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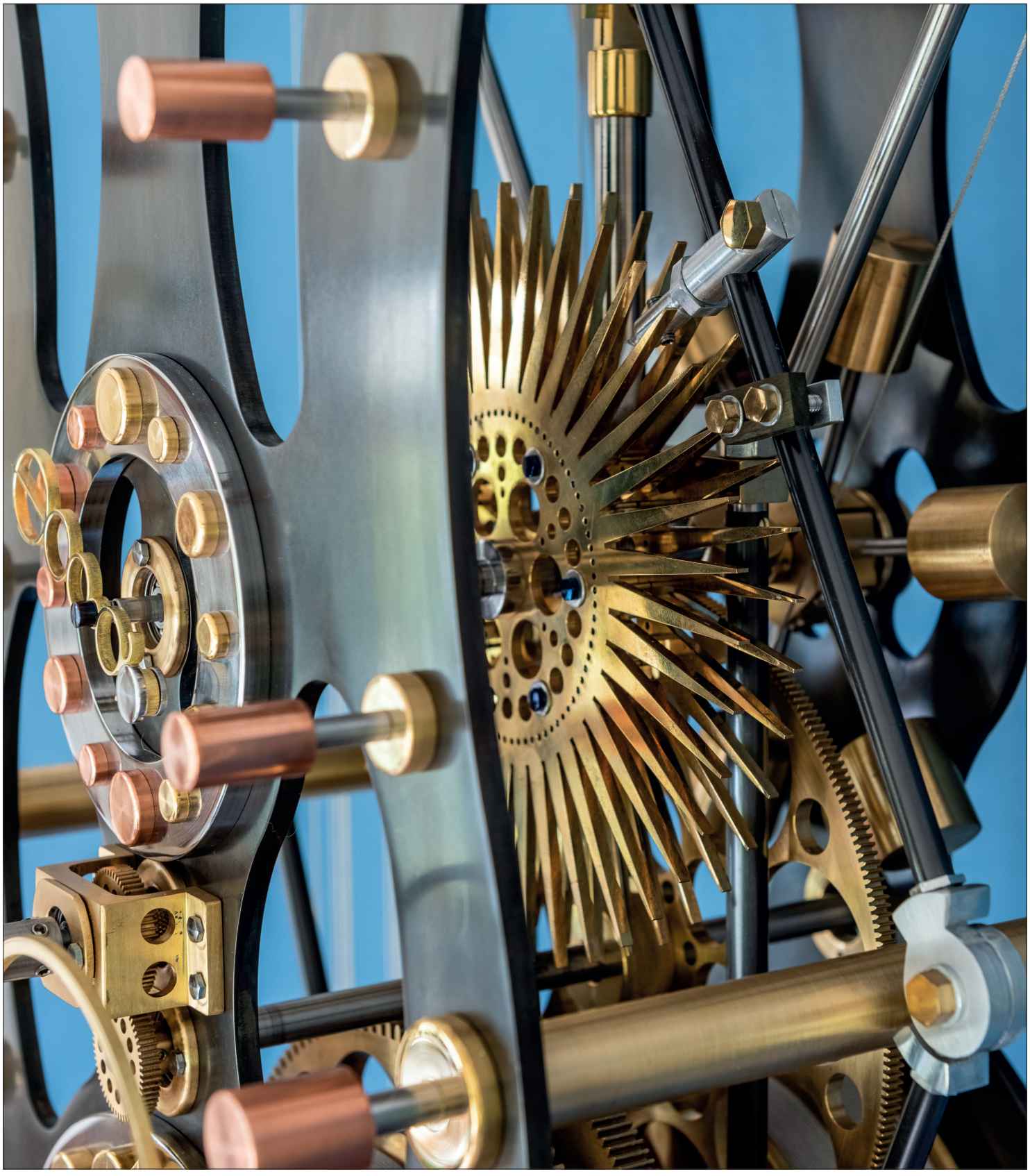
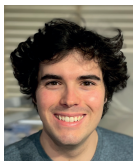


Course Review

Hand and Machine Skills including Workshop Safety, 1–2 November 2023 • Small Lathe and Skills Development, 7–9 November 2023

Tutor: John Reynolds FBHI

Joseph Cooper



Hand and Machine Skills including Workshop Safety

In November I had the pleasure of taking part in two BHI short courses: Hand and Machine Skills including Workshop Safety and Small Lathe and Skills Development.

I had begun to study the Distance Learning Course (DLC) materials in July 2023, and wanted to gain the necessary skills needed to complete the practical exercises within it. Having had little experience of hand tools, and having never been close to a lathe before, I thought these courses would be an ideal starting point.

I'm sure some of you reading this will find what I achieved during these courses rather simple, but I am hoping this report will inform newcomers to the BHI about what to expect, and the benefits that can be gained.

The Hand and Machine Skills (HMSS) course took place over two days, when four other students and I would learn to use basic workshop hand tools as well as some commonly used machines. Our tutor was the knowledgeable and helpful John Reynolds FBHI, who first showed us, step by step, how to make an angle measuring tool, **Figure 1**.

To make the tool I started by using a scribe and Jenny callipers to mark out lengths of steel plate and find their centre lines, followed by a hack saw to cut out the steel body and slide. From there, I used a pillar drill to chain drill a small section along the centre line of the slide, then a combination of hack saw and piercing saw to open out the slot along the slide and create the dog leg. The slide was then filed to fit a 5 mm shouldered screw.

The rest of the steel was used in the construction of the body of the tool, which I riveted together with a small shim at the bottom to separate the sides. I then filed down the rivets until they were no longer visible. The sides and curved top of the construction were all filed to be parallel, and draw filed to finish.

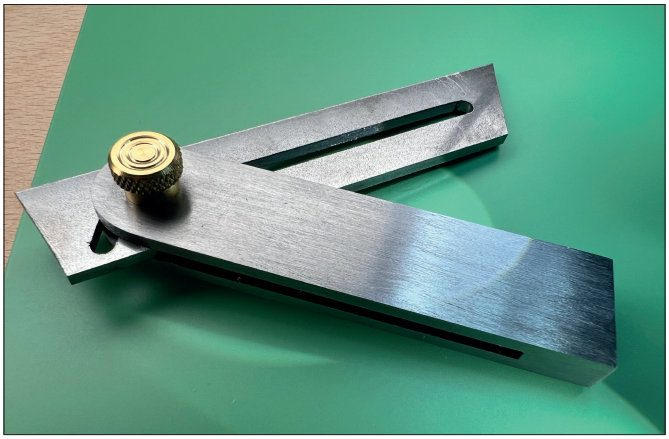


Figure 1. An angle measuring tool produced during the Hand and Machine Skills course, with some work still to be done on it.

On a lathe, I used a die to create a thread on a piece of brass rod that fitted into a tapped hole at the end of the tool. I knurled the threaded rod, and cut it to length to form a screw. This was finished on the lathe, bevelling the edges and creating a pattern on the head of the screw.

This concluded my first short course at the BHI. I thoroughly enjoyed my time and derived a great sense of satisfaction from making my first piece. Even though it was hard work it was well worth the effort. It gave me a level of confidence in myself when using these tools and procedures when working through the DLC material.

Small Lathe and Skills Development

The next week I was back at Upton Hall for the Small Lathe and Skills Development (SLSD) course: a three-day course that also did not disappoint. There were only two of us, again tutored by John Reynolds FBHI, and having a smaller group meant we each had a lot of time on the lathes under John's guidance.

During this course I made three items. The first was a filing rest, which would allow me to create flat sections on materials on a lathe, such as for a watch stem. **Figure 2** shows the file rest made by my fellow student Alex Richards-Geosey during this course.

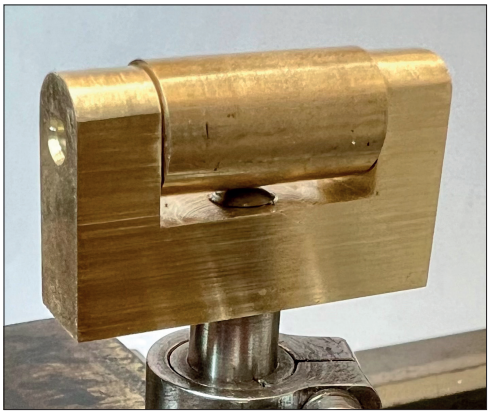


Figure 2. A file rest made by student Alex Richards-Geosey.

The second was a riveting tool, **Figure 3**, for riveting arbor collets on to wheels. The third was a mock clock arbor assembly. **Figure 4** shows both Alex's and my arbor assemblies, to see both sides of the assembly, with a square piece of brass standing in for the wheel and a pivot only attempted at one end.

The rolling file rest was constructed out of a block of brass milled into a U-shape, with one hole on the bottom and two holes on the side of differing sizes. The holes on the side were broached out to accept a taper pin. The bottom hole was tapped to accept a piece of silver steel, which I had to turn down to size on a lathe and thread.

The roller was made on the lathe by facing off a piece of brass rod, drilling an appropriate size hole to fit the taper pin, parting it off, and facing the other side down until it just fit into the U-shape in the brass block. From there the hole in the brass roller was broached out until the taper pin was tight when half way through the roller. The sides of the 'U' shaped block were finished off with draw filing. The file rest was assembled by pushing the taper pin through the block with the roller in place.

The riveting tool was constructed from a single piece of silver steel, whose angled side and domed top were formed on the lathe, and the slot cut out on the milling machine. The tool was hardened and tempered, and the dome polished on an oil stone. This tool was then used to create the mock arbor assembly.

The assembly was great fun to put together. Having read about the theory in the DLC, it was good to put it into practice. We first attempted making pivots on the lathe using mild steel, trying to turn the material down as small as possible, I managed to get down to a diameter of 0.4mm before the pivot broke.

Then to the arbor: the silver steel arbor was faced off and a pivot made with a chamfered collar, and an attempt at a dome at the end. A brass collet was made that will be soldered to the arbor, and riveted to the wheel. A square of brass was cut to make the mock wheel, and a hole made in the centre with a pillar drill, with a countersink made for the rivet.

The collet was turned on the lathe and a hole drilled to the diameter of the arbor. The collet was larger than necessary to be turned down to size later, but some dimensions, such as the face to be riveted, were made precisely to fit at this point. The collet was soldered on to the middle of the arbor. The wheel was then riveted to the arbor using the riveting tool we had made.

With it assembled it was time for some finishing touches. The assembly was put back in the lathe and a graver used to remove the excess solder from the collet, as well as turn the collet into an aesthetically pleasing shape.

Figure 3. A wheel riveting tool – milled, hardened and polished.

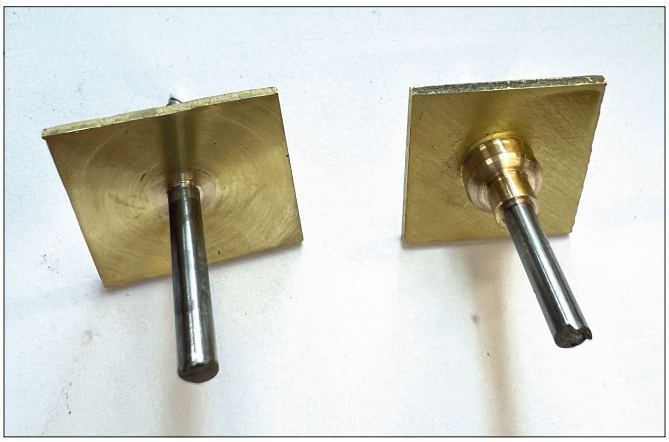


Figure 4. Two mock arbor assemblies made by student Alex Richards-Geosey, left, and Joseph Cooper, right. The left shows the rivet, and the right shows the collet on the arbor.

For me, this was another fantastic few days. I left with enough knowledge and confidence in lathe work to continue my journey as a watchmaker – and a long shopping list of tools and equipment that I wanted. It also reinforced my abilities with other workshop tools.

Conclusion

Overall, I am really pleased with the training I received during these two short courses. It was also good to meet people who share my passion for horology, and who are approaching the subject with different experiences and interests. I would highly recommend both the Hand and Machine Skills and the Small Lathe and Skills Development courses to anyone starting out on their horological journey, whether as a watchmaker or clockmaker.