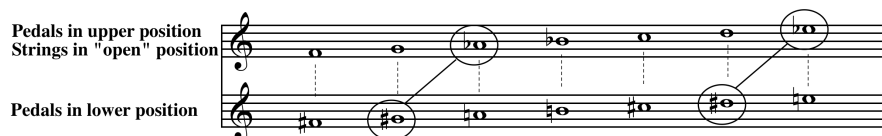


Figure 2.3: Harp set-up in E-flat major as “base” key.

2.1.2 Pitch and temperament

There is no comprehensive study on pitch¹⁰ or temperaments and the harp.¹¹ Most eighteenth- and nineteenth-century treatises and methods explain and give instructions on how to tune the harp in a specified “base” set-up key. The instructions are practical and not theoretical, and most often do not point to any specific pitch or temperament. In the earliest method for harp of 1763, P. J. Meyer writes:

“Prenez la seizième corde....qu’on appelle *fa*, cette corde sera un *mi*; mettez cette corde à l’union avec le *mib* de quelqu’autre Instrument. Accordez la corde di *si*, qui est au-dessus, à la quinte parfaitement juste en montant.”¹²

P. J. Meyer continues to instruct the harpist to tune through the cycle of fifths and octaves: *eb-bb-Bb-f-c-C-G-g-d-d-a-bb*.¹³ There are problematic features regarding this text. Before this paragraph on how to tune the harp in B-flat major, Meyer writes that the harp has thirty-two strings with a range B $\flat$ -f $\sharp$. The sixteenth string from the top of the harp is *eb*, which is called *fa* in modal terms, as it is the fourth note in the key of B-flat major. The cycle of fifths ends with “a”, which Meyer conveniently states that it is the “sensible de *si* $\flat$, qui sera le son principal de la gamme du *si* $\flat$, & toute la gamme sera accordée.”¹⁴ Just and perfect fifths and octaves result in a Pythagorean tuning, which does not function with major and minor keys or harmonies, or for eighteenth-century music. It is the author’s opinion that Meyer and the writers of other later methods use the word “juste” and “parfait” in a different way.¹⁵

¹⁰Ibid. Beat Wolf’s timeline includes probable pitches of harps during the eighteenth- and nineteenth-centuries.

¹¹Jaap Keppel, “The Pedal Harp in Its Historical Perspective: Stringing and Temperament,” in *Aspects of the Historical Harp: Proceedings of the International Historical Harp Symposium, Utrecht, 1992*, ed. Martin van Schaik (Utrecht: STIMU, 1994), 105–12.

¹²Meyer, *Essai*, 4–5. “Take the sixteenth strings...called F, this strings will be an E; put this string in unison with the E-flat of whatever other instrument. Tune the string of B, which is above, as a perfect just rising fifth.”

¹³See “System of pitch notation”, under “Abbreviations”, page x.

¹⁴It is “the sensible, the leading note of B $\flat$, which is the main note in the scale of B-flat, and all the scale will be tuned.”

¹⁵Pitch and temperament as beyond the scope of this study.

These first directions on how to tune the harp is for the “base” key of B-flat major. Meyer later explains how to tune the harp for the “base” key of E-flat major, so the A strings will be lowered by one semitone. It might seem logical when tuning the A string as A $\flat$, to take the E $\flat$ string and tune the A $\flat$ as the interval of a fourth or fifth. However, Meyer writes that the harpist should press down the G pedal, making the G string sound as G $\sharp$ and then tune the A string in unison with the G $\sharp$. It implies that Meyer’s intention is not to instruct the harpist to tune in Pythagorean tuning, as G $\sharp$ and A $\flat$ are two different pitches in that temperament.

Corbelin and Cousineau’s instructions are similar to Meyer’s, except they also instruct the harpist to check the triad of the tonic and dominant keys.¹⁶ Cousineau also specifies that after tuning the first octave “juste”, the first fifth should be:

“à baisser—un tant soit peu, parceque sans dela les tierces deviendroient trop fortes et seroient dures à l’oreille.”¹⁷

This points to a temperament that is equal or close to equal temperament, where the fifths are tempered. Backofen clearly instructs the harpist that “die Pedalharfe wird nach Quinten und Oktaven in schwebender Temperatur...gestimmt”.¹⁸

The temperament of the single-action harp can be actually measured in cents, as the semitone is a physical distance from the semitone nut on the neck of the harp to the pedal mechanism that alters the vibrating length of the string. Jaap Keppel, Dutch harp restorer, has identified two temperaments,¹⁹ where harps with single-action pedal mechanisms were either built for equal temperament—the semitone is equal to 100 cents, or for a smaller semitone of approximately 85 cents. This would point to a 1/6 comma mean-tone temperament. The temperaments of several harps have also been measured by Beat Wolf. According to him, the harps by Cousineau and Naderman were built for equal temperaments.²⁰

Pitch

The pitch of harps could also be measured. From the few historical string lists that remain, and the known total tension on eighteenth- and nineteenth-century harps, some conclusions on historical pitches could be drawn. The current research is that of Beat Wolf, where he places the pitch between 392Hz and 430Hz for eighteenth-century harps built before 1829.²¹

In P. J. Meyer’s harp method quoted above, the actual pitch of the harp is undefined, as the harpist is instructed to simply take a note, the E $\flat$, of any near-by instrument and tune the harp on the basis of that pitch.²² Cousineau writes that the harpist

¹⁶François-Vincent Corbelin, *Méthode de harpe: pour apprendre seul et en peu de temps à jouer de cet instrument; avec un principe très simple pour l’accorder* (Paris, 1779), 8–9; Jacques-Georges Cousineau, *Méthode de Harpe Suivie d’un Recueil de Petits Airs de differens Auteurs*, op. 4 (Paris: Cousineau, 1784), 16–17.

¹⁷“...lower [the fifth] a little, because otherwise the thirds will become too loud and harsh to the ears”.

¹⁸Backofen, *Anleitung*, 1801, 11. “The pedal harp is tuned with equal fifths and octaves.”

¹⁹Keppel, “The Pedal Harp in Its Historical Perspective,” 105–12.

²⁰See footnote 9.

²¹Wolf, “Timeline-Pedalharps.”

²²Corbelin, *Méthode*, 8–9.

needs to acquire a tuning-fork and take the pitch of the Opera de Paris, which is the lowest pitch of all the orchestras.²³ There is evidence from harp concertos, that the harp was used as a transposing instrument and therefore was tuned one semitone lower with respect to other instruments. This is discussed in section 4.1, and with regards to Spohr's harp music in section 6.1.4.

A comprehensive study is needed, using the primary sources like the harp methods and treatises to reach any conclusions on pitch and temperament on the harp.

2.2 Harp building 1760-1840

The first harps are described as having four or five pedals and two of these instruments have been re-discovered and studied by Beat Wolf (See section 2.2.1.2: "AR/RA" harps). Harps up to the 1780's had seven pedals. From 1785, Krumpholtz, in collaboration with Naderman, invented two effect pedals: the *pédale à renforcement* and the *sourdine* pedal. Krumpholtz also invented a *Contrebasse ou Clavicorde à marteau*, which was built by Erard. Cousineau's eighth pedal was a *sourdine* pedal. These are discussed in section 2.3.

A Naderman with twelve pedals is part of a private collection in the UK. The first seven pedals are for altering the vibrating length of the strings, the eighth is a *pédale à renforcement*, the ninth is a *sourdine* pedal, and the other three are for a "Bassoon (a buzzing sound made by a parchment strip touching the strings), Drum and Turkish Bells."²⁴ Cousineau's unique harp with fourteen-pedals is briefly discussed section 1.4.2.

Droyen-Reber lists over forty luthiers that built single-action harps.²⁵ The mechanism for shortening the vibrating length of the strings was different from maker to maker. The early pedal harps had a crutch-and-nut system.

2.2.1 Crutch mechanism

2.2.1.1 Hochbrucker harps

The invention of the *harpe organisée* is usually attributed to Hochbrucker, from Mindelheim who moved to Donauwörth, Germany in 1699.²⁶ He was a son of the violin maker and he was described as not only the inventor of the *Bret-harffe* but also that he was a "good harpist."²⁷ At least three of his sons, Simon (1699-

²³Cousineau, *Méthode*, 1784, 16-17.

²⁴Parker, *Child of Pure Harmony*, 59.

²⁵Droysen-Reber, *Harfen*, "Register der Instrumentenbauer und 'Erfinder'".

²⁶His surname is sometimes spelt Hochbrugger.

²⁷Walther, *Musikalisches Lexikon*, 316: Hochbrucker "erfundenen grossen Bret=Harffe, auf welcher er ohne Verstimmung, alle Semitonia spielen und mitnehmen kann...ist gleichfalls ein starcker Harffenist." Hochbrucker "invented the big pedal harp, on which, without tuning, all semitones can be played and made... is also a good harpist."

1750), Johann Christoph (b.1715) and Jean [Johann] -Baptist (1732-1812) travelled across Europe, performing in Vienna, Brussels, Paris and St. Petersburg, while their cousin Christian (1733-1805), a monk (Coelestin), and was also a composer and harpist. Jean-Baptist Hochbrucker writes in the Preface to his *Recueil d'Ariettes choisies*, Op. 2, that the *harpe pédale* was not known before 1697 and that it was invented by his father.²⁸ The *Neue Zeitungen von gelehrten Sachen* on December 8, 1729, announced the new type of harp as the *Pedal- oder Tret-Harffe* attributing the invention to Simon Hochprugger, who had recently performed for the Holy Roman Emperor Charles VI (1685-1740) in Vienna.²⁹ François-Joseph Fétis wrote that Hochbrucker first made harps with five pedals and then seven.³⁰ No Hochbrucker harp with five pedals has been identified yet.³¹ Three early Hochbrucker harps, one from 1720, one from 1728³² and one undated, have survived and have been studied by the world early pedal harp expert, Beat Wolf of Schaffhausen, Switzerland. The Hochbrucker harp dated 1728 is the earliest dated harp that has been comprehensively researched and analysed and is now part of the Musée de la musique, Paris.

These three harps have seven pedals with pedal rods that run through the resonance box, as the column of all three harps is very slim and the rods would not fit inside such a column.³³ For each string, four metal linkages are fixed to the neck. The tuning pin is at the highest point and this is where the string is finally held in place and can be tuned to pitch. Underneath the tuning pin is the bridge pin, which defines the vibrating length of the string. The two parts of the mechanism to alter the pitch are found below the nut. The first part is a simple crutch that moves from a vertical downwards position to a side position. When the pedal is pressed down, the crutch is pushed to one side and with this action, the string shifts out of alignment and touches the second pin below the crutch. This pin shortens the vibrating length of the string and pitch is altered by one semitone.

The author has identified two portraits, where a Hochbrucker harp has been painted. Angelica Kaufmann's *Woman Playing a Harp* clearly shows a harp with short metal pedal stumps like those of the three existing Hochbrucker harps.³⁴

²⁸Hochbrucker, *Recueil d'Ariettes*.

²⁹"Wien," 892; Hochbrucker, *Recueil d'Ariettes* writes that this performance was in 1728.

³⁰François-Joseph Fétis, *Biographie universelle des musiciens et bibliographie générale de la musique*, vol. 5 (Bruxelles: Meline, 1839). François-Joseph Fétis (1784-1871), Belgian musicologist, composer and teacher.

³¹Hochbrucker made *Hakenharfen* with five hooks.

³²"HARP RESTORATION - Harp by Hochbrucker," 2007, <http://beatwolf.ch/Restoration/Hochbrucker/tabid/823/language/en-US/Default.aspx>. Close-up photographs of the restoration of this instrument are on Wolf's website.

³³Ibid.

³⁴Angelica Kaufmann, *Woman Playing a Harp*, [1778], oil on canvas, 88.58 x 69.22 cm, Seattle Art Museum, Accession No.:66.63. A second portrait, also attributed to Kaufmann is *Portrait of Elizabeth Ewer, full-length, seated in a White Dress with a Yellow Shawl, Playing a Harp, in an Interior*, c. 1768-73, oil on canvas, 76.2 x 63.5 cm, Private collection. Kauffman, Angelica (1741-1807), Swiss painter.



Figure 2.4: Kauffman, Angelica, *Portrait of Elizabeth Ewer, full-length, seated in a White Dress with a Yellow Shawl, Playing a Harp, in an Interior*, c. 1768-73.

2.2.1.2 “AR/RA” harps

Beat Wolf has studied two early eighteenth-century harps with four and five pedals respectively.³⁵ The harps are both signed “AR” which Wolf thinks could be a monogram and could also therefore be read as “RA”. The harps have thirty-three strings but with different ranges (C1-g3 and B1-f3), and have a system of crutches that turn clockwise to shorten the vibrating length of the strings. A system of linkages run through the harp’s neck and join to the rods inside the resonance box. The rods then link to the pedals at the base of the harp. The harp with four pedals has crutches for the strings C, B, E and F, which are conveniently written on the inside of the mechanism, while the harp with five pedals has five crutches for the strings B, C, E, F, G. The pedals for the C and B string are found on the left-hand side of the base of the harp; the remaining are on the right-hand side. Both of these harps would have been tuned in Bb major. When the vibrating length of the strings are shortened the C, B, E, F and G strings would sound as C#, B#, E#, F# and G#. The pedals are approximately 8-10 cm from the ground, which, compared to other harps, is rather high from the ground.



Figure 2.5: “AR” harp with five pedals (early 18th c.), Private collection.

³⁵BW 21/001/400 is housed in the Historisches Museum St. Gallen Inv. Nr. 9606. The present location of BW 21/001/500 is unknown. I kindly thank Beat Wolf for sharing this information from his personal archives and catalogue.

2.2.2 *Crochets* mechanism

The system described so meticulously in Diderot's *Encyclopédie* is a *crochets* system. As noted by Barthel, the technical drawings in the *Encyclopédie* are very similar to the harps built by Jean-Henri Naderman³⁶ who built harps with this mechanism. Luthiers that use the *crochets* mechanism include:

Jean-Henri Naderman (1734-1799)
 Henri Naderman (1782-1846)
 Godefroy Holtzman (?1736-?1799)
 Jean-Baptiste Deshayes (1713-1767)
 Edmond Saunier (c. 1730-c. 1783)
 Jean Louvet (c. 1728-1793)
 Wolters (active c. 1822)
 Sébastien Renault (active c. 1811)
 Storck, Strasbourg (active 18th century)
 Philippe-Jacques Meyer (1737-1819), London

2.2.3 *Béquilles* mechanism

Cousineau invented a system with *béquilles* around 1780, which are “pairs of small metal levers, one on each side of the string,” which pinch “the string from opposite sides when the pedal was depressed.”³⁷ This mechanism was also referred to as *à sabots* or “Hämmerchen.”³⁸ This mechanism was mostly used by the Cousineau luthiers, Georges Cousineau and his son Jacques-Georges. Cousineau also experimented with another mechanism called the *chevilles tournantes* mechanism, where the tuning pins are directly linked to the pedals, meaning that there is no mechanism in the neck of harp. When a pedal is depressed, the tuning pin rotates and hence the pitch is altered.

2.2.4 *Fourchettes* mechanism

Sébastien Erard devised another mechanism which is called the *fourchettes* mechanism around 1786.³⁹ This mechanism uses forked discs, with two small pins. The pins pinch the strings when the disc rotates and was patented in 1794. This mechanism became the standard mechanism and is still used in modern pedal harps. The principles have changed very little since Erard's time.

³⁶Barthel, *Au cœur de la harpe*, 36.

³⁷Adelson, Roudier, and Duvernay, “Rediscovering Cousineau's Fourteen-Pedal Harp”: 160.

³⁸Johann Georg Heinrich Backofen, *Backofen's Harfen-Schule mit Bemerkungen über den Bau der Harfe und deren neuere Verbesserungen*, 3rd ed. (Leipzig: Breitkopf und Härtel, 1827), 2.

³⁹Adelson et al., *History of the Erard Piano and Harp*, 2:28.

2.2.5 “Ring” mechanism

Jacob Erat invented a system which is an enclosed version of the *fourchette*. This is a disk with an attached ring, which the strings pass through. When the pedal is depressed, the disk and ring rotate and pinch the strings.⁴⁰

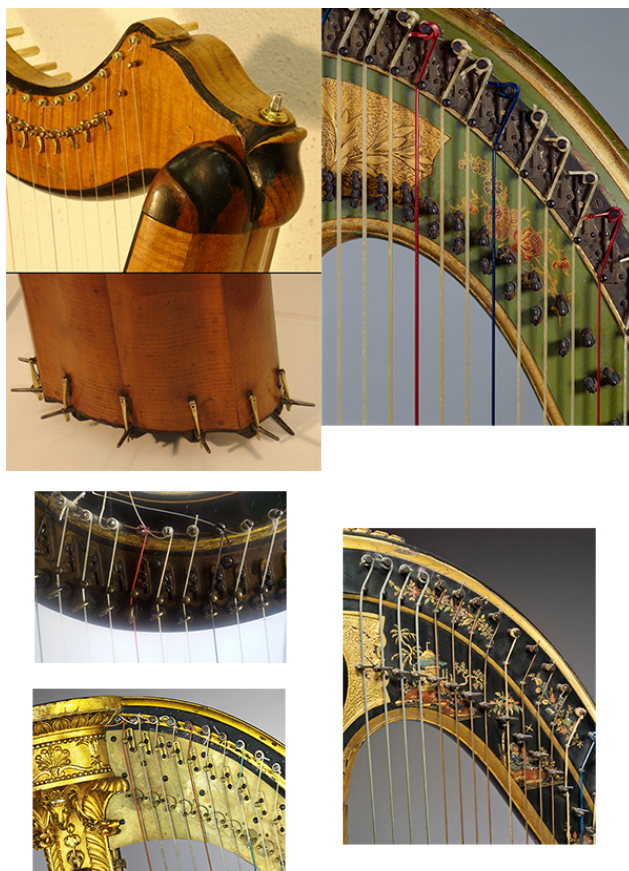


Figure 2.6: (clockwise from top left): Harp mechanisms: Hochbrucker “crutches”, *béquilles*, *crochets*, *fourchettes*, “ring”, Hochbrucker pedals.

2.3 Additional pedals

There are two extra pedals found on several harps which do not alter the vibrating length of a string. These are the *pédale à renforcement* and the *sourdine pedal*. These pedals alter the dynamics and quality of the sound produced. The main feature

⁴⁰Harp no. 345 has this mechanism and this is the property of the author.

of the *pédale à renforcement* was to produce an undulating sound, a quasi-vibrato effect, whereas the *sourdine* pedal produced an echo effect from the vibrations of resonating strings.

2.3.1 Krumpholtz's *Pédale à renforcement*

The *pédale à renforcement* is an eighth pedal located on the left-hand side of the base of the harp and operated by the left foot.⁴¹ When the pedal is pressed down, the mechanism opens five shutters which are located at the back of the resonance box of the harp. While playing, the movements of this pedal alter the dynamics and quality of the sound produced by pressing down, fixing and releasing (opening, fixing the shutters open and closing the shutters). It was invented by Krumpholtz and Naderman in 1785, and subsequently added to many harps built in both Paris and London. The invention was first described in Krumpholtz's *Principes* and the symbols are shown in fig. 3.34 and 3.35.⁴² Krumpholtz names the eighth pedal a pedal "*à renforcement, à Sons prolongés, à Sons ondés*". It was referred to by several names, including *pédal de la soupape*,⁴³ "swell pedal" in English,⁴⁴ "Verstärkung" and "Tritt für die Klappe an dem Resonanzboden" in German.⁴⁵

In Krumpholtz's *Principes*, there is a piece entitled *Étude pour le renforcement* where the symbols for the *pédale à renforcement* are notated in the score. This piece is actually the first movement, *Adagio*, of Krumpholtz's 6^{me} Sonate, Op. 14. Krumpholtz published other works with indications to show how and when to use this eighth pedal. These are Op. 14, *Amante Abandonnée* and Op. 15. Works by other composers are discussed in section 4.5.1.

Both Madame de Genlis⁴⁶ and Bochsas discuss the *pédale à renforcement* at some length.⁴⁷ Madame Merelle transcribes Krumpholtz's symbols (fig. 3.36) and then applied the *pédale à renforcement* to nearly every piece in the second half of her method.⁴⁸

⁴¹Joël Dugot, "Sonorités inouïes: la nouvelle harpe de Messieurs Krumpholtz et Naderman," *Musique, Images, Instruments* 7 (2005): 86-109.

⁴²See sections 3.6.1 and 4.5.1.

⁴³Demar, *Méthode*, 12; Benoît Pollet, *Méthode de harpe* (Paris, c. 1817), 12; Xavier Desargus, *Nouvelle Méthode de Harpe* (Paris, 1803), 2; Comte St. Pierre de Newbourg, *La Nouvelle méthode française pour la harpe* (London, 1808), 3; Xavier Desargus, *Traité général sur l'art de jouer de la harpe* (Paris, 1821), 61. All of these above treatises illustrate the position of the *pédale à renforcement*, except for Nicolas-Charles Bochsas, *Petite méthode pour la harpe: particulièrement à l'usage des jeunes élèves renfermant les règles du doigté, des exercices en tous genres, et terminée par des leçons d'une difficulté progressive*, op. 61 (Paris: Dufaut & Dubois, 1822), 28.

⁴⁴Henry Horn, *Rudiments for the Single and Double Movement Harp* (London: Goulding, D'Almaine, Potter & Co, 1816), 10; François-Joseph Dizi, *Ecole de Harpe* (London: Chappell, 1827), 5.

⁴⁵Herbst, *Ueber die Harfe*, 14: "amplification"; Benoît Pollet, *Méthode de harpe*, Français avec la traduction allemande (Offenbach, n.d.), 12: "pedal for the shutters of the resonance box."

⁴⁶Genlis, *Nouvelle méthode*, 1802, 12.

⁴⁷Bochsas, *Nouvelle méthode*, 69.

⁴⁸Mademoiselle Merelle, *New and Complete Instructions for the Pedal Harp in Two Books*, 1800, 22, 23-48.

Beat Wolf points out that the movement of opening and closing the shutters results in a change in the sound quality of the harp. The closed shutters give a warm timbre with more bass; the open shutters produce a clearer and lighter timbre. For an audience, the alteration, with respect to a change in volume, is probably inaudible, however a change in the sound quality can be heard.⁴⁹

2.3.2 *Sourdine* and echo pedals

Two types of *sourdine* pedals were invented for the harp, one by Krumpholtz and the other by Cousineau, both with a different mechanism. The Krumpholtz *sourdine* pedal was operated by the left foot, located at the furthest extreme of the pedal box, while Cousineau's *sourdine* pedal was at the centre of the pedal box. It could have been operated by either foot. The *sourdine* pedals create an echo effect, by pressing down the *sourdine* pedal before playing, then releasing it after playing a chord. It creates a second muted sound, merely by the pedal action.

Krumpholtz's *Principes* includes no information on this ninth pedal. However, instructions on how to operate this pedal, a list of symbols and its notation are part of Krumpholtz's Opp. 14 and 15.⁵⁰ The description and diagrams of Krumpholtz's *sourdine* pedal, or "Dämpfer" is explained in length in the German method by Herbst.⁵¹

The second type of *sourdine* pedal was patented by Cousineau before 1802.⁵² Musical examples are discussed in sections 3.6.2, 4.5.1, and 4.5.2.

2.3.3 Krumpholtz's *Contrebasse ou Clavicorde à marteau*

Another invention by Krumpholtz was his *Contrebasse ou Clavicorde à marteau*, which was built by Erard. It was first described in an open letter written by Beaumarchais in the *Journal de Paris* in February 1786 and Krumpholtz had already played it in public.⁵³ Beaumarchais states that it is commonly called a "Krumpholtz".

⁴⁹Email correspondence with Beat Wolf, April 30, 2016. See also Jean-Loïc le Carrou, "Vibro-acoustique de la harpe de concert" (Doctorat, Académie de Nantes, École Doctorale de L'Université du Maine, 2006); J-L. Le Carrou et al., "Vibratory Study of Harp's Soundboxes," in *Proceedings of 20th International Symposium on Music Acoustics* (Sydney and Katoomba, Australia, 2010), 5. This article tested the soundboxes of harps with a *pédale à renforcement*, but the differences between a closed soundbox and an open one are not included in their paper.

⁵⁰See section 4.5.1.

⁵¹Herbst, *Ueber die Harfe*, 13.

⁵²Cousineau, *Méthode*, 1803, 62.

⁵³Pierre Augustin Caron de Beaumarchais, "Arts," *Journal de Paris*, February 8, 1786. Pierre-Augustin Caron de Beaumarchais (1732-1799), French polymath. Donald Spinelli, "Beaumarchais, Krumpholtz, and the Harp: An Unidentified Letter," in *In Pluralism and Criticism*, ed. P. A. Giordano and A. J. Tamburri (West Lafayette, Indiana: Bordighera Press, 1999), 302-8. The letter is transcribed and translated into English in this article.

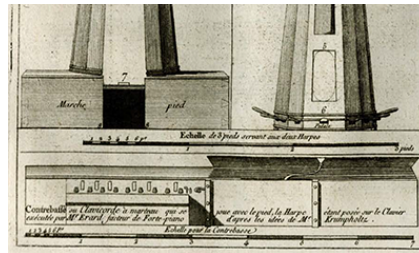


Figure 2.7: Krumpholtz's *Contrebasse ou Clavicorde à marteau*, Op. 14, 1788.

Thomas Jefferson and, Richard and Maria Cosway⁵⁴ visited Krumpholtz on August 2, 1786, in Paris.⁵⁵

Correspondence from Jefferson to Francis Hopkinson discuss Krumpholtz's "Foot-bass". In a letter from December 23, 1786,⁵⁶ Hopkinson writes:

I have lately examined a Foot-bass newly invented here, by the celebrated Krumfoltz [*sic*]. It is precisely a Piano forte about 10 feet long, 18 inches broad and 9 inches deep. It is of one octave only, from Fa to Fa. The part where the keys are, projects at the side in order to lengthen the levers of the keys, thus It is placed on the floor, and the harpsichord or other piano forte is set over it, the foot acting in concert on that while the fingers play on this. There are three unison chords to every note, of strong brass wire, and the lowest have wire wrapped on them as the lowest in the piano-forte. The chords give a fine, clear, deep tone, almost like the pipe of an organ."

Hopkinson replies on April 14, 1787:⁵⁷

"The Pedal to the Forte Piano is a good Thought. The Idea is taken from the Pedal Stop of a Church Organ."

The three inventions were presented to the *l'Academie Royale de Sciences* on November 17, 1787, the report was written on November 20 and accepted on November 21 of the same year.⁵⁸ On that occasion, Madame Krumpholtz⁵⁹ played

⁵⁴Thomas Jefferson (1743-1826) 3rd president of the United States, Minister to France for the Congress of the Confederation 1784-89. Richard Cosway (1742-1821), English portrait painter. Maria Hadfield Cosway (1760-1838), English-Italian painter and educator.

⁵⁵Thomas Jefferson, "Founders Online: From Thomas Jefferson to Maria Cosway, 12 October 1786," Letter, (October 12, 1786), <http://founders.archives.gov/documents/Jefferson/01-10-02-0309>.

⁵⁶Thomas Jefferson, "Founders Online: From Thomas Jefferson to Francis Hopkinson," Letter, (December 23, 1786), <http://founders.archives.gov/documents/Jefferson/01-10-02-0479>.

⁵⁷Francis Hopkinson, "Founders Online: To Thomas Jefferson from Francis Hopkinson," Letter, (April 14, 1787), <http://founders.archives.gov/documents/Jefferson/01-11-02-0277>.

⁵⁸A-Wgm, Ms. The pages include the proposal of Vandermonde et Haüy for the *Academie* to hear Krumpholtz's new inventions, Krumpholtz's letter of presentation and an undated report of the presentation, which differs from the extract that is published in Op. 14. I thank Prof. Robert Adelson for re-discovering these pages.

⁵⁹Anna Margarita/Anne/Julie Steckler-Krumpholtz (1766/68-1813), harpist and composer, second wife

the harp and the new “piano-forte contre basse”⁶⁰ and Krumpholtz played the violin.⁶¹

Sometime after November 1787, Naderman published Krumpholtz’s Op. 14, which includes three folios, providing the technical and practical information regarding Krumpholtz’s inventions.⁶² The first folio *Planche 40 ou 10* describes the *sourdine* pedal, the second folio contains technical drawings of how to construct this ninth pedal and the final folio includes drawings of the shutters, the soundbox for the harp, the *Contrebasse ou Clavicorde à marteau*, a list of signs and symbols for the *pédale à renforcement* and an extract from the public presentation of all of these inventions at the *l’Academie Royale de Sciences*.

This drawing of the pedal board gives a range from F1 to G. It was placed under the harp and played low bass notes with the feet. A *pédalier* made by Erard and dated 1805 is preserved in the collection of the Musée de la Musique in Paris. The range of this instrument however is F1-c and Joel Dugot states that it would not be possible to place a harp above it.⁶³

From the *Academie des Sciences*’ report, Madame Krumpholtz performed Op. 14. It is not clear whether she performed both sonatas, or only Op. 14, *6^{me} Sonate*. Krumpholtz’s *6^{me} Sonate* is the work with the most *pédale à renforcement* and *sourdine* pedal indications in any published score. But there are no indications for the *Contrebasse ou Clavicorde à marteau*. It is also not known what the Krumpholtz couple would have played together. There is no extent violin part for Op. 14. The *Amante abandonnée*, *Air Parodié sur l’Adagio de Œuvre XIV* for violin, voice, harp or piano and “contrebasse”, on the other hand, does have a violin part and the “contrebasse” is not written on a separate staff, but shares the bass staff of the harpist’s left hand. There are much fewer *pédale à renforcement* indications⁶⁴ in the *Amante abandonnée* compared to the *6^{me} Sonate*. This could indicate that the harpist played the *Contrebasse ou Clavicorde à marteau* in this piece with the left foot. However, no singer is mentioned in any historical reference of the Krumpholtz’ presentation.

Herbst dedicates a paragraph in his method to the “Contrabasse” or “Krumholz.”⁶⁵ He writes that it is eight to nine feet long and one places the harp on top of it and plays both instruments upon a high stool.

of Jean-Baptist Krumpholtz, mother of harpists Victor and Melanie Krumpholtz.

⁶⁰“Registres de l’Academie Royale des Science”, November 21, 1787, transcribed by Krumpholtz in Op. 14, 42.

⁶¹Dugot, “Sonorités inouïes,” 87-109.

⁶²Ibid., 108-9. Dugot transcribes the two folios.

⁶³Ibid., 97. The author has not seen this *pédalier* in person.

⁶⁴See section 4.5.1.

⁶⁵Herbst, *Ueber die Harfe*, 14.

2.3.4 Cousineau's fourteen-pedal harp

Jacques-Georges Cousineau⁶⁶ invented a harp with fourteen pedals in 1782.⁶⁷ This harp has thirty-seven strings (range F-g3) and a *béquilles* mechanism.⁶⁸ It has two layers of pedals, the upper layer consists of seven short pedals and the lower layer has seven longer pedals. Each pedal alters a string by one semitone. The harp is tuned in C-flat major. The upper short pedals alter the seven strings of the octave from the flat to natural position and the lower longer pedals alter the seven strings from the natural to sharp position.⁶⁹



Figure 5 a. *Hochbrucker single action*
 b. *Cousineau double-pedal single action*
 c. *Erard single pedal double action*

Figure 2.8: Cousineau fourteen-pedal harp, compared to other pedal mechanisms (After Maydwell, 1980).

The author has identified no music that specifically requires the use of the fourteen pedals. It is an example of an instrument building that precedes the musical developments of its time.

⁶⁶Jacques-Georges Cousineau (1760-1836), harpist, composer and publisher, son of Georges Cousineau.

⁶⁷Adelson, Roudier, and Duvernay, "Rediscovering Cousineau's Fourteen-Pedal Harp"; Antony Maydwell, "Georges and Jacques-Georges Cousineau and the Harp in the Latter Half of the Eighteenth Century," *Studies in Music (University of Western Australia)* 14 (1980): 67.

⁶⁸See section 2.2.3.

⁶⁹I had the privilege to string this harp and understand the pedals in 2011 with Prof. Robert Adelson. Robert Adelson, historical clarinetist, musicologist and organologist, and Professor of Music History and Organology at the Conservatoire à Rayonnement Régional de Nice, France. Between 2005 and 2016, he was Curator of France's second largest collection of historical musical instruments, housed in the Musée du Palais Lascaris in Nice.