CHURCH OF ST ANDREW

COLYTON

REPORT ON THE CONDITION OF THE BELLS, BELL-FRAME AND FITTINGS

Inspection carried out on Tuesday 20th August 2013, on behalf of the Devon Church Bell Restoration Fund, by Ian Smith and Ian Campbell (Trustees of the Fund, and Bells and Belfries Advisors to the Guild of Devonshire Ringers); met by Mr Bob Olliver and Mr David Presnail (Hon Secretary and Vice Chairman respectively of the St Andrews, Colyton, PCC Fabric Group). This report also includes the findings from 1969 and 1998 of the late Prebendary John Scott, former Bells & Belfries Advisor to the Diocese of Exeter, and published in his book "Towers and Bells of Devon".

HISTORICAL

The church stands on a shallow slope rising from the west bank of the River Coly about a mile and a half north of its confluence with the River Axe. Built on a Saxon foundation the present church is of Norman origin, though Norman work remains only in the base of the tower and the chancel, most of the work, including the top of the tower, dating from the 15th or early 16th century. The upper parts of the nave and aisles were renewed in 1769 and 1818, and further restorative work was required following a serious fire in 1933.

Five bells were listed in the Inventory (Survey of Church Goods) of 1553. One bell was recast in 1580 by John and George Poole of Yetminster, Dorset. In 1611 the 2nd and 5th bells (the present 5th and tenor) were recast in the churchyard by Robert Wiseman of Montacute, Somerset. (The date 1711 on the tenor bell is probably an error for 1611, as there is no record of any recasting being done in 1711.) The treble and 3rd bells (present 4th and 6th) were recast by John Pennington of Exeter in 1667.

In 1772 Thomas Bilbie II of Cullompton rehung the bells and added a new treble bell (present 3rd), and in 1776 recast the present 7th bell. In 1837 the tenor bell was again recast, this time by Thomas Mears of Whitechapel, London. In 1934 Gillett & Johnston of Croydon rehung the bells in the existing oak frame which they strengthened with tie-bolts, at the same time recasting the then 2nd bell (present 4th).

In 1998, to complete the octave, two new treble bells were cast by the Whitechapel Bell Foundry and hung by Nicholson Engineering of Bridport, Dorset, new steel frames for the additional bells being installed within and above the existing oak frame.

TOWER

The magnificent crossing tower with its surmounting octagon is approximately 75 feet in height. It is built mainly of Beer stone. The octagon is carried on squinches in the belfry stage. There is electric lighting at all levels in the tower.

At **Ground Floor Level** the tower is supported on four massive piers. At this level each face is pierced by a pointed unmoulded arch, those in the E and W faces (to the Chancel and Nave) being 11 feet 4 inches wide with those in the N and S faces (to the transepts) being narrower at 7 feet 1 inch wide. The internal dimensions of the tower are almost square, being 17 feet 3 inches N/S by 17 feet 5 inches E/W. The floor is flagged and is on the same level as that of the Nave, with two steps leading up to the Chancel floor. Choir stalls are situated at the base of the tower with the organ console under the N transept arch. Below the ceiling in the SE corner can be seen the underside of the steps giving access to the ringing chamber above, and towards the W end of the N wall can be seen the clock pendulum case.

The gallery access to the ringing chamber can be seen running along the E and N walls of the S transept. At the E end of the N wall of the S transept, adjacent to the tower, is a chiming wire, allowing the tenor bell to be sounded without ascending the tower.

Access to the Ringing Chamber is initially through a doorway at the S end of the external E face of the S transept, 26 steps leading to the gallery along the E wall of the transept as mentioned above. (This access stairway is by no means straightforward. The initial step through the doorway is followed by 9 circular steps leading to a square platform, from which a further 12 circular steps and 4 straight steps bring you to the gallery.) Having traversed the gallery along the E wall, one step down brings you to the gallery along the N wall of the transept, at the end of which 2 steps lead down through the S wall of the tower followed by 7 steps upwards into the ringing chamber. A certain degree of agility is required to ascend the stairway, though we are aware that one of your ringers, having suffered a severe stroke, nevertheless still managed it. It is difficult to see how the access could be improved without fairly major reconstruction, permission for which would be most problematic in a Grade I listed building of this nature.

The **Ringing Chamber** measures 17 feet 5 inches N/S by 17 feet 6 inches E/W and is 14 feet 2 inches in height. The walls are wood-panelled to a height of 4 feet, with bench seating along the S, E and N sides. The floor of the chamber is carpeted. The access stairway enters in the SW corner of the chamber and measures 4 feet 6 inches N/S by 3 feet 2 inches E/W. The S wall is pierced centrally at a height of 6 feet 6 inches by a single-light openable

window measuring 1 foot 6 inches by 3 feet 9 inches. The N wall is pierced centrally at a height of 9 feet by a slightly smaller single-light window. Though appearing to be openable it is somewhat inaccessible, meaning that ventilation in the chamber is poor. We know from experience that when ringing the bells for long periods, especially in the summer months, the room does get very stuffy. It would be worth investigating if both windows could be opened more easily, perhaps with the addition of some forced ventilation. The E wall is pierced centrally by a cupboard measuring 1 foot 6 inches by 4 feet and some 2 feet 6 inches deep – was this a former window? The W wall is unpierced.

The western half of the N wall is occupied by a large wooden case measuring 8 feet 9 inches by 2 feet 10 inches enclosing the clock, which is now electrically wound. Against the E end of the case is the pull-off lever for the clock chimes. Adjacent to the clock case is a small bell operated from below as a signal to the ringers during weddings, etc. Remains of an old Ellacombe chiming apparatus is situated towards the W end of the S wall. Only the rope on the extreme right is still fitted, allowing the tenor bell to be sounded from below.

The chamber is lit by a centrally suspended 5 foot fluorescent light fitting. There is also an emergency light on the E wall just inwards of the access stair. On top of the access stair surround are two TV monitors and a video-recorder, possibly used for giving demonstrations to the general public.

The **Intermediate Chamber** is accessed by means of a trap door in the ceiling against the E wall of the ringing chamber, served by an 18 rung aluminium ladder which is fixed at the top. This chamber measures 17 feet 3 inches N/S by 17 feet 5 inches E/W and is 5 feet 11 inches in height. The walls are unpierced and the stonework is unrendered. The floor is boarded and appears slightly domed in the centre. The bell-ropes are drawn out of the vertical to a greater or lesser degree in this chamber as follows:

Treble	2 inches	with no ground pulley or flapper board.
2nd	straight drop	with no ground pulley or flapper board
3rd	16 inches	with ground pulley and flapper board
4th	18 inches	with ground pulley, ceiling pulley and flapper board
5th	2 inches	with nylon ground pulley in hardwood box
6th	straight drop	with no ground pulley or flapper board
7th	9 inches	with ground pulley, ceiling pulley and flapper board
Tenor	straight drop	with no ground pulley or flapper board.

All the pulleys are free-running and in good condition.

A chiming drum designed to permit the bells to be automatically chimed in rounds (12345678), queens (13572468) and tittums (15263748) is situated just E of the centre of the floor. It was unclear whether this is currently functional. We noticed that one tooth (peg) had become detached and was lying on the floor. This should be refitted. On account of the

chiming mechanism the floor is criss-crossed with chiming wires making access somewhat difficult.

The ceiling of the chamber is supported by five massive oak joists running E/W and measuring between 12 inches square and 15 inches by 18 inches. These form the main sub-frame for the bell-frame above. They rest on stone corbels in the tower walls and show some evidence of previous worm/death-watch beetle activity. They are in turn supported by three spliced rolled steel joists measuring 15 inches by 6 inches running N/S, one running centrally with the other two running approximately 12 inches in from the E and W walls. They are built into the N and S walls. Although in good condition where they enter the N wall, signs of corrosion are appearing where they enter the S wall, particularly with the central beam. They should be well rubbed down at this point and a zinc-rich primer applied followed by a good quality top-coat. Furthermore, a small section has been cut out of the central beam to accommodate the fall of the 4th rope: this should also be primed and painted.

The **Bell Chamber** is accessed by means of a 6 rung wooden ladder through an open trap in the NE corner adjacent to the 5th bell. The lower part of this chamber has the same dimensions as the chamber below. Some 4 feet 7 inches above floor level, approximately level with the top of the original wooden bell-frame, are the squinches supporting the octagon above. Each face of the tower at this level is pierced centrally by an arched two-light louvre. These are boarded up to quatrefoil level and covered internally with plastic mesh. The mesh is in reasonable condition at present but should be routinely monitored to ensure that it is capable of excluding the access of birds. If it is found to be deteriorating we would recommend replacing it with steel weldmesh with a mesh size no greater than 1 inch (25 mm).

Rising from the bell chamber is the distinctive octagon which is accessed by an aluminium ladder rising from the bell-frame to a platform above the bells, from where a further ladder gives access to the roof. In the 1990s an elaborate system of stainless steel pillars and wire braces was erected in order to stabilise the octagonal lantern.

BELLS, BELL-FRAME AND FITTINGS

The oak **Bell-frame** is set diagonally in the tower so as to accommodate the squinches. Whereas the cills continue into the corners of the tower, the frame heads are abbreviated for the same reason. The frame is in good condition, being well-constructed originally and then additionally tie-bolted when the bells were rehung in 1934. Bells nos. 1, 3, 5, 6 and 8 hang in the original frame. Bells nos. 2, 4 and 7 hang in fabricated steel frames constructed within and above the existing wooden frame. We noticed that one of the angle brackets in the frame surrounding the tenor bell was in need of tightening: it would be appropriate to check the tightness of all the brackets and tie-bolts. This time of year (late summer/early autumn) is the best time to do this as the frame is likely to be at its driest. The frame is very close to the tower walls in several places. It is most important that the gaps between the frame and

walls are at all times kept clear of any dust and debris which could harbour damp and the possible proliferation of wood-boring insects.

The **Bells** are something of a mixture, having been cast over a period of almost 400 years. The Treble, 2nd, 4th and 7th are all of good tone. The 5th, 6th and Tenor we would describe as being of only fair tone. The 3rd bell is a very poor casting and has a distinctly "indifferent" tone. Having said that, there is no evidence of any cracks in the bells, though a complete dismantling and closer examination would be necessary to be absolutely certain. As this would have been done when the bells were last restored in 1998 we are sure there is no need for concern.

The Treble, 2nd and 4th bells were cast with flat tops, and the Tenor has had its canons (supporting loops) removed. The 3rd, 5th, 6th, and 7th retain their canons. All the bells have been machine tuned; in addition the 6th and 7th had been previously chip-tuned. The 5th, 6th, 7th and Tenor have been quarter-turned to even out clapper wear, the 5th, 6th and 7th having also been previously 1/8th turned. The 3rd and 4th appear to have been 1/8th turned only. The Treble and 2nd, being new bells, have not been turned.

All the bells are fitted with independent **Crown Staples** from which the clappers hang. Any former cast-in crown staples will have been removed during the 1998 restoration, thus removing any concern about cracks being caused in the crowns of the bells on account of differential expansion between the iron of the staple and the bronze of the bell.

The **Clappers** are all of SGI (spheroidal graphite iron) and have round shafts and flights and spherical or slightly ovoid balls. They are all in good condition, exhibiting sideways play of about 3/8 inch and negligible up-and-down play, this indicating that the clapper bushes have very little wear.

The **Headstocks** of bells 1 to 7 are all of fabricated steel, those on bells 3, 5, 6 and 7 being of canon-retaining design. The headstocks on the Treble and 2nd bells are fitted with clapper-adjusting screws. The headstock on the Tenor bell is of cast iron and is of Gillett & Johnston design. All are in good order and are well painted. The **Gudgeons** of bells 1 to 7 are all screwed in; those on the Tenor bell are riveted.

The **Bearings** on all the bells are self-aligning ball-bearings. Those on bells 2, 3 and 4 are showing slight signs of leakage indicating that the grease is denaturing or that the seals are starting to break down. Those on the 7th bell are showing more significant signs of leakage. There is no immediate cause for concern, though we would recommend that you ask a professional bell-hanger to inspect them in about 5 years time, ie. after they have been in use for 20 years. We noted that the bearing housings on the Tenor bell are fitted with grease caps: clearly they are of an older design and have been reused. We must emphasise that no attempt should be made to fill these with additional grease. Replenishment of lubricant in the bearings is the province of the professional bell-hanger as noted above.

The **Stays** are of ash, of straight design, and are all in good condition. That on the Treble bell was a little loose and was tightened at the time of inspection. That on the Tenor bell is slightly shaped to accommodate the angle of the slider. Those on bells 1 to 7 are all bolted to the side of the headstock; that on the Tenor bell is socketed into the headstock.

The **Sliders** and **Runner Boards** are all in good condition. The runner board on the Tenor bell is integral with the bell-frame.

The **Wheels** are all in good, or at least acceptable, condition. Those on the Treble and 2nd bells are new. Those on bells 3 to 7 are all refurbished, with new soles and shrouds having been fitted to the original spokes and centres. The wheel of the 3rd bell rubs slightly against the flapper board of the 2nd bell above, the board being in need of a little adjustment. The wheel of the 5th bell shows some damage to the internal shrouding at the join between the two halves, but is otherwise in good condition. There is slight evidence of worm activity in the spokes of the 7th wheel, though this may not be active. The metal tongues at the joins in the shrouding on the tenor wheel are starting to rust, as are the nails securing the shrouding to the sole. Some of the metal wheel stays are starting to rust slightly and would benefit from rubbing down and painting in the not too distant future.

We noticed on several of the wheels, notably the Treble, 4th, 5th and 6th, that the half-bobbins (radius blocks), installed next to the garter hole in the wheel in order to reduce the sharp angle over which the rope is pulled, have not been very accurately fitted and are somewhat shy of the garter holes. This means that the ropes on those bells are being pulled over the sharp edge of the garter holes. Repositioning the radius blocks may be a little tricky; however the problem could be alleviated by smoothing off the edges of the garter holes with a file or sand-paper. Alternatively the ropes could be fitted with leather sleeves where they pass through the garter holes, such sleeves being available from the rope manufacturers.

The **Pulleys** are all of single design and consist of cast nylon sheaves in hardwood boxes. They are all free-running and are in good condition save for the pulley on the 6th bell, which has some sideways play, and the sheave of the pulley on the 7th bell, which is becoming slightly grooved.

The **Ropes** on all the bells other than the Tenor have natural fibre bottom ends and top ends of pre-stretched polyester. The Tenor rope is totally of natural fibre. The top ends of all the ropes are in good condition save for the slight damage being caused by the ill-fitted radius blocks as noted above. The ropes on bells 4 and 7 are in fact quite new. The bottom ends of the ropes, other than those on the 5th and 6th bells are in reasonable condition. That on the 5th bells is very worn about 3 feet below the sally and is in danger of breaking. That on the 6th bell is worn at the same point, but not quite so badly.

Chiming Hammers are fitted to each bell. It was noted that those on the Treble and 3rd are just resting on the bells and require adjustment. Also some are just starting to rust and would benefit from rubbing down and painting.

DYNAMIC INSPECTION

At the time of our inspection it was not possible to examine the installation while the bells were ringing. Reference has however been made to the members of the band which rang a full 3 hour peal on the bells on 27th July 2013. Slight difficulties were apparently encountered with the 4th and 7th bells. When pulled at handstroke the 4th bell sometimes felt a little "rough" and would not rise at backstroke. We would attribute this to the excessive draw of the rope in the intermediate chamber. When pulled at backstroke the 7th bell would not always rise at handstroke when ringing next in sequence to the Tenor. We would attribute this to the fact that the 7th is hung in an elevated frame which inevitably has a small degree of flexibility. At certain times the forces engendered by the swing of the Tenor bell will have some influence on this. We must say that there is nothing wrong with either bell; the difficulties arise merely as a result of the design of the installation. No difficulties were experienced with any of the other bells.

RECOMMENDATIONS

There is very little cause for concern with any aspect of the bell installation, which is generally in very good condition. We would however bring the following items to your attention as summarised below.

1. Investigate the possibility of improving ventilation in the ringing chamber.
2. Replace the dislodged peg in the chiming drum in the intermediate chamber.
3. Rub down and repaint the RSJs in the intermediate chamber especially where they are built into the S wall. Also paint the cut out section of the central RSJ where the 4th rope passes.
4. Monitor the mesh covering the louvres and replace with weldmesh as required.
5. Ensure that the gaps between the bell-frame and tower walls are kept clear of dust and debris.
6. Monitor any grease leakage from the bell bearings. We would suggest asking a professional bell-hanger to check the bearings in about 5 years time.
7. Adjust the flapper board descending from the 2nd bell such that it does not foul the wheel of the 3rd bell.
8. Check the damage to the shrouding of the 5th wheel and have repaired as appropriate.
9. Smooth off the sharp edges of the garter holes to prevent damage to the ropes at this point. Consider obtaining leather sleeves to fit to the ropes where they pass through the garter holes.
10. Repaint the wheel stays, chiming hammers, and any other metal parts showing signs of corrosion, within the next 5 years.
11. Monitor the condition of the pulleys of the 6th and 7th bells.
12. Repair or replace the ropes of the 5th and 6th bells.

13. Adjust the chiming hammers on the Treble and 3rd bells such that they do not rest on the bells having struck.

For advice on general maintenance we would refer you to the bell maintenance section in the Guild of Devonshire Ringers Handbook (The Blue Folder), a copy of which should be held by the ringers.

We append to this report a diagram of a bell with fittings, a diagram of the present bell-frame layout at Colyton and a diagram of the former bell layout.

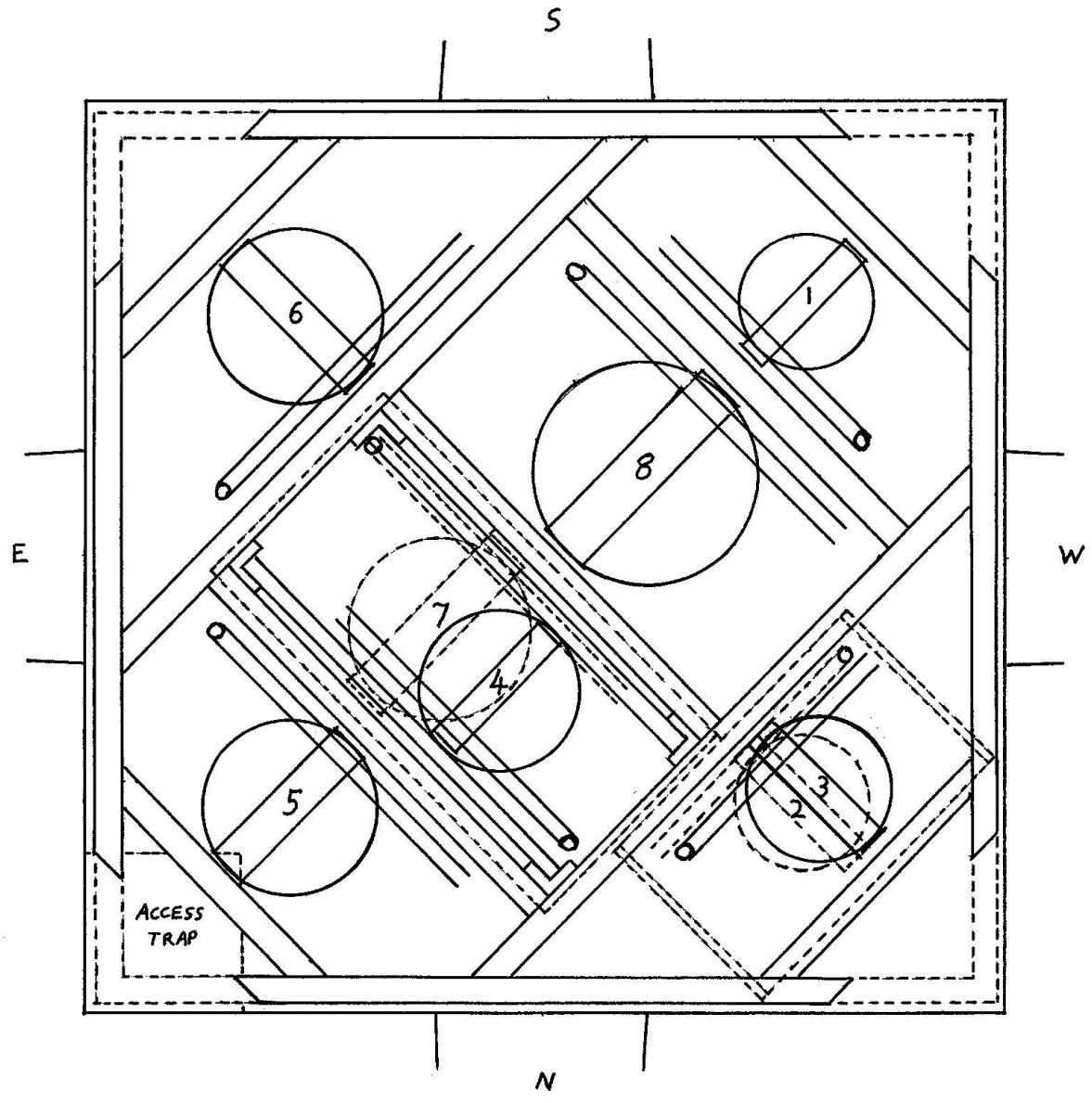
Ian Smith Ian Campbell

October 2013

APPENDICES

COLYTON BELL-FRAME LAYOUT

(Not to scale)



NB. 1. The 2nd bell hangs above the 3rd bell, and the 7th bell hangs above the 4th bell.

2. The hatched lines in the corners indicate the position of the frame cills. The internal hatched lines indicate the positions of the hoisted bells and frames

FORMER BELL LAYOUT (Prior to 1998)