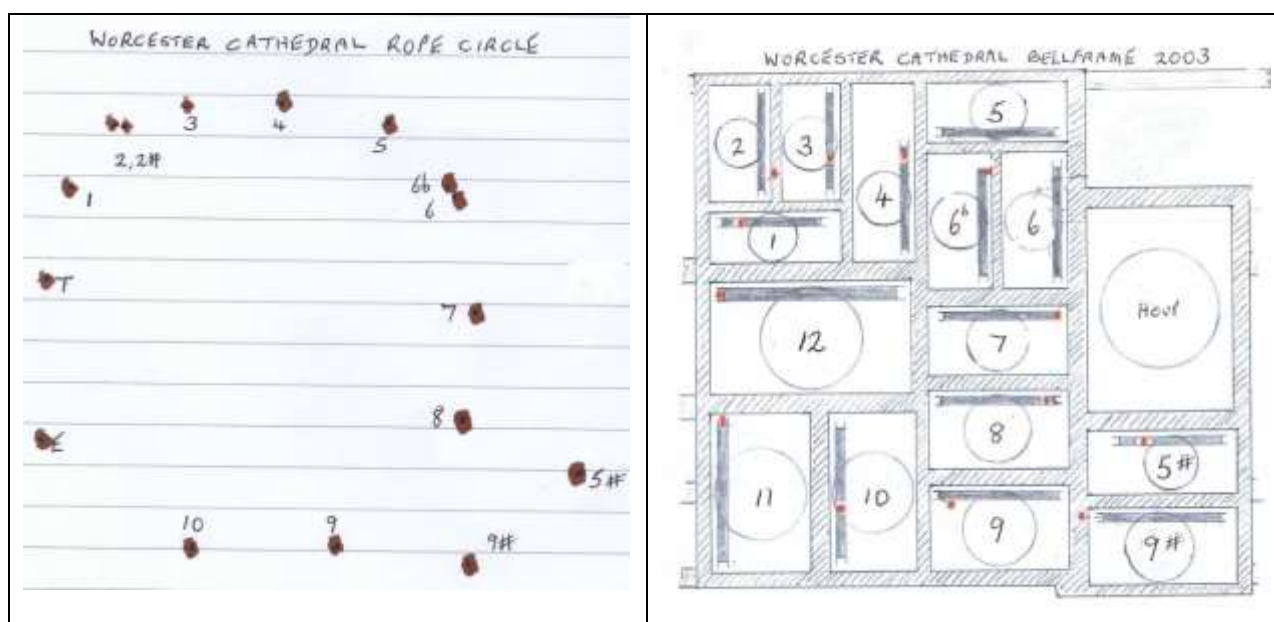


MOVING THE SHARP FIFTH

The ring of bells at Worcester Cathedral has always been unusual in having three and more recently (2018), four, semitone bells – the Flat Sixth, the Sharp Fifth, the Sharp Ninth and now the Sharp Second. However the layout of the frame had always meant that the Sharp Fifth (5#) was roped a long way out of the normal rope circle and made the ringing of certain combinations (Harmonic Minor Ten and the Clare Ten) awkward from a ropesight perspective. It fell behind the 8th of the Twelve which is the 7th in these two rings. The bell was first rung to a peal in 1961, and a note from GEE published in the *Ringling World* 1961 p.474 details the odd ‘circle’ of the ropes for the C# octave, stating ‘.....it seems practical for this arrangement to be improved’. Well George, it has only taken 59 years to do so!



We were determined to correct this as part of a long term project to improve the ease of ringing the bells but the logistics and the costs were going to be a major obstacles. This is the story of how it was finally done.

Idea 1 – move the 5#

In June 2018 we asked Whites of Appleton to quote for moving the 5# to a new pit to be placed in the NE corner, being a location from which its rope would be easily ‘drawn’ to be close to the 5th rope. That would have cost £11,753 + VAT, a total of £14,104. It did seem a lot of money just to solve a ropesight problem!

Idea 2 – swap 5# & 6b

In Oct 2018 an inspection of the size of the pits of 6b and 5# suggested that a swap might be possible for these two bells, bringing the 5# into the centre of the frame to achieve the objective of roping next to the 5th. The issue then became whether the 6b could be roped effectively from the 5# pit to be nearer the 6th in the ringing room, using the rope-hole then used for the bourdon chiming rope. This would not be ideal but it would be in approximately the right place, just rather set back from the main circle.

Such a position would result in a very drawn rope-run, 7' draw over 11' of height in the carillon room. To test the feasibility of this we roped the 5# in this way and moved the bourdon rope to where the 5# had been – which proved to be quite confusing for some people!

Despite the problems of a long sloping chute this was quite successful and the experiment ran for a year, during which 4 peals were rung on it. However it was never quite satisfactory and we put the 5# rope back to its old position in Oct 2019.

There were some other issues too. Whilst the pits were almost the same size the 6b was already a tight fit in its existing pit and would have been an even tighter one in the 5# pit, just 1cm to spare. Moreover, it would have needed smaller bearings in order to fit tight up to those of the 9# in the adjacent pit, requiring alteration to the gudgeons on the headstock. This amount of work moved the idea from a DIY job to one for the professional bellhanger.

Idea 3 – move 5#, put 6b in NE frame

By May 2019 after investigating the bearing housing issue, we had concluded that the 6b would have to go somewhere else. The obvious place was in the NE corner where there were no bells just the wooden steps which go up to the top of the frame. Only two sides of new framework would be needed to make a pit and the steps could be modified to maintain access to what is grandly called the 'viewing platform'.

Whites quoted for this idea on 26 June at £13,725 + VAT, a total of £16,470. This quote included new fittings for the 5# so as to allow the old ones to be used for a training bell in the empty 5# pit. Even so, discounting that aspect, just moving the two semitones looked like a bill of **£14,000**.

A consultative paper, which included requests to remove the carillon hammers and fix the clock's quarter chimes, was put to Chapter in Dec 2019 but approval was not forthcoming. Some criticism was made of the style of the submission but almost inevitably the scope of the work was such that misunderstandings easily arose with those not familiar with the intricacy of the bellframe. Perhaps if one of us had been invited to attend a Chapter meeting in order to explain the project the outcome might have been different.

Idea 4 – move 5#, put 6b under bourdon

So we started 2020 not much further forward and a little discouraged. However, during a visit by James Haseldine of Whites on 24 Jan a new idea emerged to put 6b in the large space under the 4-ton bourdon bell, removing the need to reconstruct the NE stairs. We looked at various configurations and settled on using two steels sitting N-S on the large sub-frame supports. This placed the bell no further east from its rope-hole than it had been west from the rope-hole in its existing pit.

A request to Whites to formally cost this was made on 12 Mar but COVID lockdown intervened and it was never done. Nonetheless it involved much the same amount of work as the NE corner plan and so there was still the issue of at least £14,000. Emboldened by the success of our other work on the cathedral bells and backed by our own bellhanging experience (Bernard at Harpenden & others, Ashley at Yarkhill) we decided to do the whole job ourselves and re-use all the fittings.

Ex-bellhanger John Slater had designed the framework for the 2# in 2018 and was happy to do the same for the 6b, creating a simple but effective structure, and producing engineering drawings. Jim Wheeler, our go-to metal engineer, agreed to fabricate it, and Neil Sparey, owner of NDS Engineering, allowed us the use of his premises and organised the provision of steel and the galvanising. The budget for the whole thing was set at £2,500, underwritten by Bernard in case funds were short.

Members of Chapter visited the belfry on 16 Mar, but a long process of consultation with both Chapter and the FAC, and much re-writing of the submission, was needed before Chapter approval was granted on 4 June and FAC approval on 15 July. Ian Stainburn, of the FAC, commented - *'The final paperwork that you and the Guild submitted was excellent and won plaudits from the Committee'*.

The approval request to Chapter also included two other projects – (1) the dismantling and removal of the 28 redundant carillon hammers, and (2) the removal of the five clock hammers on 7,8,9 and 12 and their replacement with an installation of new quarter chimes striking on 4, 5, 6b and 9. This part of the work had been quoted at £6,816 + £9,746 = £16,562 but had no funding so we offered to do all the removal aspects free of charge, saving a known £6,816 (and possibly a further negotiable £1,200 off the clock chimes cost).



Work Diary

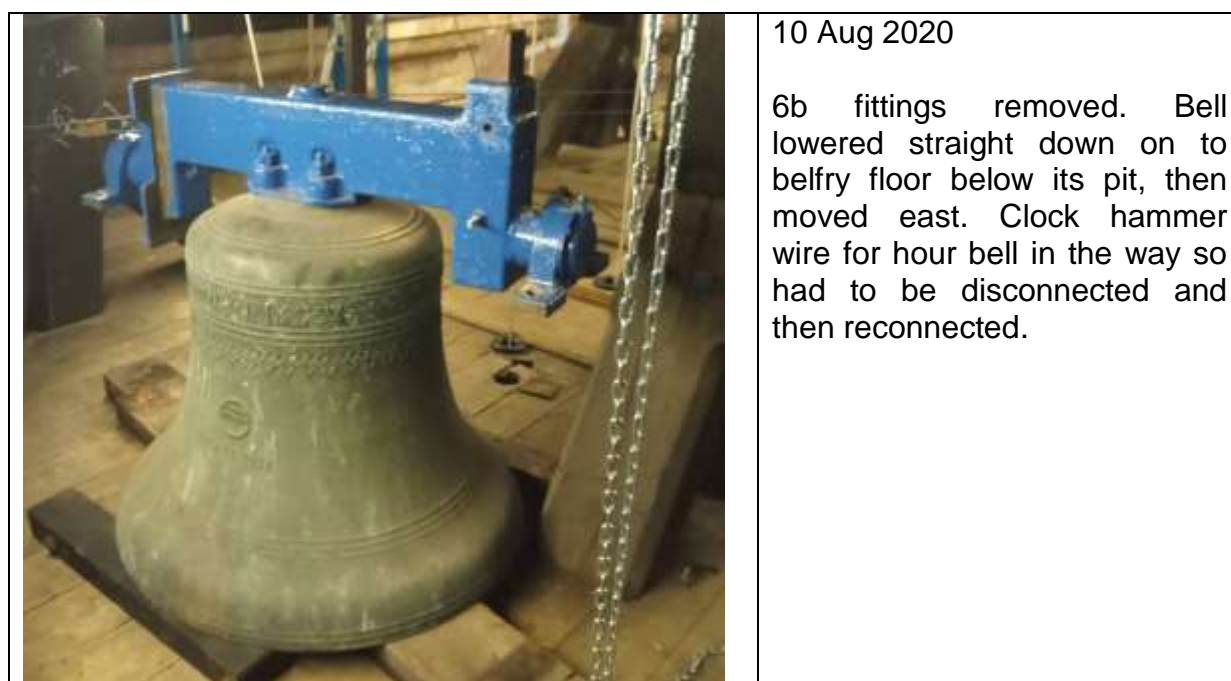
The COVID restrictions in place from Mar 2020 frustratingly meant no preparation work was possible until 13 July, and a week later we had approval for the three projects (move the bells, remove the hammers, new clock chimes). The terms of post-COVID lockdown easing meant we had permission to work 9am-3pm only rather than full days (8.30-5.00) which we would have preferred. Much of this is noted on Facebook on the Guild's group page.

13 Jul – preparatory work on carillon hammers

20 Jul – carillon hammers removed (5#, 6th, 2nd, 11th) and (6b, 7th, 8th)

22 Jul – carillon hammers removed (10th, tenor) and redundant woodwork

	<p>3 Aug 2020</p> <p>Some of the 28 carillon hammers removed from the frame, lowered down to Teaching Centre floor.</p> <p>Chain hoists installed on the north and south lifting beams 30' above bells</p>
	<p>7 Aug 2020</p> <p>5# fittings dismantled</p> <p>Bell lifted to frame-high using the south hoist for moving later.</p> <p><i>Looking north, Bourdon frame at back of picture, and wheel of 9# in foreground.</i></p>





10 Aug 2020

5# lifted from south frame and lowered into the vacated pit of the 6b.

Picture looking north, 5th bell in background.

7th clock hammer removed



7th clock hammer (mounting in 6th pit)



8th clock hammer (mounting in 9th pit)



18 Aug 2020

Repositioning west bearing plate of 5# after rotating it by 180°, drilling new holes and tapping them with M16 screw thread.

Looking south with 4th bell wheel on right.



18 Aug 2020

5# partially completed – bolted down onto its bearing plates, top half of wheel attached to check rope-run and to mount pulley.

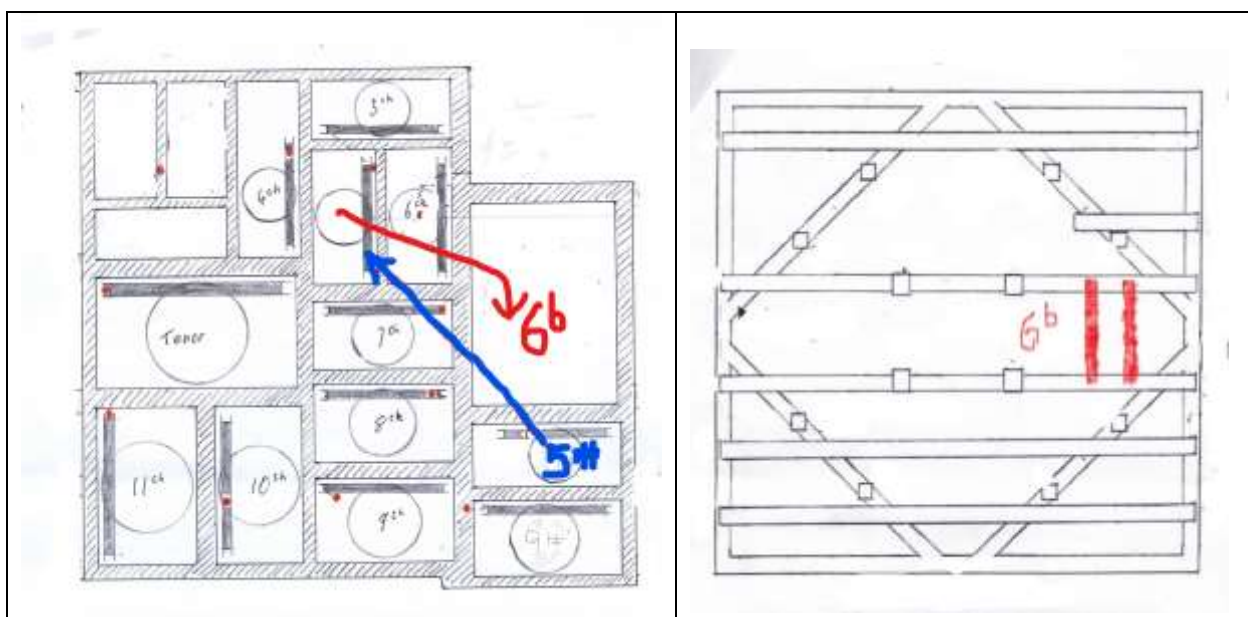
Looking north, 5th in background, 6th to the right.

24 Aug – Erection of scaffold tower in ringing room. Took longer than we expected!



27 Aug – 5# fittings assembled except for clapper. Bell was ‘dumb’ tested, dismantled for clean-up of wheel and metalwork, paintwork and wood treatment.

John Slater finalised his engineering drawings by mid-August and Jim Wheeler built all the frame at NDS in the following fortnight. It was then sent to Hereford for galvanising.





1 Sep 2020

5# fittings re-assembled, with clapper installed, bell test-rung and strike time adjusted to target speed of 360ms

Job done!
One down, one to go.

Removed clock hammer wires under bourdon, and also 8th clock hammer

5 Sep – removed 9# carillon hammers. Measured aspects of new 6b location. Much cleaning of belfry floor

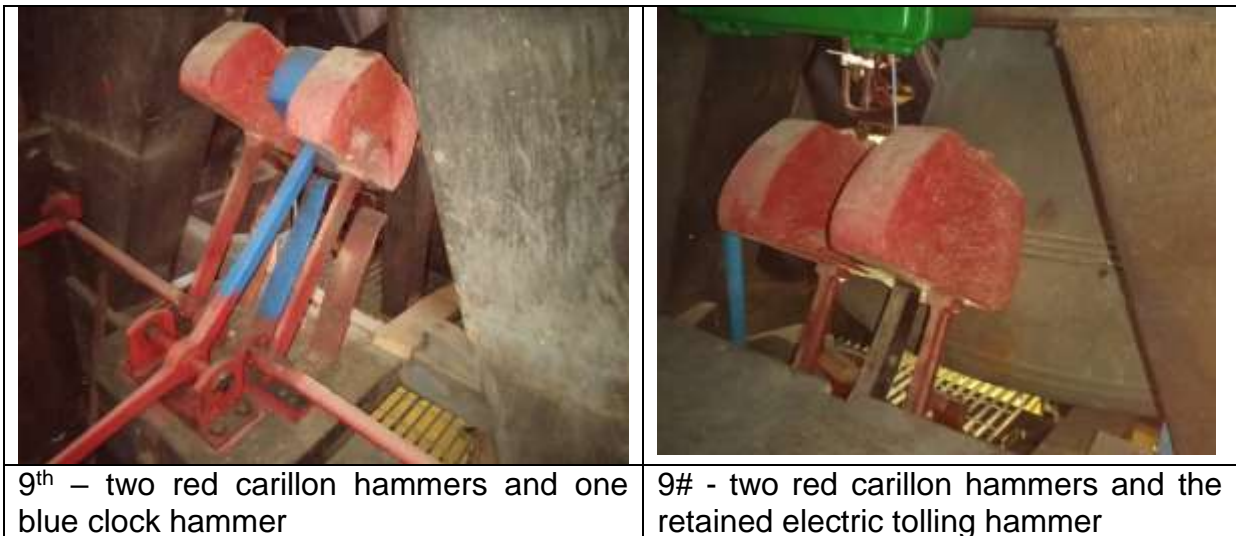
7 Sep – framework back from galvanisers, inspected at NDS by Bernard, resulting in some small alterations for Jim to do.



The (upside-down) framework

Jim Wheeler, Frame-builder

8 Sep – The last pair of carillon hammers (the 9th) and its clock hammer removed, these and all the associated paraphernalia lowered to Teaching Centre. Much cleaning to be ready for 6b work.



15 Sep – galvanised steel framework for 6b delivered by Jim Wheeler, hoisted to the Teaching Centre by cathedral staff, then to belfry by Bernard. By end of day 6b sitting in its new home under the bourdon bell.





15 Sep – If you want a job done properly, do it yourself



6b sitting on the new framework 15 Sep.

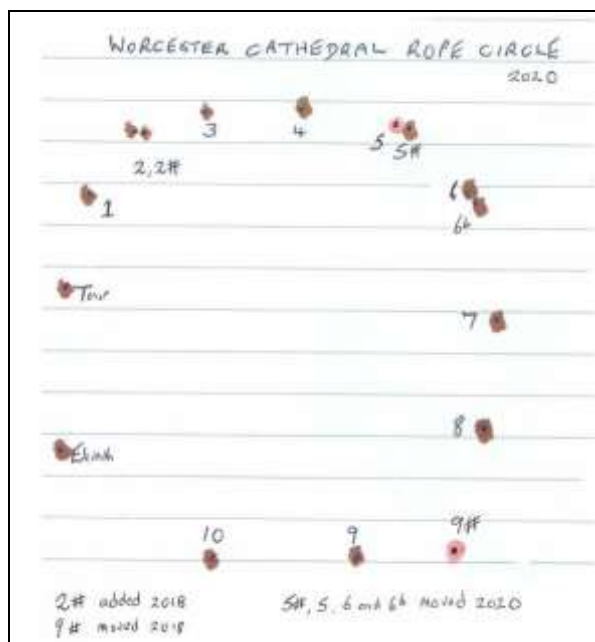
22 Sep – 6b aligned and bolted down, wheel and pulley installed, test rung from room below, rope-run mostly done. Metalwork painted ready for following week.



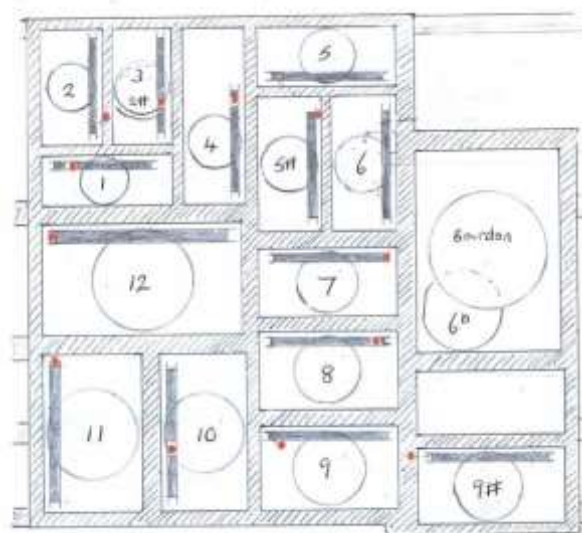
29 Sep 2020 – Bell test rung from carillon room. Rope chutes installed, with pulley-over-pulley arrangement. New sliderway made and bolted to framework. New stay created from a spare one.



6 Oct 2020 – 6b hanging finished and Bourdon rope guided round new framework. Strike time of clapper adjusted to 382 ms. Rope chutes for 6b and 6th stained. New rope for 6th put on.



The new rope circle



Revised layout of the Cathedral Bells

	<p>27 Oct</p> <p>Grillage was installed next to 6b to provide safe working platform. An access ladder from the belfry floor was fixed. Bourdon chiming rope routed via pulleys.</p>
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A second Covid-19 lockdown of the UK started 4 Nov so we finished the project just in time. We are looking forward to being able to ring these bells. Sadly the Harmonic Minor Ten (which includes both the bells moved – 5# and 6b) was not heard on Remembrance Day.

The total monetary cost was **£1,608**, an amazingly small sum, and even lower than the low figure we had budgeted. Compared to contracting out the work we saved at least **£20,000** and got it done much earlier than would otherwise have been possible. Roughly speaking the number of man-hours worked on the bell-hanging part of the project was 136, which, if we'd been paid a very reasonable £75 per hour, would have cost £10,200.

The job of re-installing the clock's quarter chimes is currently on hold.

Bernard Taylor
Nov 2020