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Jouhikko: An Instrumental Evolution

Submitted December 11, 2017
in Partial Fulfillment
of the
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Abstract

Title: Jouhikko: An Instrumental Evolution

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The Jouhikko is a unique instrument from Finland that has been in use since around the twelfth century. The Jouhikko is a member of the bowed lyre instrumental family, and its origin is surrounded in mystery and uncertainty. However, references to the Jouhikko, and instruments which could be potentially related to it, can be found in the Finnish epic the *Kalevala* and in archaeological sites throughout the Scandinavian region. The first portion of this project investigates the evolution of the Jouhikko over time. This is done by examining the history of instruments with similar designs and/or construction, such as the Gusli and the Erhu, as well as looking into the evolution of the bow. The playing styles of instruments from the neighboring regions, such as of Novgorod Russia and the Asian Steppes, are also examined. The second portion of this thesis documents how I constructed my own replica of a Jouhikko and compares my construction method with the method used by a professional luthier. The final portion of this thesis will analyze different methods used to play the Jouhikko, and compares these methods to the playing styles of the Erhu, Gusli, and the Kantele.

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Introduction

The Jouhikko is an instrument native to the country of Finland and not much is known about its history in modern society. As Rauno Nieminen, a musical scholar who wrote his doctoral thesis on the Jouhikko, said in an email, “There is still work to do in Jouhikko.” The Jouhikko is an instrument with roots in the ancient past which have been forgotten over time. Traces of it are hinted at in myth and legend, and other artifacts have been found in excavations around Novgorod and the Scandinavian Peninsula of instruments believed to be related to the Jouhikko. The following discussion will look into this instrument and its history, as well as to propose a theory as to its development.

Background Information on the Jouhikko

The Jouhikko, or Jouhikantele, is a member of the bowed lyre family. Jouhikko translates roughly to Horse-Haired-Lyre, as one of its defining characteristics is that the strings are made of horsehair. Bowed lyres can be found from all around the world, but the Jouhikko is specific to Finland. It could also be found in some parts of Estonia and scattered regions across the Scandinavian peninsula. It is related to several different bowed lyres of the region such as the Talharpa from Estonia, and some suspect that it is related to the Shetland Gue and the English Crowd from the British Isles.

Studies of Jouhikkos and their counterparts from archeological sites have revealed that the lyres were commonly made of either alder, aspen, spruces, birch, or some combination of these woods. Russian harps and lyres tended to be made of alder wood, and in Finland it seems that the preferred wood was spruce and pine. Birch was not as common in Finnish Jouhikkos. (Nieminen, 50-53). The differences in the woods used for these instruments are mostly likely due to the regions these instruments are from. In

Novgorod and Finland, the natural trees were usually alder, spruce, birch, and other types of coniferous trees. Novgorod was also a major trading center, so there would be lots of different types of wood available for the building of instruments due to all of the trade. In Finland, the Jouhikkos tended to be made of spruce or pine wood would most likely be due to the availability of these woods. Coniferous woods would be extremely common given Finland's cold climate, and it would not be difficult for someone of even the lower classes to obtain pine or spruce wood to make an instrument out of.

The strings of the Jouhikko, as well as the Finnish Kanetle (harp), appear to have been originally made of sheep intestines or horsehair. Over time, as technology advanced, the strings were made of brass or steel instead. From records, it appears brass strings were used on kantele harps during the 1790s and potentially earlier (Nieminen, 53-54). It would make sense, therefore, that brass strings could have also been used on the Jouhikko during this time if the caller, or player, could afford them. According to Anter Vornanen, the Jouhikko was better fit for horsehair strings than steel or brass because the horsehair held the resin better (Nieminen, 55). The downside to horsehair strings was that they were more likely to break than metal strings, and to some the steel made a better sound due to the smoothness and consistency in the make of the steel strings (Nieminen, 55). The string types, much like the woods used to build the instrument, would most likely be based on what the instrument maker could afford and had access to. Most people in the Finnish region probably either had a horse or knew someone with a horse, therefore the horsehair strings would be easily accessible and cheap. Metal strings, on the other hand, would have been much more expensive and harder to obtain and, if needed, create.

The people who played the Jouhikko most often were the “poor Soviet musicians [in the Finnish regions] of Savo and Karelia.” After a few centuries, the Jouhikko was “replaced by a violin and accordion as dance instrument[s] (Nieminen, 51).” After its replacement, the Jouhikko was nearly lost to history until an effort to preserve Finnish culture and folklore by the Finnish Literature Society in the 1900s managed to find a few callers who still played the Jouhikko and brought it back from the edge of obscurity by recording some callers playing the Jouhikko (Väisänen).

The Jouhikko and Kantele in Myth and History

The Jouhikko and its close relation, the plucked Kantele, can also be found or hinted at in folklore. In the Finnish epic, the *Kalevala*, it can be observed that one of the main characters, Väinämöinen (sometimes spelled Wainamoinen in English), is associated with the kantele. Väinämöinen is the Finnish deity of chants, songs, and poetry and is commonly described as a bard who has a compelling, magical voice during the length of the *Kalevala*. He is also recorded as being the one who first creates an instrument which, in description seems similar to the Kantele:

“Steadfast old Väinämöinen said these words: ‘...from these might indeed come a fishbone harp were there a competent person, a maker of a bone instrument.’

When no one else at all came, when there was no competent person, no maker of a bone instrument, steadfast old Väinämöinen turned himself into a constructor, made himself a maker. He made a

pikebone instrument, produced an instrument of eternal joy. From what the harp's frame? From the great pike's jawbone. From what are the harp's pegs? They are from the pike's teeth. From what are the harp's strings? From the hairs of Demon's gelding. Now the instrument was produced, the harp got ready, the great pikebone instrument, the fishbone harp (Lönnrot, 274).

After the pikebone instrument was constructed, Väinämöinen tried to find someone who could play it. Men, woman, and children of all ages and walks of life came to try and play the instrument, but none could play a joyous tune on it.

“... all sorts of people played. The instrument of joyous music does not produce music, the instrument no music. The strings kinked up, the horsehairs squeaked badly, the tone reverberated harshly, the instrument sounded terrible.

“A blind man was sleeping in a corner, an old man on top of the stove. The old man on the stove awakened, screeched from the stove stones, snarled from his sleeping place, growled from his corner: ‘Stop, cease, leave off, end it! It is piercing my ears, hurting my

head; it is making me shudder, it will deprive me of sleep for a long time. If the instrument of the Finnish people will in the future no produce joyful music or lull one to sleep, induce rest, then fling it in the water, sink it in the waves or take it back! Bring the instrument over there to the hands of the man who made it, to the fingers of the tuner (Lönnrot, 275).”

Eventually, the pikeharp makes it back into the hands of Väinämöinen, and he plays a tune which causes all beings, creatures, spirits, and divine beings who can hear it stop what they are doing and listen. Anyone who listened was moved by the music, and as Väinämöinen played for two full days, they all shed tears for the beauty of the music. During his own performance, Väinämöinen sheds tears of his own, which fall into the sea and become “bluish fresh-water pearls, as an honor for kings, as an everlasting joy for rulers” (Lönnrot, 279) In the third rune, or poem, where the pikeharp makes its appearance, the harp is lost to the sea during a storm and carried it into the realm of Ahto, the deity of the sea. “There has gone my creation, gone my lovely instrument, vanished my eternal source of joy! I will never get one better than that, never, never at all, an instrument of pike teeth, a clear-toned fishbone one” (Lönnrot. 286)

Everything about the pikebone harp, from its effects on Väinämöinen to its effects on other people, show that this harp brought joy to everyone, and the blind man who slept on the stove even called it “the instrument of the Finnish people” (Lönnrot, 275). The story of the *Kalevala* was passed down orally for many centuries, so it is not possible to know if the pikebone harp, which many assume to be a version of the kantele, is the

traditional harp version of the kantele which is plucked, or a jouhikantele which is primarily played with the bow.

Outside of folklore, the earliest record of the Jouhikko that can be found is a small carving/statue in the Trondheim Cathedral in Norway. This statue/carving dates back to the 13th century (Nieminen, 45-46). Also, during an excavation of Novgorod, around 1992, fragments of instruments were also unearthed, along with paintings or carvings of people playing these instruments. Of the instruments uncovered, there were lyres, several different types of zithers, fiddles, lutes, and harps.



Figure 1: Figure from Trondiheim Catherdral, Nieminen pg. 46

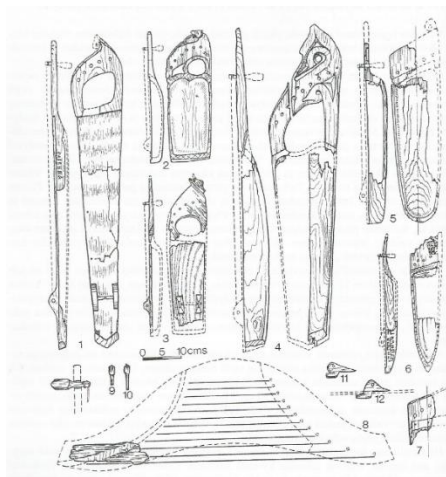


Figure 2: Sketches of the instruments found during an archeological excavation of Novgorod. Nieminen, pg.

Evolution of the Jouhikko

The instrumental family of the lyre can be traced back as far as the second millennium B.C.E. in Assyria (Panum, 13). However, it was not until around the eleventh century that bows were found in Europe (Bachmann, 61). This date is a good guess as to the earliest time that the Jouhikko could have come into existence, but since Finland is found in the Eurasia region, this date could easily be inaccurate as bows have been recorded being used in Asia around the ninth and tenth century (Bachmann, 48). Therefore, the origins of the Jouhikko is something that remains shrouded in mystery. It is unlikely at this point in time that the true origination of this instrument will be discovered, but for now theories can, and have been, presented as to how this instrument was created or evolved. Some theories proposed by scholars are based around the history of the bow. One of these theories is that the bow originated in India and was spread northward to the Byzantine Empire and eventually into Europe (Bachmann, 9). Another theory that has been proposed is that the bow originated in the Scandinavian Peninsula (Bachmann, 23). A third theory was that the bow originated in the Central Asian plains, and the final theory is that it originated independently in multiple places throughout history (Bachman, 9, 50, 56).

The theory that I propose is a combination of the theories stated above. After looking through several sources, maps, and historical events, I have theorized that the Jouhikko was developed due to a mixture of the Novgorodian Gusli and the influence of bowing techniques from the steppes from Asia. The first part of its development is very straightforward in nature. It starts with the Xiqin, a bowed instrument from the Central Plains of Asia and was an instrument commonly associated with the Xi tribe prior to

1195 when Chen Yang first published a book mentioning the instrument. In his opinion, even in 1195 the Xiqin was an old instrument (Stock, pg 91-92). Following the development of the Xiqin was the Erhu, or huqin-erhu, which roughly translates to *two*, which represents the two strings of the instrument (Shen Yun). The Erhu is also a bowed instrument from the Central Plains region of Asia during the late eleventh century (Stock, 97).



Figure 3: Erhu from Central Asia

Two other instruments to consider are the Gusli and the Kantele. The Gusli is a plucked northern lyre found in the Novgorod, which is a northwestern region of Russia. The Gusli is played by resting it either across the lap or on a surface. It is very similar in appearance to the Finnish Kantele, and in fact the two could have easily come from very similar, if not the same, source. A carving of a Gusli, or an instrument extremely similar to it, was found and dated back to the mid-tenth century (Popłavska, 63-34). Similar to the Gusli is the Finnish lyre, the Kantele. The Kantele is Finland's version of the Gusli, and the two instruments are extremely similar in playing style and build.

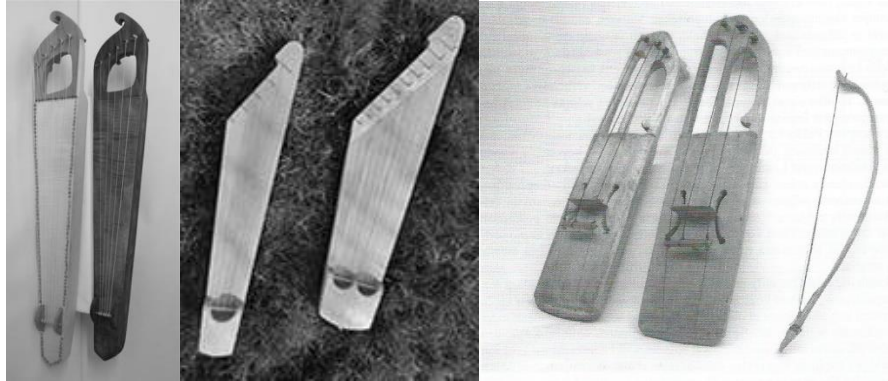


Figure 4: 2 gusli (left), 2 kanteles (center), and 2 Jouhikkos (right)

Since Novgorod served as a large trading center for the surrounding regions, which included areas of Finland as well as the steppe peoples of the east and south in Asia via the river Volga, it would make sense that some of the practices and influences of the nomadic tribes from Asia using bows on their instruments would travel north to Novgorod (Smith, 1). I believe that it is from the influence of both the Asian bowing influence and the Kantele that the Jouhikko came into existence. After analyzing the information from various sources, such as Nieminen, Bachmann, and Panum, it can be concluded that the Jouhikko was in existence by the thirteenth century, but may have been developed sometime during the eleventh or twelfth century. When the people of Novgorod started using the bow, probably around the 11th century, then their influence spread to Finland via merchants and traveling musicians. Thus the Jouhikko was created.



Figure 5: The borders of Novgorod during the fourteenth and fifteenth centuries (in pink). The borders included the southeastern portion of Finland (Yanin, 87).

Jouhikko Evolution Theory

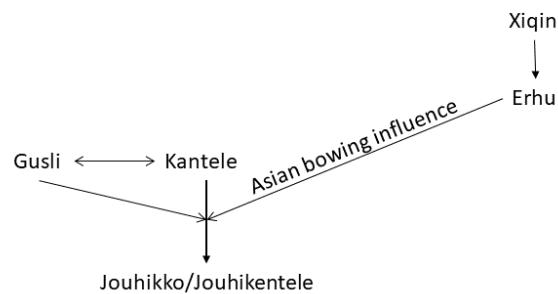


Figure 6: The Evolution of the Jouhikko

How the Jouhikko was Made for this Project

Materials

The materials for this project were: poster board, string, maple, spruce, and birch wood, a dowel rod, stain, polyurethane, horse hair, and a tree branch. The tools needed to construct it were: jigsaw, sandpaper, electric sander, clamps, circular saw, a box cutting knife, wood glue, superglue, a couple of nails, a pencil, and a wood burning kit.



Figure 7: Body (top left), Back of Soundboard (top right), Tuning pegs, Tail Piece, and Bridge (bottom left), Top of Soundboard (bottom right)

Methods

Jouhikko:

-Based off the method used by Jóhann Hrímland

The first step of making the Jouhikko is to plan the design. Jouhikkos come in many different sizes and shapes, so the design can be very personalized. In order to make the Jouhikko without wasting materials, make a life-size scale of the Jouhikko out of poster board before using the wood.



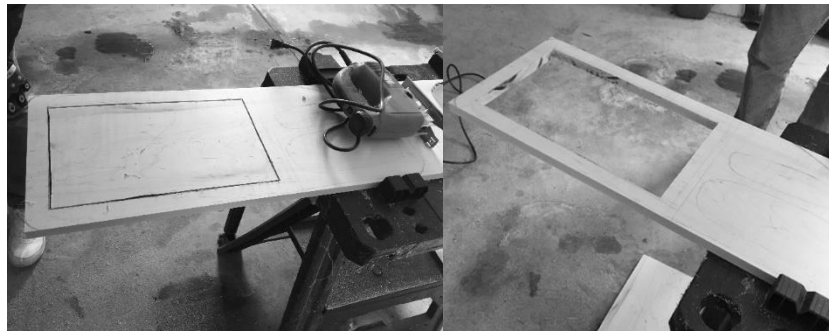
Figure 8: Poster Board Jouhikko

Once the scaled replica is complete, copy down the measurements of the body of the instrument and redraw them on the piece of maple wood, or trace the scaled replace onto the piece of maple wood. Also trace the tailpiece and bridge pattern onto the upper portion of the maple.



Figure 9: Body of Jouhikko Traced on Maple Wood

Use the Jigsaw to cut out the sound box portion of the Jouhikko.



Figures 10: Cutting Out the Sound Box

Next, use the Jigsaw to cut out the hand holes on the top of the Jouhikko, and the circular saw to separate the yoke of the Jouhikko from the rest of the board. Sand down all of the edges using sand paper and the electrical sander.

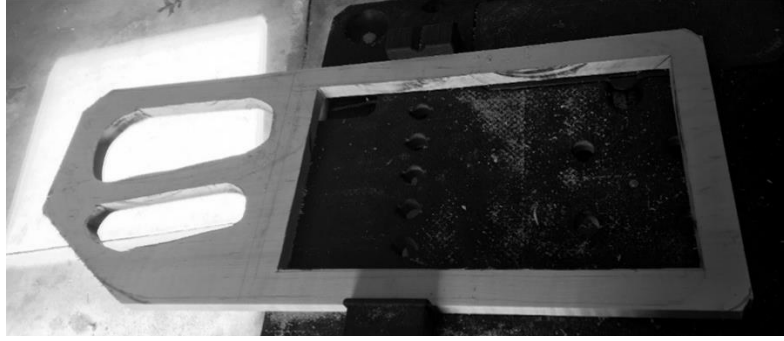


Figure 11: Body of the Jouhikko with Cut Out Hand Holes

Use a drill to create holes at the top of the yoke for the tuning pegs.

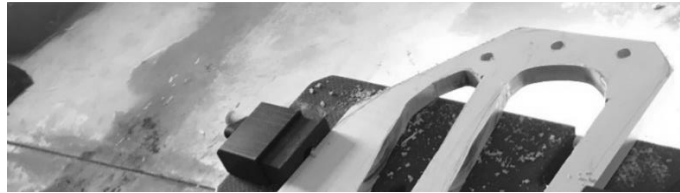


Figure 12: Holes for the Tuning Pegs

For the top of the sound board, draw an outline of the body of the Jouhikko on a piece of birch plywood. Trace this outline with a box cutting knife to help avoid splintering the wood. Cut the top of the sound box out with a jigsaw, and then cut the sound hole out with the jigsaw as well. Sand down all of the edges.



Figures 13: Cutting out the Top of the Sound Box and the Sound Hole

For the back of the sound box, trace the body of the Jouhikko onto a piece of Spruce wood, and cut it with the circular saw. Sculpt the back of the board so that the top will taper to a point. Sand down the edges.



Figure 14: The Back of the Sound Box

To make the tuning pegs, cut the dowel rod to the desired length, and then sand down the edges. Make sure there is enough of the rod showing on both ends that the player can grab the bottom and turn it, and so that the player can tie the string around the top. Drill a tiny hole at the top of the peg to thread the string through the tuning peg.

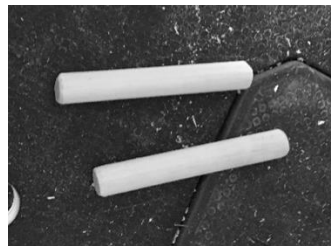


Figure 15: Tuning Pegs

Finally, use the jigsaw to cut out the bridge and the tail piece.

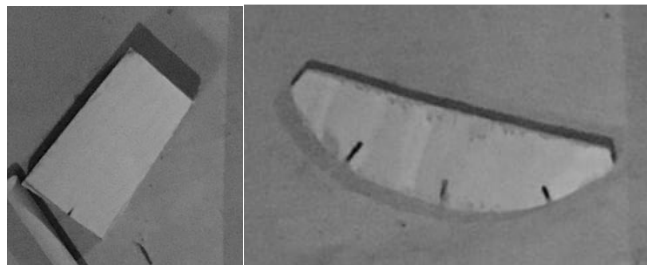


Figure 16: The Tailpiece (left) and Bridge (right)

Once everything is cut out, glue the body of the Jouhikko to the back of the soundboard and the top of the soundboard using wood glue. Clamp the body of the

Jouhikko together and use heavy objects to pressurize the wood as necessary. Wait around twenty-four hours for the glue to dry.



Figure 17: Gluing the Sound box together

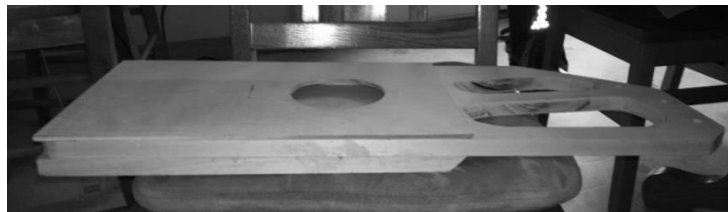


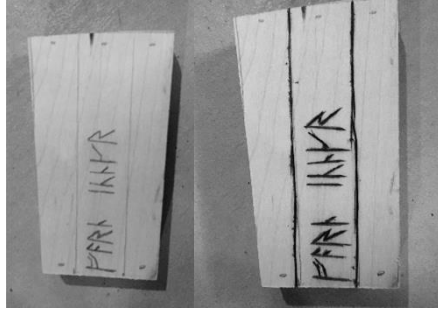
Figure 18: Finished Body of the Jouhikko

Lay out the bridge and tailpiece and insert the pegs into their holes to determine if the overall layout is satisfactory. If decorative designs are going to be on the Jouhikko, draw them in the desired locations.

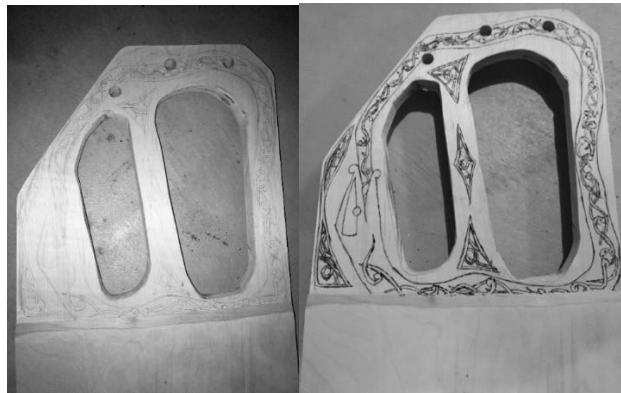


Figure 19: Piece Layout

Sand down the top edge of the top of the soundboard so that the transition from the body to the yoke is smooth. Use a wood burning kit to etch the designs drawn previously on the Jouhikko into the wood.



Figures 20: Sketched Design (left), Wood Burnt Design (right)



Figures 21: Sketched Design (left), Wood Burnt Design (right)

Stain the Jouhikko and all of its parts the desired color and then coat it in polyurethane. Give it a day to settle and dry. Once the pieces are dry, insert three small wood screws into the tail piece to tie the horse hair strings to. Then insert one screw into the bottom of each of the tuning pegs to help the player turn the pegs for tuning. Finally, insert 3 wood screws into the tail piece to tie the string around.



Figure 22: Jouhikko Stained and Polyurethane

Bow:

To make the bow, find a tree branch, preferably one already shaped like a bow. Use sandpaper to scrape off the bark and dirt until a smooth branch is left. After the branch is sanded, cut the branch to the desired length.



Figure 23: Branch (left), Sanded Branch (middle), Cut Branch (right)

If wanted, the top of the bow can be notched in order to make string the bow easier. This step is dependent on the shape of the branch and the ease with which the horse hair can be secured to the bow. Instead of a notch, a hole could be drilled to thread the horse hair through and then to tie a knot.



Figure 24: Notched Branch

Stain the bow to the desired color and then coat it with polyurethane. Allow it to dry for approximately a day.



Figure 25: Stained Branch and Jouhikko

Stringing the Instrument and Bow_(King):

Use natural Mongolian horsehair to the strings of the bow and the Jouhikko. Use approximately five hundred and fifteen hairs to thread the bow. Secure it to the bow using string, knots, and superglue. The string is supposed to be slightly loose.



Figure 26: Strung Bow

Choose which notes the strings should be. For this Jouhikko, the strings are G, D, and C. For the G string, take approximately twenty-seven horsehairs and tie them around the wood screws on the tail piece. Comb the horsehair until there are no knots and then twist the string as tightly as possible along its length. Thread the horsehair through the hole drilled in the tuning peg, and tie it around the peg. Use superglue on the horsehair to secure the knots on the tuning peg and around the wood screw. Repeat this process for the remaining strings. The D string has approximately fifty-seven hairs, and the C string has approximately thirty-seven hairs.

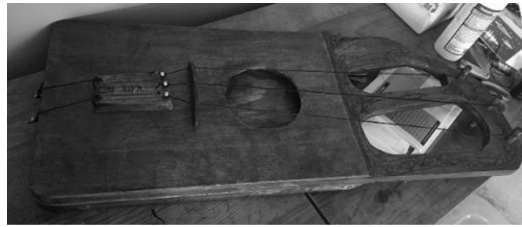


Figure 27: Strung Jouhikko

How the Jouhikko was Made by Nieminen

Jouhikko:

In 2007, Rauno Nieminen made a Jouhikko for his doctoral thesis which focused on its construction, the sound of the Jouhikko, and looking into the instruments from the National Museum of Finland. He made his Jouhikko out of a log of aspen. He split the log into two pieces, carved the outline of the Jouhikko that he desired. The instrument was then carved and hollowed out to make the base of the body and the sound box.

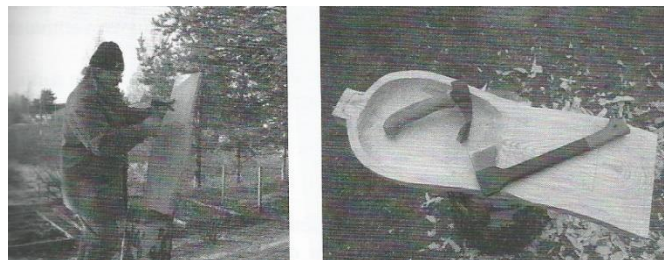


Figure 28: Nieminen carving the body of the Jouhikko, pg. 133

Next Nieminen designed a cover for the Jouhikko and the sound opening was shaped and carved out. The wood was then thinned and the inside of the sound box was leveled. The arms were then joined to the body of the Jouhikko. The contour of the crossbar was then drawn and carved with a knife. Next the cover was cut out and the sound holes were drawn onto the cover. A hole was then drilled at the top of each sound holes so the jigsaw had a place to be inserted. The sound holes were then carved out with a jigsaw.

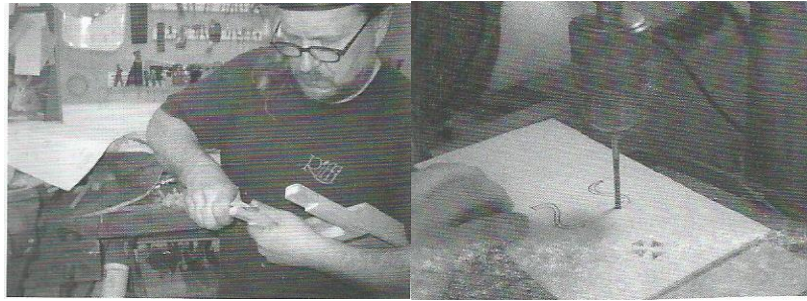


Figure 29: Nieminen inserting the ams (left) and drilling holes for the sound holes (right), pg. 148-149

The cover was then glued onto the body of the Jouhikko and secured with clamps until the glue was dry. Once the glue was dry, the edges of the cover were sculpted with a knife until it matched the sides of the body of the instrument. Screws or nails were then used to finish securing the cover of the Jouhikko to the body.

Turning pins:

The wood used for the turning pins were carved out of wood and then holes were drilled into them. One hole was then drilled into each pin to later insert the horsehair. Finally, the pins were carved to the preferred shape with a knife.

Strings:

The string was then fastened to the string holder on the tail of the and the horsehair was then combed and twisted tightly. The horsehair was then fastened to the tuning pin by threading the hair through the hole that had been drilled into the pin earlier and tying a tight knot with the horsehair on the other side of the pin.

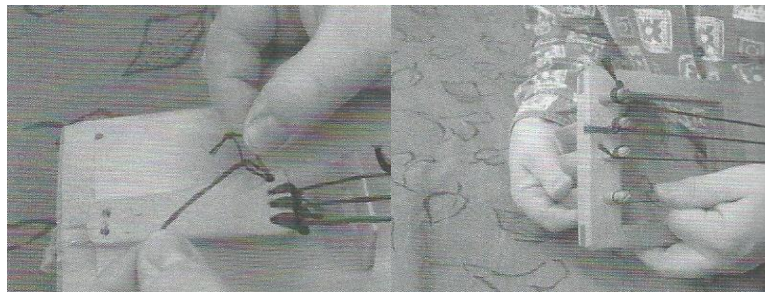


Figure 30: Nieminen attaching horsehair to string holder (left) and securing horsehair to tuning pin (right), pg. 152

Bow:

A branch was used for the bow, and it was bent into the desired shape using heat.

A hole was then drilled into the tip of the bow. The horsehair was then secured to the base of the bow followed by securing it to the tip of the bow.

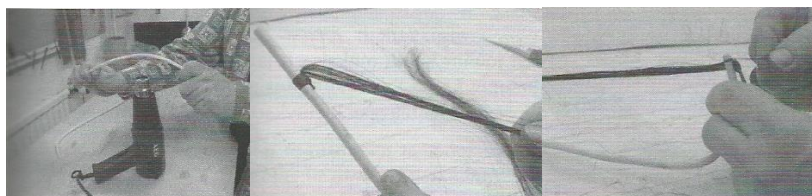


Figure 31: Nieminen bending the bow (left), attaching the horsehair to the base (center), attaching the horsehair to the tip (right), pg. 153

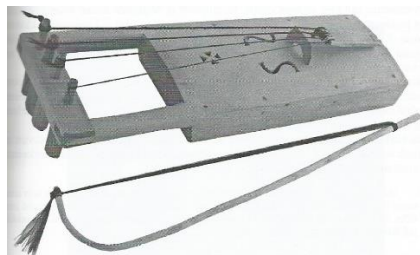


Figure 32: Nieminen's finished Jouhikko, pg. 153

How the Jouhikko and Related Instruments are Played

The final aspect to analyze regarding the Jouhikko is its playing style. To fully appreciate the evolution of the Jouhikko in its entirety, it is important to see how the instruments it could have evolved from were played. These playing styles can then be compared to the playing method of the Jouhikko.

The structure of the Erhu includes the body and the neck, with two strings attached running from the top of the neck down to the base of the resonating drum. The horsehair of the bow used to play the Erhu is trapped in between the two strings which run down the length of the Erhu. While being played, the Erhu rests on the player's left leg. The right hand controls the bow and the left hand changes the notes. To change the notes while playing the Erhu, the player presses down on the top of one or both of the strings and slides their hand up or down. All of the fingers are used except for the thumb, in a way that is similar to how they are used to change the notes on the violin (Shen Yun).



Figure 33: Xiaochun Qi playing the Erhu (Shen Yun).

The next instrument to consider is the Gusli. There are two ways to play the Novgorodian Gusli, which has a hole at the top much like the Jouhikko does. The first method is to play with your hand behind the hole at the top of the instrument using a ‘stop and strum’ technique. With this technique, the Gusli rests diagonally across the left leg and the base rests against the inner thigh of the right leg. The right hand strums the strings with a modern plectrum, or a horn or bone pick. The left hand is behind the strings, reaching through the hand hole to change the notes by resting the pads against the

string and stopping the string's vibration. Only three fingers are used to stop the string's vibrations: the ring, middle, and index fingers (Fletcher).



Figure 34: Kate Fletcher playing the Gusli using the stop and strum method

The second method used to play the Gusli is to lay the instrument across the lap. There are two techniques which can be used to play the Gusli in this position. The first is the stop and strum or block and strum techniques. Using these techniques are much like the stop and strum technique where you block the strings you don't want to hear with the pads of the fingers from the left hand, and strum the open strings. The second technique that can be used to play the Gusli in this position is a plucking method. The plucking method produces a more delicate sound, and utilizes both hands to pluck the strings. The basic method used is the thumb and pointer finger of the right hand on the outer two strings and the pointer, index, and ring fingers plucking the inner three strings. Using this method, the outer two strings are the drone strings, and the middle three strings are a part of the melody (Fletcher).



Figure 35: Kate Fletcher playing the Gusli using the plucking method

The third instrument is the Finnish Kantele. The playing of the kantele seems to be similar to the Gusli. The Kantele is only played either laid horizontally across the lap or horizontally on a stand. Kanteles can have anywhere from 5 strings on the basic kantele to around as high as 40 strings on a concert Kantele. The primary method used for playing the Kantele seems to be the plucking method, but the stop and strum is also mixed in with the plucking melody depending on the tune the player wants to create.



Figure 36: Olga Kolari playing the Kantele using the plucking method

After analyzing how the instruments which might have led to the development of the Jouhikko, it is time to look into the playing method of the Jouhikko. To play the Jouhikko, it is rested diagonally across the left thigh and the bottom of the instrument

leans against the right inner thigh. There are two methods to playing the strings of the Jouhikko: the Finnish and Estonian methods.

With the Finnish method, only one of the three strings is used, and the backs of the fingers touch the string at different locations to change the notes played. The middle string is the drone string, and the last string, if present, is not touched by the fingers and merely acts as an extra note. The bow is drawn across two strings at a time for a deep resonating sound (Broch)



Figure 37: Finnish Fingering Method

The Estonian method uses the pads of the fingers to change the notes on the string. The middle string remains the drone string and is not touched by the fingers. The third string, however, can be played by touching it with the pads of the fingers to change the notes on that string. The bow is drawn across two strings at a time with this method as well (Broch).



Figure 38: Estonian Fingering Method

Conclusion

The Jouhikko is a unique instrument from the Baltic region of Europe that has been in use since around the twelfth century. References to the Jouhikko, or one of its close cousins, can be found in the Finnish epic the *Kalevala* as well as in drawings and carvings found throughout the Scandinavian region. While the origin of the Jouhikko is surrounded in mystery, it is likely that the Jouhikko developed from a mixture of influences from the Xiquin and Erhu from the Asian Central Plains region, the Gusli from Novgorod Russia, and the Kantele from Finland. The similarities and connections between these variety of instruments can be seen more clearly when analyzing the methods of playing these instruments. The Jouhikko is also simple in design and construction. This is most likely due to the fact that the players of the Jouhikko were usually poor folk or from the lower classes of society.

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Figure 2: https://ibarakey.files.wordpress.com/2012/02/erhu_dragon3.jpg

Figure 3 (left):

[http://www.ancientmusic.co.uk/images/large_images/\(small\)%20slovisha_gusli_fronts.jp](http://www.ancientmusic.co.uk/images/large_images/(small)%20slovisha_gusli_fronts.jpg)

[g](#) –

Figure 3 (center):

[https://upload.wikimedia.org/wikipedia/commons/thumb/2/2a/5and10stringkantele.jpg/25](https://upload.wikimedia.org/wikipedia/commons/thumb/2/2a/5and10stringkantele.jpg/250px-5and10stringkantele.jpg)

[0px-5and10stringkantele.jpg](#)

Figures 1, 3 (right), 26, 27, 28, 29, 30, appendix: Nieminen.

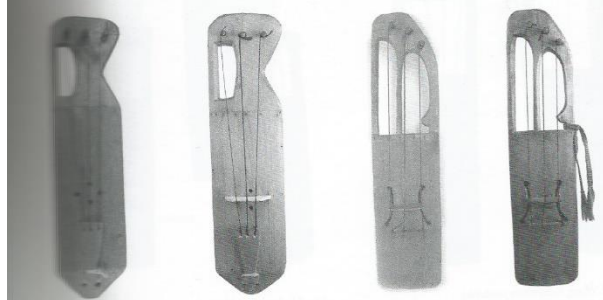
Appendix:

Different types of Jouhikkos:



Jouhikko Keski-Suomen Museosta.

Nro 10. Fedor Pratsun jouhikko.



Nro 13. Juhno Vaittisen jouhikko

Nro 14. Juho Villasen jouhikko

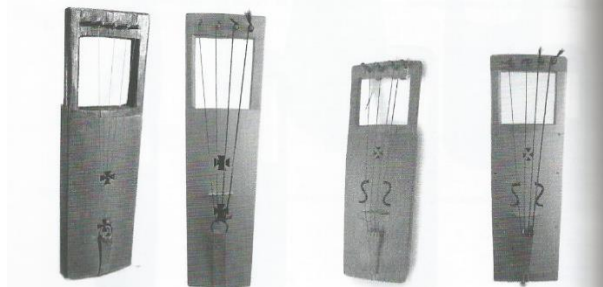


Nro 21. Petka Lambergin jouhikko.



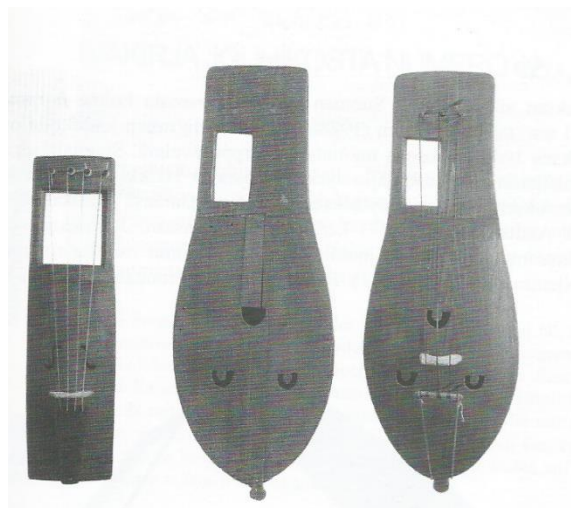
Nro 30. Jüri Bruusin jouhikko.

Nro 31. Virolainen jouhikko.



Nro 41. Hans Rengvistin jouhikko.

Nro 42. Jouhikko Vormista.



tsista.

Nro 48. Jouhikko Öijestä, Taalainmaalta.



nnista.