PEDAL HARP JAKOB HOCHBRUCKER, DONAUWÖRTH, 1728
THE HARP

The small single action harp with the slim body appears very elegant and filigree. It has seven short pedals with a sophisticated spring mechanism that allows keeping them engaged. From its design and construction the harp can be regarded as the work of a gifted instrument maker. The elaboration is of the highest quality, which concerns also the extremely perfect and well thought mechanism. The harp is signed and dated only by the manufacturer of the mechanism.

The body shell consists of four curved staves made of poplar wood, the outside is covered with sycamore-maple veneer. The sound board is of fine spruce with vertical grains. The neck has a hollowed space for the mechanism and is covered by a thin lid. The upside of the neck is stepped to contain the brass tuning pegs, which projects only little from the neck. The straight forepillar from maple is extremely slim, slightly tapered to be thinnest at its bottom end.

Three screws at the three corners of the harp suggest easy dismantling, assuming that the harp could be designed as a travel harp. Actually it could be rapidly turned into a slim package if the connection of the pedal wires would not resist to that. In fact, it is not possible to take the pedal wires off from the bell cranks and to fix them again, without an elaborate working process done in the studio.

Total height 1395 mm, width 540 mm. 34 strings; compass G1 to eb\(^3\), according to the painted letters at the neck. 7 pedals; single action mechanism with 30 turning crutches.

ORIGIN AND ATTRIBUTION

The harp was sold to me by a private person in February 1992. It came from a liquidation of a music shop in Uster, Switzerland.

For a long while, I kept the harp without any idea of a manufacturer’s name and I could not receive any hint even by colleagues. It was only clear that it must be the work of a highly skilled and innovative maker. In this context, I can refer to a harp at the Museum Bellerive, Zurich (no. 1963-60, 25), which was presented as a gift to the city in 1963 by the collector Hug. That harp of the same size and type is a bit more elaborate in woodwork and probably produced a bit later, but also without a label.

Only in 1997 (in the framework of cooperation for the Berlin harp catalogue) I was able to make a comparison with the harp SAM 565 of the Kunsthistorisches Museum Vienna, with the kind support of Dr. D. Droysen-Reber. That harp, labeled "Hochbrucker, Donauwörth 1720", differs in the external appearance of sound box and pedals, but convincing parallels in substantial parts can be observed, thus justifying the attribution to Jacob Hochbrucker (1673-1763).

The identical "Zurich" Harp shows varied details, which allow intermediary comparisons. For the Vienna harp on the other hand, it is to bear in mind that their pedals and the pedal box most probably have been changed essentially in the 19th century. Unfortunately I never have seen one of the often mentioned five-pedal harps by Hochbrucker.

JACOB HOCHBRUCKER

The German Jacob Hochbrucker (1673-1763) of Donauwörth, son of a violin maker, has constructed the new invention of the pedal harp in 1699 as one of the first makers. He has started making a five-pedal harp first (after Fétis Biographie universelle...1839), but in 1720 his harp with seven pedals was already well known. Only now he could create his family’s live more comfortable after he had to play dance-music on peasant’s feasts before\(^1\).

In 1729 his first-born son Simon introduced the new pedal harp with great applause at the Austrian court before Kaiser Karl VI. In 1740 the German harpist Stecht might have introduced this harp in Paris (again after Fétis).

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\(^1\) After an article by Ludwig Wolf "Johann Baptist Hochbrucker und die Harfenmode in Paris" in „Musik in Bayern“ 1985.
Two other musicians of the Hochbrucker family have succeeded as composers for harp: Jacob’s son, Johann Baptist (> *Six Sonates pour la harpe*, dedicated to de Rohan, 1762) and the nephew of Jacob, Pater Coelestin (> *Six Sonates pour la harpe*, dedicated to de la Guiche, ca. 1771).

However the invention of the pedal harp was claimed by several makers: J.P. Vetter of Nuremberg and Johann Hausen of Weimar are often mentioned. The French harpist Mme de Genlis writes in her “Méthode…” of 1805 that the German musician Gaeffres had invented the pedal harp in 1745 and has built 4 or 5 such harps in Paris. Goepffert (Gaeffre) has played the pedal harp at the Concert Spirituel in 1749. Garsault also mentioned Goepffert in 1761. But his honour as an inventor is raised in doubt by P. Maquer in 1773 - for him the Italian Petrini has invented the pedal harp.

Even if Hochbrucker shall not really be the inventor, he surely has built the most perfect and sophisticated pedal harps, as the existing instruments may prove (I had many occasions to see other pedal harps of that period).

**STATE BEFORE RESTORATION**

The harp is in very good shape, the body well straight, the soundboard is flat. The mechanism responds easily to the pedal action. In the bass there are five thick plain gut strings of modern gauge, they did hardly fit into the small holes of the tuning pegs. The center strip (bridge rail) is ripped off the resonance board on the entire length and is broken in the lower part. Fortunately, the sound board is not damaged. After this failure the stringing-work was apparently aborted, to the great happiness for the wonderful instrument.

The metal parts are complete, the brass shows little oxidation, but the iron parts show hardly rust. The varnish is slightly dusty, on a few points it appears rubbed off in cause of use.

Inside the harp a major effort of changing is to observe, worked out on the unopened instrument through the hole in the bottom block: Most of the numerous ribs of the soundboard (wide, thin ribs of willow) are thinned down by rough scraping. Then it was tried to make this procedure undone by reinforcing these ribs again with small pieces of wood (taquets), as far as it could be realized from the outside. Single taquets have fallen off the wire, and stick slightly far from the desired place. It is not to exclude that the harp maker himself wanted a correction, but repented and tried to undo. In the above-mentioned harp in the Museum Bellerive the ribs of the soundboard have been executed in a different manner (with upright spruce ribs).

**CONSTRUCTION OF THE SOUND BOX**

**Soundboard:** the broken bridge rail makes the constructive particularities of this sound board visible. To make the sound board loadable again, it will be necessary to remove the failed reinforcements and to renew those ribs that have been scraped too thin.

Based on the sketch aside, the complex design can be explained.

The sound board consists of two thin spruce boards (about 2 mm thick) with the grains running lengthwise. In the middle they are inserted and glued into the grooves of the H-shaped bridge rail (center strip) from both sides. Thus they rather perform the function of a membrane without static task. The bridge rail is coated with snake-wood. The sound board edge is glued inside a small fold at the edge of the body shell and covered inside with a black fabric tape.
The **body shell** is made up of four curved staves, shaped from poplar wood, but on the outside covered with maple (sycamore). The overall thickness is about 5 mm, and varies greatly; the maple layer is about 2 mm thick.

The **top block** is glued into the shell as a long wedge from pear wood; it has an opening right side for the pedal wires. Above the body it is defined as shoulder part in where the neck is embedded – slightly asymmetric to the right side.

The **bottom block** - also made from pear wood - is a generously cutout frame, 7 holes are spread symmetrically on the outskirts to bear the pedal wires. Through the large aperture of the bottom block some interventions in the body shell have been done.

### MAIN RESTORATION WORKS

#### Dismantling the harp

The three screws at the harp’s corners are opened quickly, but it is not easy to take the pedal rods off the bell cranks; so first I take the wires off the pedal couplers and pull the whole bunch through the opening of the top block. The upper ends of the pedal rods are hooked into the bell cranks; some skill is required in order to loose them off. Nevertheless I broke three of the small, angular hooks. I see that the end hooks were fixed into the brass levers by fine threads or grooves, acting like claws. Fortunately, the wires are long enough to equip them with new hooks later. The pedals and their springs are easy to unscrew. The tuning pegs can be turned out easily.

#### Sound board:

My first concern is restoring the original sound board construction. Thus I have to make undone the unlucky changing (which may have been executed possibly – but not absolutely – by Hochbrucker himself). Even if these changes should have served for a desired sound improvement, it is clear today that the operation failed: a number of the scraped ribs appear thinned down to the sound board level. Another indication that the desired purpose has failed, is given by the twenty diamond-shaped (or some rectangular) taquets, some of spruce, some of willow. They should stabilize again the weakened ribs. The taquets, coated with plenty of glue, have been brought in through the bottom block, pinned on an iron stick and such placed to the desired location. Some taquets are slipped out of place; one has even dropped from the stick.

To restore the original design correctly and without compromises, I have decided to take the sound board off the body shell.

The bridge rail now is finally removed after it is already torn from the inner side by the mismatching string tension. I remove the inner leavings for to replace them later by new parts from maple.
Sound board and body shell as found after opening.

Now, as first I shall remove all taquets from the ribs. Then, the weakened and scraped ribs were removed from the sound board. The lower 13 ribs stay original, as well as the 4 top ribs. I reconstruct the other ribs from willow, according to the determined measurements.

The body shell is completely intact; I do not find any work necessary.

The preparing of the sound board attachment is done cautiously; it is a delicate work, because it has to happen quickly, and no opportunity for later correction is given. Initially I prepare a suitable counter-mould from thin hardboard which shall press with their narrow, padded bars onto the edges of the sound board, using rubber bands and cord windings to tighten. With a "dry training" I can assure myself that the order of acts works well and all accessories are ready.

No work is necessary on the neck and pillar. The neck is made of solid maple; on the left hand side it is covered with a sycamore maple veneer by 2 ½ mm thickness. The under side is rounded and painted black; the upper side is chamfered. On the left hand side the tone indications are paint in different colours onto the varnish: "G A H C D E F ...... E".

The pillar is also made of solid maple; the inner side (towards the player) is rounded and painted black. The side cheeks are covered with a veneer of sycamore-maple while the black front edges are made of ebony.

No work is necessary on the base board. It consists of a hollowed piece of pear wood and is painted black outside. A crack once was glued with white glue.
**Varnish:** At three patches on the sound box the varnish is rubbed off by frequent playing use: right side near top by the right forearm; left side by leaning it against the knee and chest. I apply a matt acrylic varnish (Lascaux) to these places, on one hand to protect the bare wood and on the other hand to keep visible the "organic" wear.

**Signatures on mechanism:** During the dismantling of the mechanism some signatures have appeared. The most important one – because it bears a date – appears in the fifth link rod. It reads best as a “G O’ do’ 1728”. Certainly it is the signature of a watchmaker, who was entrusted with the manufacture of the mechanism. A watchmaker’s help is to presume because of the linkage material (thin, blue spring steel) on one hand, the tiny adjusting screws on the other hand and generally the fine elaboration of the mechanism. A splitting of the tasks according to métier (materials) or even after craftsmen guilds is generally given for this epoch.

Reading trials: G O do... or S O do... or 8 Octo ...? What is clear: 1728; (L?) might be the signature of the executor. "do" could mean Donauwörth, but also (anno) do(mini).

A further signature is on the back of the first linkage, where „Blakey” is engraved by a practiced hand. About a metallurgists and surgeon named Blakey I could find a reference in the internet, telling that his father was trading on watch springs. It could well happen that our spring material is imported good.

The mechanism is in well working condition. In order to be able to clean all parts, I dismantle the whole linkage. Now I can clean the brass parts (lever axles, crutches, bearing rings, adjusting screws) with “Sigolin” and distilled water. I leave the bridge pins and semitone pins in the neck and rub them with a bit of Sigolin.

The re-installation of the mechanism into the neck goes easily ahead. Since the lever axles have enough clearance in the wood and move easily, I insert them dry (without tallow).

The connection of the pedal rods with the bell cranks becomes somewhat more difficult. Since all seven cranks are on closest area on one axle, little clearance remains between the levers. Then I slide the bunch of rod wires through the top block into the body. Now the cleaned pedals are assembled, the springs are attached and the pedal couplers are screwed onto the pedal rods. The couplings are connected to the pedal levers by tapered pins.

**Function of the mechanism:** The seven pedals – connected by the pedal rods which run through the sound box – are acting the seven linking rods, hidden in the hollowed neck. The linking rods are connected to the brass levers, whose axles lead through the neck to the left exterior. Here the turning crutches are inserted through the square openings of the axles. Each crutch is locked to its axle by a small grub screw and thus enables an adjustment. The crutch is square at the upper end while the lower end is spatula-shaped, in order to grasp the string properly. When e.g. the C- pedal is pressed down,
the crutches of all C-strings turn and press the strings laterally against pins, thus limiting the vibrating length of the strings.

The **pedal parts** are forged of iron and marked with I - VII from left to right. The layout results from the belonging to the linkage in the neck; without crossing the pedal rods the order B - C - D - E - F - G – A is given. This layout may be seen also on the Zurich harp, while the Vienna harp SAM-565 shows the normal order DCB-EFGA, but the pedals might have been exchanged in the 19th century.

The **pedals** do not have pedal tongues, but end as short stumps, which are acted by the shoe tips. Two rectangular holes are forged into the pedal shaft right under the sound box edge: the pedal coupler is attached to the inner hole by a small tapered pin (the coupler is screwed onto the rod end); the outside hole is for the detent (a brass tongue with a spring, screwed at the body shell). If the pedal is pressed downwards, the detent holds the pedal down by the cut-out edge. If the shoe tip presses the detent against the body shell, the pedal can release, pulled upwards by the reset-spring located in the head of the harp. Probably the Vienna harp was originally furnished with the same system.

**Stringing:** Unfortunately nearly no splits of old strings are found to be assigned. Only for the notes ab° 0.78 mm; eb₁ 0.60 mm and ab² 0.36 mm the squashed splits remain in the string holes. The diameters of the holes of tuning pegs give little information. Nevertheless, they are quite small.

I have reconstructed a probable stringing after the three splits of strings, it results about 140 kp total tension at a¹ = 415 Hz, tuning in E-flat Major (or B-flat Major). Since the forepillar begins slightly to bend after the first trials, I reduce the overall tension down to 112 kp (1100 N) and I keep the tension curve relatively flat, so that as less pressure as possible is acting on the forepillar (pressure on pillar 65 kp / 640 N; pressure on top block 47 kp / 460 N). The lowest four gut strings are wound strings: G1, As1 and B1 with silver wire, C with copper. The string buttons from boxwood are hardly original and have no grooves. I cut them with grooves and I renew five missing buttons in stained boxwood.

It appears that the weakest part in the harp is not the sound board, but the extremely slim forepillar, which deviates slightly from the straight line even without string tension. Perhaps this results from a slight warping of the wood, but also possibly by the pressure throughout the time of its use.

Of course, it is primarily the matter to treat the harp very gentle in order to avoid any deformation. Even my very light stringing should be tuned only for a **temporarily playing**; otherwise the harp shall stay with the string tension released. Reasonably a permanent use by a harpist should not be expected to this wonderful harp: the benefits of playing techniques shall be weighted less than the safe preservation of the valuable instrument.

**Adjusting:** To adjust the pedals (retighten the rods), the holding pins must be taken out and the couplers must be screwed further in, until the pedal rods keep slightly stretched and the pedals are pulled tightly to the bottom block (by the force of the reset springs, placed in the head of the harp). Therefore the effect of the crutches also needs our attention: by stretching the pedal rods, the pressure of the crutches onto the strings increases and can be influenced that way. Furthermore, the crutch can be adjusted in its length by help of the adjusting screw (grub screw), this also affects the pressure.

**Intonation:** The temperament of the harp is difficult to determine, because the shortening amount of the vibrating strings lengths by the mechanism appears of various size. It seems generally possible that
a meantone temperament was intended. Anyhow, a practical approximation to an even temperament of “6th comma” seems the most realisable solution (thus the pedal increase shall be 86 cents).

THE SOUND

The harp can be played now with the light stringing. Despite its minimum string tension the harp sounds surprisingly energetic and has a quick response. Generally the sound is very direct, bright and almost silvery, as the thin gut strings promote numerous overtones. The bass is well marking, especially when the strings are plucked close to the neck, what would be the case anyway if the player is standing. When playing in sitting position, the bass can be plucked also close to the soundboard.

The harp could be played already by renowned harpists, who are very familiar with historical harps; especially by Masumi Nagasawa and Mara Galassi. After the audition the string tension was released again.

THE ACTUAL LOCATION

The harp was acquired early 2009 by the Musée de la Musique Paris (mus.-no. E.2009.1.1) and is on permanent display; a playing sample can be heard with the “audioguide”.