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## HARP OF GOLD

Shaun Newman recreates the ancient lyre of Sutton Hoo



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[www.earlymusicshop.com](http://www.earlymusicshop.com) – for gut strings if chosen; wrest pins and wrenches; and hitch pins if needed

[www.stringsdirect.com](http://www.stringsdirect.com) – for steel strings, ball- or loop-ended. Strings may be bought as singles, half or full sets

[www.luthiersupplies.co.uk](http://www.luthiersupplies.co.uk) – for all types of timber, purflings and fret wire to suit any luthier's needs

[www.capitalcrispin.com](http://www.capitalcrispin.com) – for high-quality veneer sheets

#### SOME DIMENSIONS

The lyre described is a little smaller than the Sutton Hoo example. However, the maker can really decide what size to make it, and indeed whether to stay with six strings or increase this to seven which would offer a wider range of playing possibilities. I think the structure would actually tolerate eight strings, but there's always the possibility that an extra one could cause the body to warp.

Overall length	60cm
Width at pin bar	17cm
Width at tail end	15.5cm
Length of sound chamber – external	31cm
Body depth	27mm
Length x width x depth of case – exterior	64cm; 22.5cm; 8cm



# RECREATING THE SUTTON HOO LYRE

Based on the 1948 Sutton Hoo reconstruction, Shaun Newman explains the steps involved in making a historic, though little known, musical instrument

Whenever we hear about the astounding finds from the famous Anglo Saxon burial ship, discovered in Sutton Hoo, Suffolk during the 1930s, we immediately think of the priceless gold and other precious metal artefacts. Other treasures, however, included some extraordinary examples of Anglo Saxon art and craft that'd ever been seen. Notably among them all is the beautiful, though rather menacing, full-face helmet, which was crafted from iron, bronze and silver and likely coated in copper. Then there were buckles of garnet and gold, ornaments, a magnificent sword, Byzantine silverware, not to mention a lavish feasting set.

Of course, designing and building a ship of this scale was a huge task in itself, and during the excavation, only the imprinted outline of the vessel could be detected. In a dedicated feature that appeared in the July 2022 issue, John Greeves looked extensively at building a replica of the Sutton Hoo 'ghost ship'. Progress on the reconstruction's development can be followed here: [www.saxonship.org](http://www.saxonship.org). The build's expected completion date, which was seriously disrupted owing to the COVID-19 pandemic, is now scheduled for 2024.

## Musical instrument fragments

Similarly, mention is rarely made of the musical instrument fragments whose remains were found with two metal brackets, scraps of preserved wood (photo 1) and traces of animal hair.

Excavators soon established that the animal hair was almost certainly from a fur-lined carrying case, which had been made from beaver skin. Further research revealed that the instrument would've had just six strings, tuned with wooden pegs, and made from a hardwood – most likely maple.

While this artefact is actually one of the lesser known finds, it nevertheless holds an intriguing history. Initially identified as a harp by archaeologist/historian, Rupert Bruce-Milford – whose job it was to identify and catalogue the finds – little more attention was given to it for many years. The fact that most harps had a sound box, pillar and peg bar, with the strings running at an angle from the box, was somehow overlooked. The remains here, however badly



1 Instrument fragments found in the burial ship

decomposed, didn't suggest such a structure, and as such, there was little to go on.

In 1948, an attempt at a reconstruction based on current thoughts at the time – in terms of the instrument's correct shape – was made, which has since been described by some historians and musicologists as 'awkward and unconvincing'. But despite these comments, the reconstruction was put on show at the British Museum, and it wasn't until 1970 that the remains were truly identified as a lyre. Indeed, it's now simply known as an Anglo Saxon lyre. The chief reasons for the shift in understanding



2 Veneers attached to the lyre's body



3 Drilling out waste from the sound box



4 ... followed by a gouge



6 Soundboard edges being squared



4 Further clearing with a router...





7 Soundboard components in the wedge and lace jig



8 The wedge and lace jig

and the more accurate identification were due to finds of other such instruments in Europe – for example, Oberflacht in Germany, where more than one was found, and Taplow in Buckinghamshire – both of which were discovered in the 1800s; this gave historians firm evidence well in advance of the Sutton Hoo excavation although somehow the link wasn't immediately established.

Accuracy of the 1970 identification was further confirmed by examples found in 1939 – Cologne, Germany – followed by Trossingen, Germany and Prittlewell, Essex in 2001 and 2003 respectively. These instruments are now



11 2mm wide veneer strips are used to make up the rosette



12 Using a thumb plane, the rosette is levelled



9 Basic soundboard construction

known by such names as the 'Germanic' or even 'Viking' lyres. In total, some 30 examples have been recorded from England, Germany, Denmark, Holland, Sweden, France and Norway. A new reconstruction of the Sutton Hoo lyre was made in 1970 – to replace the former – and is still on display at the British Museum.

#### Lost one standing

One of the Oberflacht examples and the Cologne lyre were both destroyed during World War II. The former had been moved to Berlin for safety and stored in a large jar filled with liquid. This was broken open by Russian soldiers who drank the preservative – which was almost neat alcohol – and the harp disintegrated! Similarly, the Cologne lyre was destroyed in an allied bombing raid towards the end of the war.

So, it's the Sutton Hoo reconstruction that prompted the build described here. Although my lyre is a little smaller than the original and doesn't have bronze brackets either side of the string bar, it's extremely straightforward to make and has a beautifully clear sound.

#### Choice of materials

My first consideration before embarking on the project build was which timbers to use.



13 The sound hole pattern is cut out with a 'long reach' fretsaw...



10 The rosette channel is cut

Upon closer analysis, the Sutton Hoo version was, as mentioned earlier, found to be made almost certainly of maple, while others were from oak. As I had a piece of oak available that seemed likely to fit the bill, I opted for that. I felt I should give the soundboard its best chance, so chose spruce as it's resonant and also in plentiful supply. The remainder of my cutting list included some red and black veneer sheets, a few smaller pieces of mahogany and some purfling scraps left over from a recent guitar build. I also needed six tuning pins, a set of six light gauge strings, and a small piece of fret wire for the bridge's top.

#### Preparing the lyre body

In order effectively to create the lyre's body, I started to prepare the oak board by attaching some black and red veneer sheets; these would stand out around the edges once the shape had been cut, the soundboard fitted and the outline dressed (photo 2). Next, it was necessary to mark out the location of the body's hollow section to create a rudimentary sound chamber, which would later be covered by the front. I used a china pencil to make the profile stand out, then set about removing material from what would become the box's interior.

The first operation involved drilling out as much waste as I dared (photo 3). I needed to leave the sound box's edges and bottom thin enough to enhance the resonance, but strong enough to keep the body rigid and flat when the strings are brought to tension. Once the many holes had been drilled, the hollowing out process could be completed using a hand-held router. Fitting an extra wide Perspex base ensured I could see the china pencil lines clearly and avoid getting too close to the edges. Depth of cut was obviously governed by the depth



14 ... and finally cleaned up with needle files and a small chisel





15 Achieving the correct soundboard shape

gauge on the router itself (photo 4). Once I'd removed most of the surplus material, this could then be cleaned up with a sharp gouge (photo 5).

### The soundboard

The next task involved preparation of the spruce soundboard. As the instrument's body slightly tapers along its front outline, I thought some purflings that matched the taper's angle would look effective. There's no evidence whatsoever that such designs were present in the Sutton Hoo lyre, though the Trossingen one did show some signs of artistry with etched lines and relief carving. I always like to think of such decisions as the luthier's privilege!

I first planed the spruce until it was just 2.5mm thick – anything thicker will begin to reduce both sound quality and volume. Next, I planed all edges to be joined at exactly 90° and dead straight along surfaces that'd meet. My 50-year-old Record O42 shoulder plane was exactly right for the job (photo 6). I made the soundboard in three pieces with the purfling strips sandwiched between the edges, then held the entire soundboard in a 'wedge and lace' jig (photo 7). This type of jig has been used by stringed instrument makers for hundreds of years and is extremely easy to make. It comprises a series of 2 x 1in pieces of pine, which are set into a cross bar made from a piece of roofing rafter. The long wedges were taken from an old coffee table top, made from mahogany and 19mm thick, so they're very strong (photo 8).

Once removed from the jig (photo 9), I could then start to think about how to make this look attractive, while giving it some kind of sound hole. I chose to do a little fretwork and found a series of copyright-free designs online. Having chosen an appropriate one, I printed a copy and attached it to the front with wood glue – this



20 Mahogany trims for the remaining front are placed in cramps



16 Marking where the top part of the lyre should be removed



18 Marking out the soundboard support

would act as a guide for the fretsaw blade.

I'd intended to fit a rosette into the soundboard, so cut a channel in advance, but later placed some coloured purflings into the channel using a side edge seam roller along with Titebond glue (photo 10). To make up the rosette, I used strips of dyed tulipwood – some black and others red (photo 11) – before trimming flush with a small thumb plane (photo 12). Of course, it's also possible to fit a ready-made, commercially available rosette, though in this case, I'd suggest one made for a ukulele, or perhaps a mandolin. However, one intended for a classical guitar, for example, would look far too big.

Once the rosette was fitted, I could now move on to fretting out the sound hole pattern. Owing to the long reach required for this task, I used a fretsaw that I'd put together some 25 years ago. I'd taken the spring steel arc from an old one and attached it, using small bolts, to a new one with part of the back end cut off in preparation. This saw gives an overall reach of over 40cm (photo 13), which is ideal for a gorilla aspiring to be a woodworker...! I then cleaned up the fretwork detail using needle files along with a 1.5mm chisel (photo 14).

### Initial assembly steps

My next consideration was the best method for attaching the soundboard to the lyre's body. Firstly, I had to cut out the spruce, following



21 The spindle moulder in use



17 The instrument is much lighter as a result

the profile created when the arms and tuning block were marked out above the body's main part and sides. The spruce doesn't cover what's left of the whole instrument, but extends around two thirds up towards the tuning block. This feature is visible in some of the finds, with other examples being better preserved than the Sutton Hoo one. I found that a slight angle in the spruce arms looked attractive (photo 15) – the spruce will eventually be glued in place and the remaining trim made from scraps of mahogany, similarly planed down to 2.5mm thick.

At this stage, however, it was too early to attach the soundboard as the upper part – across which the strings will pass – first has to be removed. I started by drilling four 20mm holes – one in each corner, thus offering a simple curve – then placed masking tape across the inner edges of



19 Cramping the soundboard in place



22 Tie block dry fit for the string ends





23 Lining up the string positions

the part to be removed (photo 16). I used a jigsaw to follow the tape's edges and managed to achieve a good edge, which was then cleaned up with sanding sticks and a tin chisel (photo 17). To prevent the soundboard from collapsing inwards due to string pressure exerted after putting the bridge in place, I made a support that'd sit directly under the bridge position – acting in a similar way to a violin sound post. The supporting piece needed to have exactly the equivalent depth to that of the sound box interior. To lighten the support's weight, I cut away some wood with a fretsaw and dabbed a little glue onto where it'd meet the back's insides and front respectively (photo 18).

To fit the soundboard, I used a series of cramps placed around the edges, which worked well (photo 19). There are other methods for doing this as it's generally no thicker than 2.5-3mm, and therefore easy to hold down. Strong and long elastic bands, weights and even twill tape pulled tight will do. The most important thing is to ensure that all edges and corners fit flush. I then fitted 2.5mm mahogany trims to the remainder of the lyre's front.

With everything in place, I drilled six 4.5mm holes through the pin bar located at the instrument's top, which allow the wrest pins to be housed. The holes are a fraction smaller



26 Screwing in the wrest pins



28 The case exterior...



24 The tie block holes once marked out

than the pins, which have a very fine thread, so they're tight and can hold the strings firmly. But if you make the holes too big, the pins will slip and everything then goes out of tune.

Ensuring smooth, slightly curved edges around the structure so far was aided by my home-made spindle moulder. This gadget is made from an old hand-held router, attached to an MDF board through which the cutter can pass. It's then placed over the opening to a folding workbench, with the cutter facing upwards. The downward pressure exerted during use helps to keep it stable – you just need to watch your fingers (photo 21)!

#### String tie block & wrest pins

At this stage, the lyre was looking both sleek and elegant, and my next task was making a tie block for the strings. With an instrument of this nature, two types of string can be fitted: the first is 'ball-ended' – requiring 1.5mm holes to be drilled through which the strings can pass until the ball traps them – or held by bridge pins such as those used on an acoustic guitar; and the second is 'loop-ended' – which requires hitch pins to be hammered into the tie block, or in some cases, into the tail end of the instrument itself. The latter method means that the tie block also acts as a bridge, and is fixed. I chose ball-ended strings of differing gauges as these



27 The small bridge is made from mahogany



29 ... and interior



25 The tie block in place

allow for a separate bridge, that's moveable both backwards and forwards by a fraction to lengthen or shorten the strings, and angled clockwise or anti-clockwise to allow for slight tuning changes to pitch.

From carrying out previous builds, I know that a string block can pull off from the instrument as the strings are brought to tension, so I felt it'd be wise to fit this with strong beech dowels. As Einstein is once purported to have said: 'A clever person may solve a problem, but a wise one avoids it in the first place.' Using dowels, I started by dry fitting the block to the front (photo 22). As shown, the block's length allows it to sit neatly between purfling lines at the lyre's lower end. The holes' position through which the strings pass are marked using a long steel ruler, placed to the left-hand edge of the string hole (photo 23), as the pin would be turned clockwise. Each string would then be similarly wound on. Holes through the pin block are drilled along a centreline. If these are placed too close to the soundboard, it can be difficult for the ball-end to sit properly and if too close to the top, the block can split away. Over the last 35 years, I've had my fair share of experience with all these fun moments (photo 24).

To make the tie block look a little more attractive, I inlaid a strip of purfling along the front edge, rounded off the corners and capped the dowel holes with two mother-of-pearl dots – these are normally used as position markers on guitar finger boards (photo 25).

Once the tie block was in place, I could then screw the wrest pins into the lyre's upper rail. Each pin should be put in at an equal depth to that of the others, and to begin with, this is an easy task. The pins penetrate deeper once the strings are tightened, so they can look odd. It can take several attempts to get things looking just right while ensuring the instrument is actually in tune (photo 26). Just before that final stage,



however, I had to make a small bridge using a piece of mahogany, measuring just 15.5mm high x 8mm wide, before inlaying a strip of fret wire across the top edge. Without fret wire, the strings bite into the mahogany and dull the sound (photo 27).

### The simplest & best finish

For this project and indeed many other stringed instruments, the simplest finish to use is Liberon Finishing Oil as it's extremely easy to apply and enhances the timbers beautifully. Just three applications make for a perfect job. We don't know whether the original Sutton Hoo lyre had any protective finish applied, and if so, it'd most likely have been a type of oil or animal fat. One thing we do know for certain is that someone felt the instrument was worth taking care of, then preserving. This is evidenced by the traces of beaver skin found and the fact it was included in King Raedwald's treasured possessions, to be taken into the afterlife.

### The moment of truth

When making any stringed instrument, the 'the moment of truth' finally arrives, but what will it sound like? Well, this beautiful little lyre produces a fine clear note and each string has its own character owing to the different gauges. My daughter always says that a good stringed instrument should be like an angel – with a beautiful face and a beautiful voice – which I think is a nice insight.

### The case

With the lyre completed, I could now move on to making a case in which to house it. This is essentially a box, made in the usual way, by first building the sides, before pinning and gluing the top and bottom into place. I used pine for the sides – around 10mm thick – and 3mm ply for the top and bottom. I sliced off the lid to ensure a perfect fit and lined the interior with 12mm thick foam, which is covered with

crushed velvet. It's useful to fit 90° hinges at the rear, which holds the lid open and reduces the possibility of damage to the lyre as it's taken in and out of the case. Fitting a tape inside that allows the instrument to be lifted out easily. I first found this idea in an old zither case from Austria, which came in for repair. I sealed the case exterior with cupboard paint and applied the 'Anglo Saxon' style decoration by hand, using a fine brush. I found that making a stencil from acetate greatly aided the edge design, but the central rondel was completed largely by hand. I'm very fortunate that my wife is a competent artist, and has a steady hand (photos 28 & 29).

### Tuning & playing

Finally, a note on tuning and playing. We have no real idea as to how this lyre would've been tuned. It most certainly wouldn't have adhered to the modern convention of A=440, and likely tuned to blend with a human voice, which is still the case with some guitars and instruments such as the Appalachian dulcimer. I simply took the plunge and tuned it from left to right, looking at the lyre to g, a, b, c, d, e. This way, some very simple tunes can be picked out, and not least given the right sequence of tuning the theme from *EastEnders!*

We're also not fully aware as to the intended playing position. From looking at stone carvings and the like, the player would most likely be seated rather than standing, which would otherwise make it difficult to hold in place for any length of time (photo 30). However, some of the lyres found show evidence of what may have been a hand strap across the back. Possible explanations include an aid for a standing player, or when some of the strings are deadened with the left-hand fingers, allow simple chords to be played (photo 31). Either way, the sitting position offers greater ease of playing with or without a strap. ✕



30 The playing position required



31 Deadening strings with the left hand

