Building a Swedish Clavichord after Lindholm-Soderstrom

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Eugene, OR Chapter

Introduction

Bjarne Dahl, a collector and restorer of early keyboard instruments in the San Francisco area, has said that the late Swedish clavichords achieved the pinnacle of clavichord "technology," that in these late instruments the clavichord went as far as it could go, both in technical and musical refinement. One of the instruments in his collection is a Specken clavichord he acquired in Copenhagen in the 1960s. My first encounter with that Specken inspired me to learn more about and build Swedish clavichords. I had grown up with a clavichord and was acquainted mostly with Hubert style instruments ***(Editor's Note:*** *Christian Gottlob Hubert was a German instrument builder who lived from 1714-1793)* of which I had built one model; the C-g''' ***(Editor's Note:*** *Piano technicians know these notes as C2-G6)* in Nürnberg, but the Specken, having been made in Sweden, the land of my ancestors, had a magic and irresistible quality that attracted me instantly. Not long after that experience, Eva Helenius-Öberg's book (*Swedish Clavichord Builders 1720 - 1820*) came out and I acquired the drawing of the 1743 Specken in the Musikmuseet (The Stockholm Music Museum). Shortly thereafter a commission to build a Specken was received. That instrument was shown at the Boston Early Music Festival in 1997, which caused an enthusiastic player to inquire if I would entertain building one of the late Swedish instruments.

Research

Following that request, I set about building a clavichord in the late Swedish style, specifically, an instrument after Lindholm-Söderström, built in 1806. Three instruments were examined prior to commencement of building: the actual prototype at Finchcocks ***(Editor's Note:*** *Finchcocks is a museum and performance Center in Kent, England housing over 70 pianos, harpsichords, and clavichords)*, a 1780 Lindholm owned by John Barnes (whose restoration report appeared in Clavichord International just before his death), and a 1796 Rackwitz in the Edinburgh collection. In addition, I had the good fortune to examine an actual soundboard removed from a 1793 Lindholm, lent by Steve Barrell. Before examining the three clavichords, I had acquired an excellent drawing of the Finchcocks instrument, and was acquainted with aspects of their structure, and of course I had the Helenius-Öberg book. It was shocking to hear the two playing examples. My heart sank when I realized that these large instruments with their enormous sound boxes and huge soundboards didn't produce very much sound. Both instruments seemed stifled and difficult to play. Each had been recently restored, and I had nothing with which to compare them. Faced with building them, I resolved to proceed in the belief that they were capable of producing more than I had heard.

The consistency of design of these clavichords over a span of more than thirty years is striking. This is particularly noteworthy considering the number of makers active in Sweden, of whom Lindholm was the most famous and prolific. The Rackwitz of 1796 is uncannily similar to the 1806 L-S. The 1793 Lindholm soundboard fits almost exactly the soundbox of my reproductions! There are three designs that evolved – FF-a''' (F1-A6), FF-c'''' (F1-A7), and a few CC-c'''' (C1-C7) giants. All have a 4' in the bass, though the number of strings decreases in number as time goes on. The FF-c'''' models begin to appear in the early 1780s, which is surprising in that fortepianos generally hadn't attained this range this early.

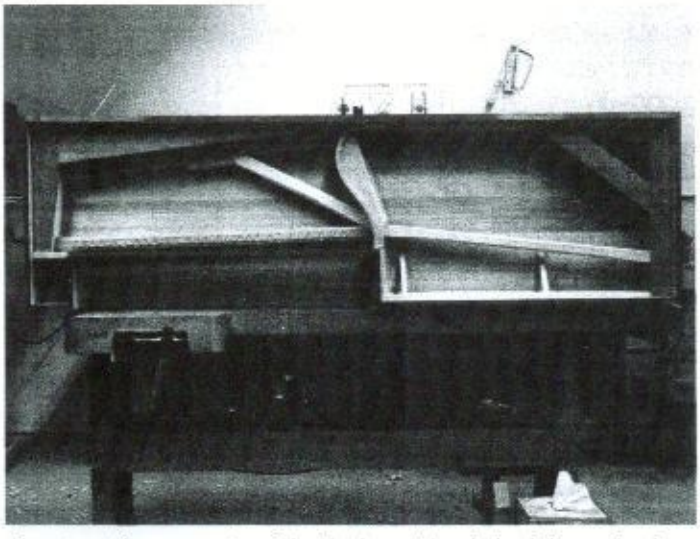

Photo 1 — Plan, or over view of clavichord case. Note the key balance rail and recess for the keyboard on the left side. The soundboard is installed on the right side, with strings running roughly parallel to the keyboard.

One is also struck by the unique relationship forged between the theoreticians at the Vetenskapsakademien (Academy of Science) and the instrument makers back in the 1740s. Acoustical ideas emanating from the Academy, such as the grain direction of the soundboard, were actually put into practice by the instrument builders. Specken adapted these theories to the clavichord design that he brought from his native Saxony, which improved the instrument dramatically. The history of the Swedish clavichord through to its end is a testament to the strength and logic of these ideas.

Building The Case

In my instruments, the case materials used are at variance with the originals; however, all the materials are conifers. The baseboard and all structural parts – hitch-planks and wrest-plank supports under the oak sections – are quartered Sitka spruce. The case stock is what is known in North America as "sugar pine." Both of these woods are from the northwestern United States where I live. The sugar pine is lighter than the Scandinavian pine of the originals. It is a beautiful and stable wood, has a nice tap resonance and is up to the stress born by these large clavichords. The quartered Sitka spruce bottom measures 36mm (1.4") thick, is good enough for soundboards, and, in spite of their fifty pounds of heft, are surprisingly resonant by themselves. I suspect they are a more live acoustical agent than their slab-sawn original cousins and, in that respect, are more than mere structure. There is no trenailing ***(Editor's Note:*** *A trenail is a wooden peg that swells when wet, used to fasten timbers)* of the baseboard to the case; instead, the joints are reinforced by triangular fillets on the interior, where not already reinforced by the massive wrest-plank and hitch-plank sections.

The late Swedish instruments have two unique structural members that, in not contacting the baseboard at all, turn the whole structure into a simple but effective truss. They consist of, firstly, a large strut between the bass wrest-plank and the belly rail, parallel to the bass strings, running downhill from the wrest-plank. On the other side of the belly rail is a second diagonal strut butting the member just described and the treble end of the balance rail. It runs at a more extreme angle into the key rest rail, just above the baseboard and just below the level of the keys. (See Photo 2)

It is beautiful and simple triangulation and it works. The Finchcocks instrument and the two instruments I have made so far have negligible twist. I feel certain that the case distortion Barnes describes in his 1780 version reveals that this feature had not yet been incorporated to counteract the inevitable twist of the case. The Rackwitz, also an FF-c"" instrument, has this feature. The strut under the bass strings

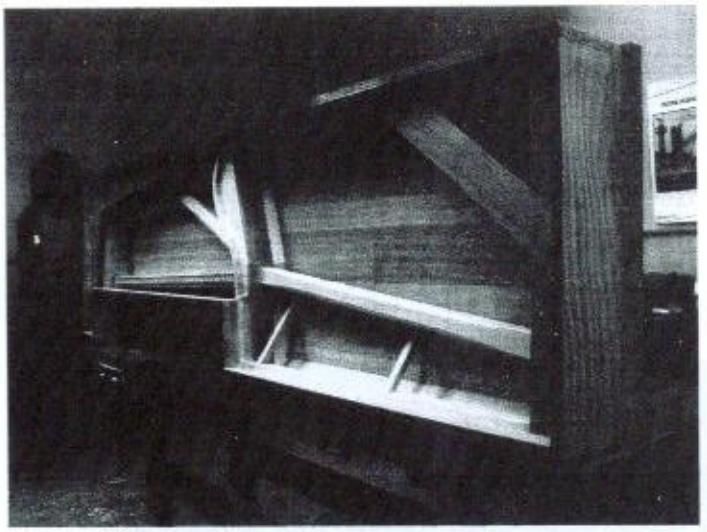

Photo 2 — Here you can see the two trusses, which help to prevent case twisting. The large strut, in the foreground, runs between the bass wrest plank and the belly rail (about halfway across the instrument). The smaller strut runs from the belly rail-balance rail intersection to the rear case side. Note also the two small diagonal struts at the front of the instrument and the "mouseholes," the small one through the treble cheek at the end of the keyboard recess, and the slightly larger one through the belly rail at the back.

is extremely resonant, and when tapped lightly, can be felt through the bottom in the key well. Might it be a sonic element as well? I think so, in a subtle way; so much is subtle in these large and seemingly un-subtle instruments.

Additionally, there are two small diagonal struts between the front piece of the sound box and the baseboard. These certainly buttress the case side, but their relatively small size and position leave me a bit puzzled. The one on the left side is so close to the front-treble cheek joint that its usefulness escapes me. The second is located a bit to the right of center. Perhaps they are able, as they engage the liner, to transmit some vibration from the soundboard back to the baseboard.

The Interior

The keyboards are made of the same sugar pine as the case stock. The extreme crank and length of the treble-most keys create some physical problems involving torsional forces on the balance mortise and the ability of the key to flex laterally. Some effort was required to make these keys work easily and well. In addition to undercutting of the heads, some lead was needed. I have wondered if the stiffer pine of the originals might account for some of the playing difficulty I encountered; if there might be more inclination for the key to "chuck" if not perfectly executed (not taking into account pitch, scaling, string diameters, and their cumulative effect on touch.) Perhaps the somewhat less stiff wood I use absorbs a bit of the violence of the strike. I will have an opportunity in an upcoming instrument to use

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genuine Swedish pine for the keyboards and case stock, and look forward to having a real comparison.

Comment is also warranted on the "Swedish rack." Its simple system of a leather-lined key riding in a superimposed wooden channel is as quiet a guiding system as I have encountered. (See Photo 3)

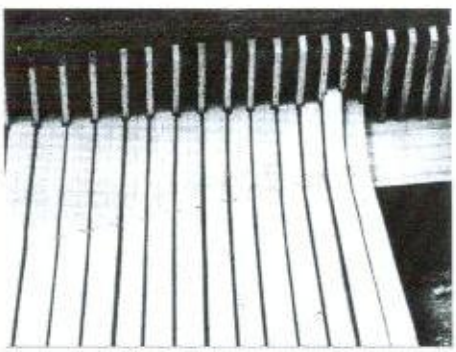

Photo 3 — The Swedish key rack uses leather lined keys and wooden channels rather than a more commonly seen pin or slip riding in a slot.

This system offers great benefit in keeping the key laterally stable in its vertical excursion. It is consequently a great help in the torsional problems of the treble keys, and is superior to a pin or slip riding in a noisy slot.

The soundboards were made of spruce from the Italian Alps. Here too, I will soon have an opportunity to use soundboard-grade wood from Sweden, which is the stiffest I have ever seen. The speaking soundboard is defined by the cantilevered belly-rail and the perimeter of the wrest-plank. There is no "through" area to the far right rear corner, as the treble wrest-plank support runs its entire length. It is completely sealed off. There are two "mouseholes:" a large, long one through the belly-rail, and a smaller one through the treble cheek. The cantilevered piece over the treble keys is a challenge; it must be strong enough to support the treble soundboard but thin enough to allow clearance for the removal of the treble keys that work underneath. The bridges are of beech. The 8' bridge seems to be the ideal profile and mass to allow excellent dynamic range without sacrificing sustain. (See Photo 4)

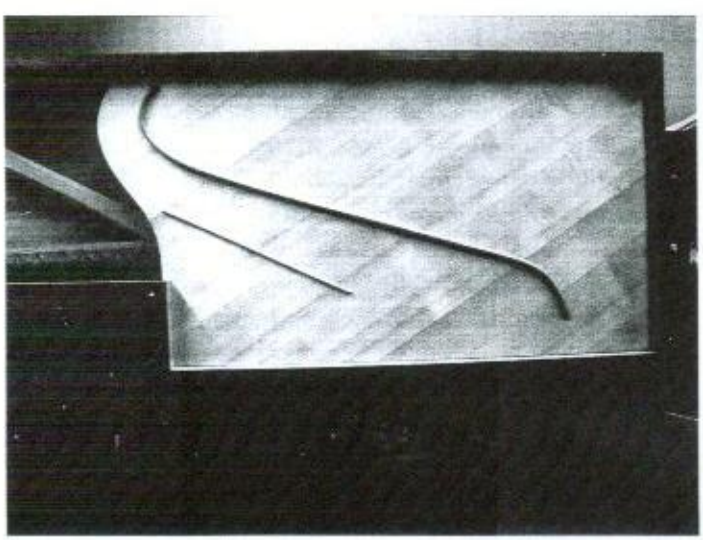

Photo 4 — Italian spruce soundboard, with 8' and 4' bridges, installed.

There are four ribs parallel to the 8' bridge, the second one from the front doubling as the 4' hitchpin rail. The combination of diagonal soundboard grain and the bridges and ribs crossing at near-right angles causes the board to be incredibly rigid, dynamic and stable, particularly the area between the 8' bridge and the wrest-plank. This is one of the masterstrokes of the design. (See Photo 5)

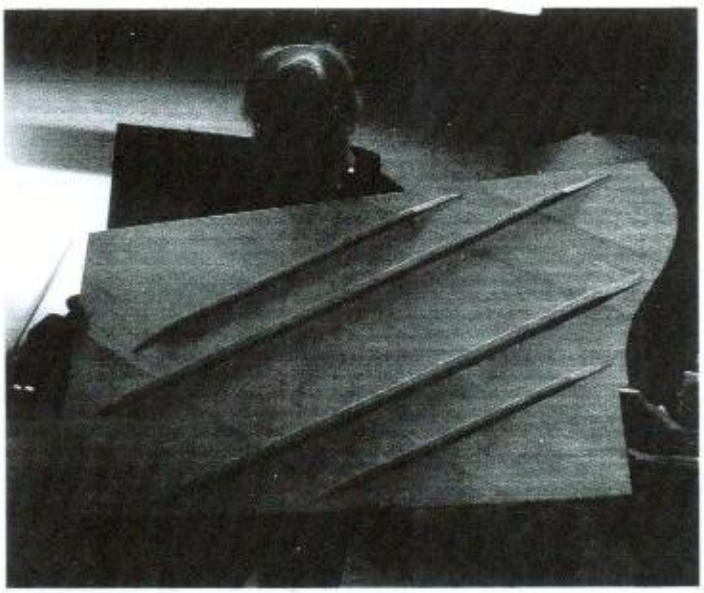

Photo 5 — These four ribs run parallel to the bridges and at near-right angles to the grain of the soundboard, one of the masterstrokes of this design.

The after length of the strings, much longer than in German designs, produces an incredible amount of sympathetic energy, causing the sound to shimmer. The ability to sustain would be choked off were there any attempt to damp this. Accordingly, overdoing the listing ***(Editor's Note:*** *The "listing" is the felt woven through the after length of the strings.)* beyond the tangents can reduce the dynamic ability of these clavichords. This was proven to me in my own instruments, when the listing was reduced to as little as necessary, with no dense weaving in the area between the tangents and hitch plank. The sonic contrast to the originals I had seen could not be more dramatic.

The stringing chosen largely reflects the list appearing in PekkaVapaavuori's article on the CC-c"" Söderström in Finland (the May 1999 issue of *CI*). As this clavichord has its original strings, it seemed a logical course. I did not use wrapped strings in the extreme bass. Examining the bridge of the 1793 soundboard, I could see no evidence that it ever had wrapped strings. Based on the musical result, I see no need for them. The combination of un-wrapped strings and 4' yield a robust bass and the ability to play quite softly without a "spit-

ting" effect. The transition into the notes with 4' is the least abrupt I have heard. The two Hass clavichords I have heard had a much more noticeable transition. The 4' bridge sits completely on live soundboard. The 4' was strung so that the strings were at a slightly higher level than the 8' at the point of the tangent, enabling a soft strike to not even engage the 4' string. The ability of the iron wire to sing right up to the top C is one of its most exquisite qualities. I pitched the clavichords at A-420, based on Grant O'Brien's article on the Rackwitz clavichord in *de Clavicordio* 1995. They seem quite happy at this pitch level, and their tuning stability is nothing short of extraordinary.

Conclusion

In the clavichord circles with which I have been associated, a great deal of time is spent debating the contention that fretted clavichords are superior to the un-fretted, and whether it is only appropriate to play certain music on one or the other type of instrument. ***(Editor's Note:*** *In fretted clavichords, the same string produced two or even three notes, depending on where the tangent struck the string. Unfretted instruments used one string or set of strings per note.)* That the instrument performs musically is more important to me than any other consideration. For me, the large Swedish clavichords seem able to convey almost anything in a musically satisfying way.

I would like to close with some words from one of my customers: "This Lindholm is a perfect clavichord. Lindholm really figured out all the right acoustic answers. Unlike most other early instruments, Lindholm's late innovations do not cancel out or nullify anything that any earlier clavichords were trying to achieve. It can correctly play any music ever written. You DO need a dozen different flutes, lutes, viols, harpsichords, fortepianos, violins and bows, etc. to cover all the different periods and styles. You need only one good clavichord! I have put all my other clavichords away. They are nice, but I just now don't need them!" What greater satisfaction could a maker of musical instruments receive?

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Andrew Lagerquist worked in Frank Hubbard's shop outside Boston from 1973-1978, and for a time in the shop of William Dowd. In 1982, he was invitied to work in Switzerland, in the shop of his colleague and friend, Werner Iten. It was there he built a Hubert clavichord, which kindled his interest in clavichords. From 1983-1989, he worked for John Phillips in the Bay area, doing harpsichord musical finishing and keyboard making. Since that time, he has pursued clavichord building, as well as free-lance tuning for such organizations as the Philharmonia Baroque Orchestra; the San Francisco Symphony, Opera and Ballet; and the American Bach Soloists. In 2002, he relocated to Oregon to pursue his interest in Swedish clavichords as well as slow down the pace of life. ■

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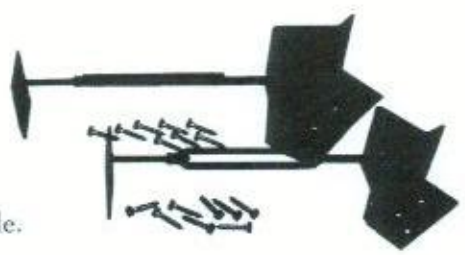

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