



# Repair of 1895-1900 Concert Zither



**Performed by Ron Cook**

**November 2006 - January 2007**

**For Dick Husta of Wilton, Connecticut**

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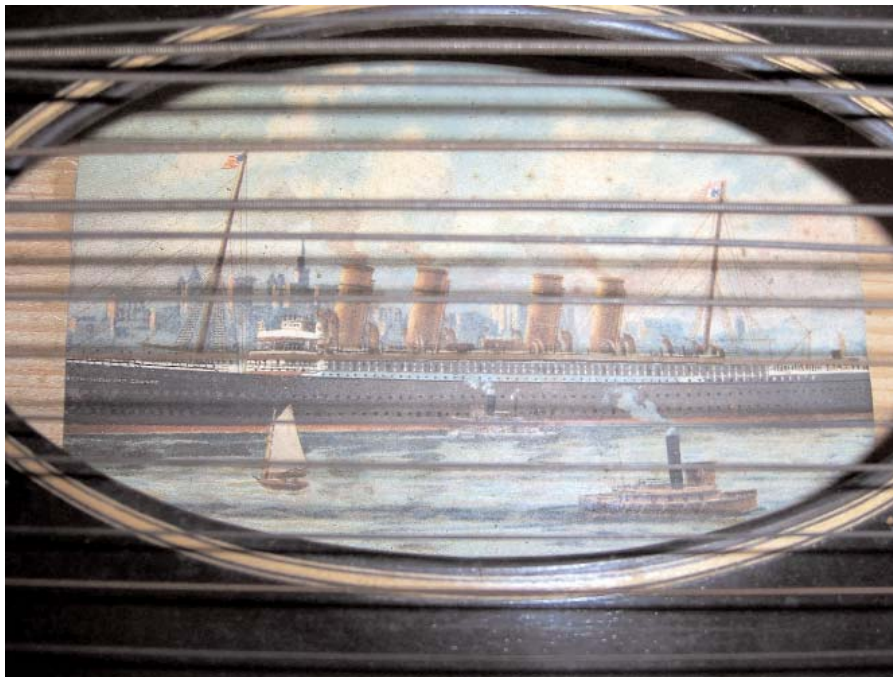
## Background

Dick Husta found my previous zither repair logs on my website and inquired about the possibility of having his concert zither restored. He recently acquired the instrument from an uncle who died at 95 and the zither had stress-related problems so common with old instruments of this type. From this zither's appearance, it seems to be from around 1885 to 1900. There is no maker's label. There is a paper print of a four-stack passenger ship pasted inside the sound hole.

The damage was not too bad but could have been worse. The pin block was pulled up, which separated the back from the frame and sides around the bottom section of the instrument. Often this type of racking can create large stress cracks in the top and back, but only a couple of small, unopened stress cracks showed up on the back when it was removed, which were easily taken care of. There was one small "fracture" that turned up on the top edge that needed a touch up to fill in and match the top color and faux graining as much as possible.

After receiving the zither, I took several "before" photos, and a close up of the ship label. I increased magnification in Photoshop and could actually read the ship's name on its bow. It is the Kaiser Wilhelm der Grosse and is the first of the fourteen four-stacked liners ever built (which included the Titanic many years later). It was launched in 1897, and its maiden voyage that year was from Bremerhaven to New York. The picture is of its arrival in New York. At the end of this log is a full account of the liner's interesting and mysterious history.

Also at the end of this log are tuning diagrams and charts for the concert zither.



Picture of Kaiser Wilhelm der Grosse, first 4-stack passenger ship, launched 1897  
Pasted over maker's label

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## Valuation

Concert zithers and the unfretted versions, often called “guitar zithers”, were manufactured on both continents in the late 1800s. The older zither companies were primarily in Germany and Austria, and the newer companies were in the eastern and mid-western part of the United States, run by German and Austrian immigrants who brought to us their musical knowledge and skills.

Because of the number of manufacturers, and also due to the popularity of the instrument at that time, hundreds of thousands were made. Quite a few of those have been destroyed and thrown away when they warped and developed cracks. However, many more, even those in perfect condition, were stored away in attics, closets, and damp basements, some for the last 100 years and are finally being brought to light as estates are inherited or sold. Many now show up on auction web sites, often going for as little as \$25 (with cracks and very few or no strings), or as high as \$300 or more (in near-perfect to perfect condition).

Putting a value on this particular zither is difficult, since the maker’s label is not visible. Also, there were no manufacturer’s marks on the inside to help identify the company. It is a very well-made and well-used instrument that has survived over 100 years with minimal damage.

For many people, the value is not monetary, but sentimental. To be able to have a restored piece of family history on display, to know its use, its background, and who played it, and to be able to pass it down to future generations, is priceless.

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## Day 1: Assessment



On the first day, I always look over an instrument to see how much work is needed to restore it. Very often I make preliminary repair estimates based on customer photos, but I can't really determine the amount of work until I can look at the instrument in person. When I took this chord zither out of the shipping box, I saw that the customer photos were pretty accurate on the extent of needed repairs.

It appears that this concert zither had been played quite often in its early days. It also looks like it was being used for someone to learn to play or to teach because of the penciled note positions on the fingerboard. String tension had been maintained for many years, and due to that the pin block racked, breaking the glue joints on the back. What was not apparent from the original photos were a couple of hairline cracks on the back just starting to form.

Fortunately, all the strings were still there and in good condition. Often when antique instruments are stored away for long periods, the strings rust or corrode and become too brittle to re-use. The strings on this one were all salvageable.

There is no maker's label or marks on the inside of this zither, so the only way to determine who crafted this is to compare it with others.

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Note: Glue failure is common in old instruments. The reason is hide glue. Hide glue is derived from the collagen found in animal hides. It is very similar to the gelatin we eat and is not toxic. In the U.S. edible gelatin is made from pork skins and hide glue from beef hides. Hide glue is mixed with water and “cooked” as needed and brushed on to surfaces being pieced together. The mixture has to be made in the correct proportions, and if done improperly or with inferior powdered glue, often won’t penetrate the wood very well. As hide glue ages, even the best mixtures, it becomes brittle, and any severe bump can cause a glued joint to fail. Sometimes, extremely dry climates, or even the changes of climates from humid to dry and back again, can cause wood joints to “pop” apart, especially if the strings are at pitch, which keeps strain on the instrument’s body.

If an instrument is to be stored away for long periods of time, it is always best to loosen the strings.

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## Day 2: Remove Strings and Back



On Day 2, the real work began. First, I had to loosen all the strings and tape and label them in groups so if they came out, I would know where they went. Since nearly half of the back had separated from the frame, it was relatively easy to remove it. It was very fortunate that the racking damage did not extend to the top. There was only a very small “fracture” that showed up on the top edge opposite the fingerboard.

With the back off, I was able to determine how to take the rack out of the pin block, how to strengthen the frame, and how to clamp it .

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## Day 3: Removing and Cleaning Tuning Pins



The metal parts, strings, tuning pins, and frets, all had some corrosion. The tuning pins, because they were iron based, had quite a bit of rust on them. I removed all of them and cleaned them with a wire brush.

This was the first zither repair I've done where the threads on the tuning pins were reversed. You turn clockwise to remove, counter-clockwise to tighten. The funny thing is, shortly after receiving this zither, another old German zither arrived for repair with the same type of reverse-thread tuning pins. It appears that the American made zithers from that period used normal-threaded tuning pins and the German made zithers used the reverse.

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## Day 4: Strengthening and Gluing the Frame



The next day, day 4, I began the process of pulling the racked pin block back into place. The pin block had separated from the bracing, and I had to clean the old hide glue out so I could get a good bond when regluing it.

I was surprised at how much clamping pressure I had to use to get the pin block back in place. The years had pretty much formed the top into a slight curve that was hard to pull down. My main worry was the top. I didn't want the pressure to snap the top or cause any top cracks, or to have any of the top bracing pop loose.

I ended up applying clamps around the frame to help hold everything in place, then used a bar clamp, end-to-end, to pull the pin block back. I use Titebond I for repairs like this where the tension is pulling the opposite direction. It makes a strong, permanent bond.

After gluing, and while the clamps were still in place, I added a couple of strengthening pieces to the frame, then drilled through one of them into the pin block and inserted a 5/16" dowel piece. I also drilled for a dowel in the side of the zither into the pin block. These two dowels will help hold the block in place and keep it from ever racking again.



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## Days 5 & 6: Prepping and Gluing the Back



It took a couple of days to glue the frame back into shape. Once the glue had cured, and I was satisfied with the results, I cleaned and scraped the frame edges and prepared to glue the back.

Before I put the back on, I filled the few hairline cracks on it with glue and used a special, sticky, binding tape to hold the cracks tightly together.

The next day, I coated all the contact points with glue and clamped the back into place. As you can see from the picture, I used quite a few wooden cam clamps, bar clamps, and luthier's spool clamps.

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## Day 7: Gluing and Scraping



Now that the instrument was in one piece again, I could start working on the finishing touches, which often take longer than the actual repair work.

The first thing was to replace the broken piece where one of the feet screwed in. It was relatively simple to “carve” a piece to fit the break and glue it in place.

Later in the day, I started preparing the sides and back for a new coat of black enamel. I had to scrape all the edges to remove any glue residue, then use painter’s tape to line the areas I didn’t want any paint to get on.

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## Days 8 - 10: Painting the Back



On days 8 through 10, I applied several thin coats of black enamel similar to the original. Each day, I used 0000 steel wool to rub out brush strokes and spots before applying another coat.

I used a water-based enamel that dried quickly and was able to put on two coats each day.

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## Day 11: Rubbing Out Brush Marks and Polishing



Day 11 actually came several days after the painting. I wanted to make sure the paint had cured for several days before doing the rub out and polishing. Fortunately, the weather was being cooperative for a few days and the sun warmed my studio enough to speed up the curing process.

Rubbing out is the action of removing fine scratches, dust specks, and brush strokes. My preferred method is to use pumice and rottenstone. Pumice is a light abrasive that I apply with a rag soaked in a special rubbing oil. This removes most imperfections. After cleaning the pumice off, I do the same thing with rottenstone, which is a very fine abrasive. When I clean the rottenstone off, surfaces are almost polished.

But I do use a paste wax for the final polishing. I have several types of polish, but the one I use the most is Antiquewax, which is a nice-smelling beeswax and carnauba mixture. It's easy to apply and wipe off and leaves a good shine.

I only use paste waxes on glossy or semi-gloss surfaces. Matte surfaces, like on some of the instruments I build, get an oiled surface that can't take paste wax.

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## Day 12: Screwing in Feet and Cleaning Top



Now with the back done, I screwed the three spiked feet back into place and turned it over to clean up the top areas.

I put a few drops of mild dish soap in luke warm water and use cotton swabs to clean all the narrow places, like between the tuning pins and along the fingerboard. I then put a special luthier's fingerboard oil on the fingerboard also using cotton swabs. Fingerboard oil is a light mineral oil with a little alcohol drying agent. I apply it, wait around 10 to 15 minutes, then rub off the excess. It takes around 24 hours to cure.

I put the painter's tape around the fingerboard to keep from getting the oil on the sound board, because it would discolor it.

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## Days 13 - 15: Small Top Split Touch Up



As I mentioned earlier, there was a very small fracture on the outside edge of the top, which left a little grain showing through. For the next three days, I kept filling it and touching it up to match the rest of the grain the best I could.

The problem with matching the rest of the surface is that the top is a faux grain applied to simulate a dark Brazilian rosewood. It was a small repair, but it took a lot of applications and rub outs.

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## Day 16: Final Cleaning and Polishing



After the touch up was done, it was time to do the final cleanup and polishing. The top's surface finish was in very good shape. There was a slight "fogging" under the varnish, but there is no way to clear it up totally without a complete refinishing.

But, as they often say on Antiques Roadshow, refinishing often reduces an item's worth, and a refinishing of the top could have caused problems with the decorations. Just putting another coat of varnish on the surface would not improve it either. The fogging would still show.

I did use some rottenstone and oil to rub out a few scratches, but I used very little so as not to rub too much old varnish down. After cleaning that off, I again used Antiquewax to give it a nice shine.

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## Day 17: Stringing



Now it was time to re-install the strings. Even though the strings were flexible and in good shape, they were dirty and a little corroded. Also, the metal bridge inserts were corroded, and I cleaned them with 0000 steel wool.

I also used the steel wool to clean the strings. I would clean five or six at a time, then install them. Notice in the pictures, I put a thin towel over the surface of the zither so the string ends wouldn't scratch the surface if they slipped out of my grasp and to keep steel wool pieces from getting on the polished top.

Out of all the strings, only one broke, and it broke on the very end where it attached to the tuning pin. There was enough left to still attach the string and get a couple of winds around the pin.



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## Day 18: Completion



When I finish repairing an instrument, I sometimes feel like a doctor who brings a patient back from the brink and is happy to know the patient will continue to live. This zither was my patient, and music was its life force. I'm elated to know it will live again.

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## Notes on the Label

When I took the back off, I was able to get a close, unobstructed view of the ship picture. The first thing I saw that I couldn't before was the little bits of maker's label peeking out of the ship picture's top arch. I tried to see if there was some way to safely remove the ship label to see who made the instrument, but that was impossible. The picture was glued down quite effectively. I even tried shining a bright light through the back to see if any word showed through, but the back's finish was too dark and thick.

I continue to search the internet for similar concert zithers to see if I can narrow down the possible makers. So far, I located the following:

Adolf Paesold of Fleisson: One search brought up this maker who manufactured concert zithers with oval soundholes. (Most are round.)

Frz. Schendl of Mittenwald: Another who made concert zithers with oval soundholes.

C. Hermann Weber of Weber Zither Institute (unknown location): Concert zither found on ebay with painted floral top decoration in same style as the Husta zither. However, this zither had a round soundhole.

On the following pages is the information I found on the Kaiser Wilhelm der Grosse.

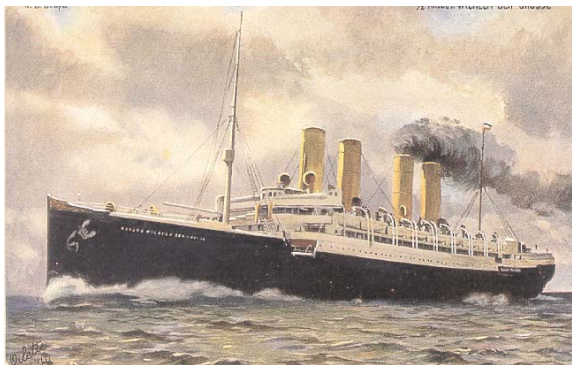
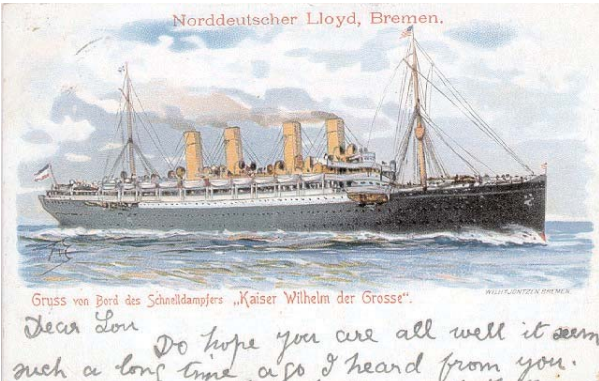
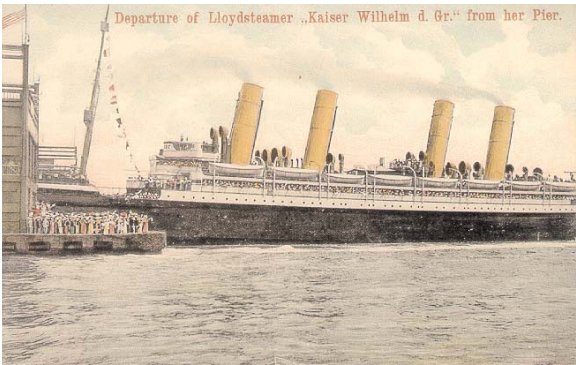


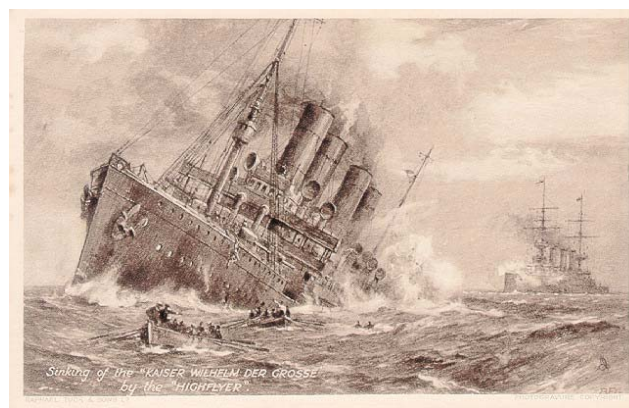
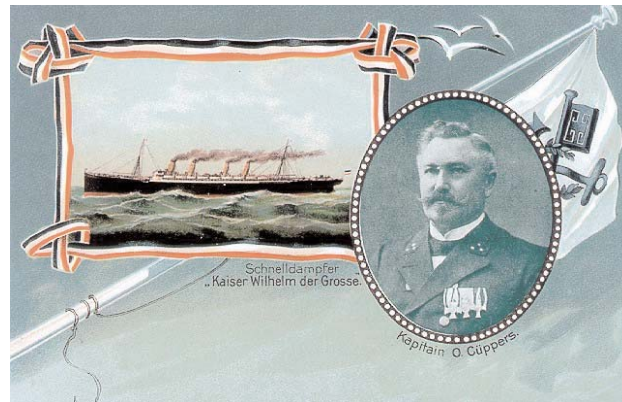
The first of the fourteen four-stackers ever built, Norddeutscher Lloyd's Kaiser Wilhelm der Grosse was built by Vulkan of Stettin. Launched in 1897, she made her maiden voyage on 19 September of that year, from Bremerhaven to New York. In November 1897, she set an east-bound crossing record from Sandy Hook to the Needles and four months later she captured the westbound Blue Riband. She held these records until Hapag's Deutschland took the eastbound record in July 1900 and the westbound one in September 1903.

The ship narrowly escaped a massive fire at NDL's Hoboken, NJ, piers in June 1900, which badly damaged her running mates, Main, Bremen, and Saale and killed 161 crewmen on those ships. Six years later, in November 1906, she was struck broadside while trying to cross in front of Royal Mail's Orinoco; five passengers on Kaiser Wilhelm der Grosse were killed by the impact and a hole 70 feet (21m) wide by 26 feet (8m) high was made in her hull. An Admiralty Court found the accident to be 100% attributable to Kaiser Wilhelm der Grosse.

In August 1914 the ship was taken over by the German Navy as an auxiliary cruiser, assigned to commerce raiding off the Canary Islands. After sparing two passenger ships since they were carrying women passengers, she sank two freighters before she herself sank on 26 August after being attacked by HMS Highflyer. (British sources insisted that Kaiser Wilhelm der Grosse sank because of the damage inflicted by Highflyer. German authorities claimed she had been scuttled by her crew to avoid capture when she exhausted her munitions.) Whatever the cause, she earned the dubious distinction of being the first passenger ship sunk during World War I.

Sources: Shaum and Flayhart's Majesty at Sea; Kludas' Great Passenger Ships of the World; Williams' Wartime Disasters at Sea





**Kaiser Wilhelm der Grosse**  
The first German ship to win the Blue Riband

Owners: Norddeutscher Lloyd  
 Builders: Vulcan Shipyards, Stettin  
 Laid down: 1896  
 Launched: May 4, 1897  
 Christened: May 4, 1897  
 Maiden voyage: September 19, 1897  
 Fate: sunk (scuttled) after fighting HMS Highflyer

**General Characteristics**

Tonnage: 14,349 gross tons  
 Length: 655 feet (200.1 m)  
 Beam: 65.8 feet (20.1 m)  
 Power: triple expansion reciprocating engines driving twin screws, 33,000 horsepower (25 MW)  
 Speed: 22.5 knots  
 Complement: 1506 passengers (206 first class, 226 second class, 1074 third class), 488 crew

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# String Charts for Concert Zither

## Munich Tuning

There are two zither stringing formats in use today: Munich and Vienna. Munich is the most commonly used because it incorporates every note in the chromatic scale encompassed by the scope of the instrument. The stringing pattern on the fretboard is like the violin family, a fifth apart. The open strings are in the circle of fifths, broken between Eb and Ab and laid flat on the zither, similar to a accordion layout.

**Fretboard**  
**Munich Tuning**

a-440 - tuning fork or digital tuner

**Accompaniment Strings 1-12**

eb 1, bb 2, f 3, c 4, g 5, d 6, a 7, e 8, b 9, f# 10, c# 11, g# 12

**Bass Strings 13-24**

Eb 13, Bb 14, F 15, C 16, G 17, D 18, A 19, E 20, B 21, F# 22, C# 23, G# 24

**Contra Bass Strings 25-37**

F 25, E 26, Eb 27, D 28, C# 29, C 30, B 31, Bb 32, A 33, G# 34, G 35, F# 36, FF 37

In addition to the basic 29 fretboard, accompaniment and bass strings, zithers may have 2, 3, 5, 7, 9 or 13 contra bass strings - the full harp zither has 42 strings (5 fretboard and 37 open strings). In some early versions, and on perfecta zithers, the contra basses were arranged in the same circle of fifths as the accompaniment and bass strings. Munich tuning was often expressed in treble clef (violin key, or similar to guitar clef) but today is mostly written in bass clef.

## Viennese Tuning

Viennese Tuning was/is prevalent in Austro-Hungarian Empire regions (i.e., Bohemia, Vienna) and stems from the teachings of Carl J. Umlauf in the middle 19th Century, while Munich Tuning generally speaking, stems from the teachings of Adam Darr and others in Bavaria. Viennese tuning was always written in bass clef.

**Fretboard**  
Vienna Tuning

The diagram illustrates the fretboard for a zither in Vienna Tuning, showing the positions for the first three groups of strings:

- Accompaniment Strings 0-12:**
  - 0:  $ab$
  - 1:  $eb$
  - 2:  $bb$
  - 3:  $f$
  - 4:  $c$
  - 5:  $g$
  - 6:  $d$
  - 7:  $a$
  - 8:  $e$
  - 9:  $b$
  - 10:  $f\#$
  - 11:  $c\#$
  - 12:  $g\#$
- Bass Strings 13-24:**
  - 13:  $Eb$
  - 14:  $Bb$
  - 15:  $F$
  - 16:  $C$
  - 17:  $G$
  - 18:  $D$
  - 19:  $A$
  - 20:  $E$
  - 21:  $B$
  - 22:  $F\#$
  - 23:  $C\#$
  - 24:  $G\#$
- Contra Bass Strings 25-32:**
  - 25:  $C$
  - 26:  $B$
  - 27:  $Bb$
  - 28:  $A$
  - 29:  $G\#$
  - 30:  $G$
  - 31:  $F\#$
  - 32:  $FF$

Additional notes: The top staff shows the notes  $a, d, g, g, c$  in treble clef. A note below the first staff reads "a-440 - tuning fork or digital tuner".

Zithers tuned in the Viennese mode have 38 strings - the addition of the first accompaniment string of  $ab$ -0 and 8 contra bass strings comprise the total strings. Other differences are the fretboard has a high "g" instead of two "a"s", strings  $g$ -5 and  $f\#$ -10 are an octave higher, and 5 contra basses are inserted in the bass strings:  $Eb$ -13,  $F$ -15,  $D$ -18,  $E$ -20 and  $C\#$ -23. Zitherists working in entertainment settings often utilized the 5 contra basses, but not other features of the Viennese tuning.

