CHURCH OF ST ANDREW

YARNSCOMBE

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

Inspection carried out on Friday 3rd June 2016, on behalf of the Devon Church Bell Restoration Fund, by James Clarke and Ian Smith (Trustees of the Fund). James Clarke is also Consultant on Bells and Belfries to the Exeter Diocesan Advisory Committee, and Ian Smith is Bells and Belfries Advisor to the Guild of Devonshire Ringers. This report also makes reference to the findings of Prebendary John Scott from his visits in 1973, 1996 and 2002, the 1996 visit being in the company of his assistant Frank Mack.

HISTORICAL

The village of Yarnscombe lies on the west side of the River Taw between Great Torrington and Barnstaple, about a mile and a half north of the Torrington to Umberleigh road, the church standing at an elevation of approximately 460 feet above sea level, and sheltered only a little by the high ground to the south and west. The church dates from the 13th century, though most of the present building is of the 15th century and was significantly restored in 1888-89.

Four bells are listed in the Inventory (Survey of Church Goods) 0f 1553, one of these bells, the present fifth, still remaining from that time. It is believed to be from the Bristol foundry, it displaying motifs which seem to link it to Bristol, though its precise founder is unknown. It would have been cast between 1420 and 1480 and is "listed" for preservation.

The tenor is dated 1608 and is also "listed" as a rare early bell by the Pennington family, probably by Thomas Pennington I of Barnstaple who may have been working with Robert Pennington of Bodmin, hence the initials "R.P" inscribed on the bell. It is in fact the earliest bell still extant in the Diocese by a member or members of this family. The former fourth

bell, according to Ellacombe, was by Thomas Pennington II and was dated 1631, though has since been recast.

The current third bell is unusual in that it is a bell dating from 1709, but we have no idea who cast it, or where. For its archaeological interest it is "listed" by Churchcare as worthy of preservation.

In 1889 the fourth bell was recast by John Taylor & Co of Loughborough, who also provided two new bells to complete the ring of six, all the bells being hung in a new oak frame by Harry Stokes of Woodbury, the wood for the new frame being given by the Lord of the Manor, the Hon Mark Rolle. At the same time the tower was strengthened with tie-rods.

More recently, in 1973, the bells were re-hung on new self-aligning ball-bearings by Arthur Fidler of Bow. Further work was carried out in 2002 by Robert Parker of Taunton when the former cast-in crown staples were cut out from the bells and replaced with independent clapper staples and new SG iron clappers. The timber and metalwork of the bell fittings were also cleaned down and painted.

TOWER

The N transeptal tower, some 55 feet in height and built in local rubble, is diagonally buttressed at the NW and NE corners to approximately two-fifths height. It is surmounted by small square pinnacles and has a polygonal stair turret with five light openings reaching to full height just to the right (S) of the centre of the W face. A weather vane is mounted towards the S side of the roof and there was formerly a central flagpole.

There is a plastic down-pipe descending centrally down the N face from a hopper above the sound exit louvre, discharging water from the roof. A lightning conductor descends at the N end of the W face.

The tower is of three stages, the lower stage comprising a ground-floor ringing room, the middle stage comprising an intermediate chamber, and the upper stage comprising the bell chamber and roof. Electric lighting is provided in the lower stage only. A vestry is now built against the E face of the tower.

Our inspection was carried out during a reasonably long period of dry weather, and it was therefore surprising to see the amount of dampness in the tower walls at low level. We think this could be mitigated to a certain extent by keeping the door to the tower stairway open as much as possible so as to increase ventilation. We would also suggest that the valley gutter between the nave and the tower could be leaking, but we were unable to see it during our inspection.

The **Ground Floor Chamber/Ringing Room** measures 9 feet 1 inch E/W by 9 feet 10 inches N/S (plus a further 2 feet to the screen) and is 16 feet 3 inches in height. The W wall

is pierced towards its S end by a small doorway to the tower stairs, reached by a single step; the N wall is pierced by a large three-light window in Perpendicular style; the E wall contains a central recess to a former window which was blocked up when the vestry was built; the S wall comprises a tall unmoulded archway through to the Nave, the lower 7 feet 10 inches being enclosed with an unglazed wooden screen with a central single-leaved doorway.

The floor is stone-flagged and surrounded by patterned encaustic tiles. The walls are rendered and painted. As mentioned above, there is severe evidence of water ingress in the SW corner. The floor, particularly along the N side of the chamber was also damp when we visited, though this was probably as a result of condensation.

The ceiling is boarded and is supported by seven wooden joists running E/W, the central joist being interrupted by a square removable trap of sufficient size to allow the passage of the bells should they need to be removed for restoration in the future.

The chamber is lit by a single pendant light fitting descending from the S side of the trap, and operated by a switch to the right of the Nave arch. There is however no emergency light designed to activate in the case of power failure.

The ropes at this level are all of natural fibre and are in quite good condition, though the treble rope has a short-splice 12 inches below the sally and the fifth rope has a similar splice 2 feet below the sally, the latter splice now becoming a little ragged. The tails of all the ropes are conventionally tucked. When not in use the ropes are hoisted on a bell-shaped wooden rope-spider, the cord for which runs over two pulleys in the ceiling and descends to a cleat on the wall beneath the N window.

There is a former boxed clapper on the floor below the N window.

The **Intermediate Chamber** is reached by means of 24 steps in the spiral tower stairway. The steps of the stairway are badly worn and extreme care should be used when ascending them. There is a vertical crack some ⅛ inch wide in the masonry of the staircase wall, roughly where this meets the main tower wall on the N side of the stair turret.

The chamber measures 9 feet 5 inches E/W by 8 feet 11 inches N/S and is 15 feet 10 inches in height. The walls are of roughly dressed stone, large areas of which are green with algae due to the constantly damp conditions, particularly on the N wall. The N and S walls are unpierced; the E wall is pierced centrally by a small window; the W wall is pierced to the left (S) of centre by an opening to the tower stairs. The floor is boarded and contains a central removable trap some 45 inches square, as seen from below. Within the chamber, at two levels, are tie rods across each wall, the lower set being 5 feet 6 inches above floor level with the upper set about 2 feet below the ceiling, presumably installed to hold the walls together. The rods are of steel and are now corroding significantly despite having been painted.

The bell-ropes, as they pass through the chamber, are all enclosed within wooden chutes which are quite robust. In order to produce a good rope circle in the ringing room below, they are all drawn out of the vertical to varying extents as follows:

Treble	26 inches → SW (7.8°)	4th	6 inches → SE (1.8°)
2nd	12 inches → NW (3.6°)	5th	18 inches → E (5.4°)
3rd	14 inches → SW (4.2°)	Tenor	18 inches → E (5.4°)

There are however no ground or ceiling pulleys to ease the path of the ropes over each change of direction. We would certainly expect to see these installed where the angle of draw approaches or exceeds 5 degrees.

The ceiling/floor of bell chamber above is boarded and is supported on two substantial oak beams running N/S across the middle of the tower. These also form the foundation of the bell-frame, though only four bolts can be seen penetrating the beams. The outer parts of the bell-frame are bearing on oak wall plates along the E and W walls. Due to the lack of suitable ladders, it was not possible to determine the condition of these timbers.

The **Bell Chamber** is reached by a further 26 steps in the tower stairway, this chamber measuring 10 feet 11 inches E/W by 11 feet 10 inches N/S and 11 feet 4 inches in height to the lowest of the roof timbers. The walls are of rough stone.

The N, W and S faces are each pierced centrally by a single-light louvre; the E face is pierced by a similar louvre but towards the N end of the wall so as to accommodate the entrance to the tower stairway. The louvre slats are of slate. Three of the four louvres are covered with fine mesh which is excluding the jackdaws successfully, even though it allows them to nest between the louvre slats and the mesh screens. The E side louvre however was screened with 1 inch chicken wire, but this has broken down and there is a nest built upon the louvre cill in which there were some young jackdaws at the time of our inspection. Luckily, the nest builder has been unusually tidy and has not filled the chamber with sticks. There is however an urgent need to clear away the nesting material as soon as the young birds have fledged, and the opening secured, preferably with heavily galvanised ¾ inch (20mm) weldmesh, chicken wire never being totally successful and having a limited life in this situation.

There is no artificial lighting or power outlets in this chamber; neither is there in the intermediate chamber below or in the tower stairway.

The **Roof** is supported by a central beam running N/S from which nine rafters run each way to the E and W tower walls. The exterior of the roof is reached by means of a further 22 steps in the tower stairway and then through a small door which was secured with baler twine. The roof is slated with a central leaded gutter and is in poor condition, several of the slates either being cracked or having slipped. There are brambles growing in the mortar

joints of the parapet walls, and many other problems which no doubt will be noted by your architect in his upcoming quinquennial inspection.

BELLS, BELL-FRAME AND FITTINGS

The **Bell-Frame** is of oak and was built and installed in 1889 by Harry Stokes of Woodbury in East Devon, a provider of very well designed and built bell frames. It consists of cills and long heads, with braces and end-posts between the cills and heads (Pickford 6.A). The internal joints are dove-tailed; the corner joints are half-and-half joints, bolted through.

The frame is in two tiers, the pit for the second bell being built up on tall braces from the frame heads of the treble and third bells (see Appendix). The lower tier of the frame is reasonably well tie-bolted with 18 bolts, four of which penetrate to the foundation timbers below. The upper tier is provided with a further six tie bolts securing it to the lower tier. Additionally, two tie-rods run from the W frame head of the upper tier to the N frame head of the tenor bell and the S frame head of the fourth bell in the lower tier to provide additional strengthening. Due to the constraints of the tower the N end of the pit for the treble and the S end of the pit for the third bell are provided with gallows ends which are integral with the frame for the second bell above.

The layout of the frame is such that bells treble and 3 swing mouth-to-mouth in a N-S direction along the E side of the tower, with bells 4, 5 and tenor swinging side-by-side in an E-W direction. The second bell swings N-S directly above the treble. The layout of the lower tier is described as Pickford 5.1 (A6, B1, C3, D4, E5) – see Appendix.

The frame appears to be in good condition as far as can be seen due to the presence of dust and debris around the frame and the bird nest in the opening on the E side. There is a little furniture beetle in some sap wood of the upper frame heads, but this is of no significance. The frame fits tightly into the tower in places and it is in these that the debris and dust has collected. If this is not cleaned out thoroughly the timber is in danger of becoming denatured due to the constant contact with the damp walls, and thus starting to decay. This usually leads to Death Watch Beetle attack. It is possible that this process has already started and so the clean-up should be the first priority. If the oak timbers are kept dry, they will not need treatment with insecticides and fungicides.

We were concerned that the frame head timbers were touching the masonry in places. If the tie-rods are not kept tight, shunting of these members could occur with subsequent damage to the walls. When we tried out two of the bells, however, the frame seemed to be standing firmly, and there appears to have been no damage caused to the walls since the frame was installed.

The **Bells** are of quite fair tone. The two largest bells, the fifth and tenor, have unfortunately lost their cannons – they may indeed have been broken off intentionally by a previous bell-hanger. The others all retain their cannons, those on the treble, second and fourth bells being

rather squat with sharply angled shoulders, while those on the third bell are taller and more rounded. (Cannons are the supporting loops cast onto the top of the bell.) As far as we could see, there are no cracks in any of the bells, though total dismantling and a much closer inspection would be necessary to be absolutely certain.

All the bells are now provided with independent **Crown Staples** from which the clappers are suspended. They are all in good order, though that on the tenor bell is a little loose and should be tightened. The bells would originally have been provided with cast-in crown staples which would have been removed when the independent staples were fitted. We were, however, unable to determine whether the stubs of these staples had been totally drilled out; dismantling and a much closer examination being necessary to ascertain this. The presence of cast-in staples or their stubs is a common cause of bells becoming cracked, firstly due to corrosion in the staple, and secondly due to the differential expansion between the iron of the staple and the bronze of the crown of the bell. Whenever a major restoration of bells is undertaken it is now standard practice to remove all remnants of the cast-in staples or their stubs.

The **Clappers** are all of modern design, having octagonal shafts and flights, round balls, and barrel tops fitted with a bush for pivoting on the hinge pin of the clapper staple.

The **Headstocks** are of elm and have been painted. They appear to be in perfectly good condition. The treble, second, third and fourth bells are each suspended from their respective headstocks by means of iron straps and dogs; the fifth and tenor are each suspended by means of four bell bolts through the head of the bell. The bells are all perfectly tight on their headstocks.

The **Gudgeons** are all plate gudgeons and are secured to their respective headstocks by means of two U-bolts. The gudgeon plate at the stay end of the tenor headstock was found to be slightly loose and should be tightened. When tightening, the pair of nuts nearer the centre of the headstock should be attended to first, each nut being tightened only a little at a time so as to place equal strain on each side of the U-bolt; the outer pair of nuts should then be tightened similarly. The inner nuts on the tenor headstock are recessed somewhat into the headstock making access rather difficult, a suitably sized socket spanner being necessary to complete the job.

The **Bearings** are all self-aligning ball-bearings and appear in good condition. With normal use, they will only require attention every 30 to 40 years. It is good practice to keep the bearing housings clean such that any grease leakage, which could indicate breakdown of the bearing seals, is easily detected.

The **Stays** are all straight by design and are secured to the headstocks by means of a squared U-bolt at the top with a single bolt below. They are all in good condition. We did notice that the stay of the treble runs very closely to the pivot of the second slider above. If this

stay ever needs to be replaced extreme care will need to be taken to ensure that the new stay does not foul the slider pivot.

The **Sliders** and **Runner Boards** are of conventional design and, again, are in good condition.

The **Wheels** likewise are in good condition and are quite firm on their headstocks. We noticed that the sections of shrouding on the wheel rims are tongue-and-grooved, rather than having independent tongues as is often the case.

The **Pulleys** are all single by design and consist of hardwood sheaves running in hardwood boxes. They are all free-running and with very little play. An additional, smaller, pulley is provided in the pit of the treble bell, to guide the rope from the second bell above. Again, this is in good condition.

The **Bell Ropes** are of natural fibre throughout and all appear to be in fair to good condition. They must be quite new as they have yet to suffer from the damp conditions prevailing in the tower.

DYNAMIC INSPECTION

As mentioned above, two of the bells were raised and rung in order to determine any movement in the bell frame. The second bell was rung to determine any movement of the upper tier of the frame in a N-S direction. Only minimal flexing was seen and there seems to have been no damage to the masonry of the walls, even though the frame ends abut them. The tenor bell was rung to determine any movement in an E-W direction. Again only minimal flexing was seen, and there was no detectable vertical movement. From this we may assume that the frame supports are still doing their job adequately.

RECOMMENDATIONS

1. Clean out the bell chamber thoroughly taking care to remove any debris which has collected between the frame cills and the tower walls. We suggest the use of a workshop type vacuum cleaner in order to reduce the amount of dust in the air. Before doing this, the chicken wire should be removed from the E louvre opening and replaced with galvanised weldmesh of mesh size ¾ inch (20mm) suitably cut to shape and fixed accordingly.
2. Tighten the loose clapper staple and gudgeons on the tenor headstock as described above.
3. Make arrangements to improve the ventilation in the base of the tower and tower stairway, and check the valley between the tower and nave to determine if a leak there is causing the dampness.

4. Remove the brambles and other weeds from the tower roof and parapets. Repair the slates and lead valley gutter to ensure that penetrating rain does not damage the bell installation.
5. Install good electric lighting in the tower stairway and bell chamber, and also power outlets in the latter, in order to facilitate good maintenance.

We append to this report diagrams of the two tiers of the bell-frame, the side-frames of the treble, second and third bells, and also of a bell with traditional fittings.

James Clarke Ian Smith

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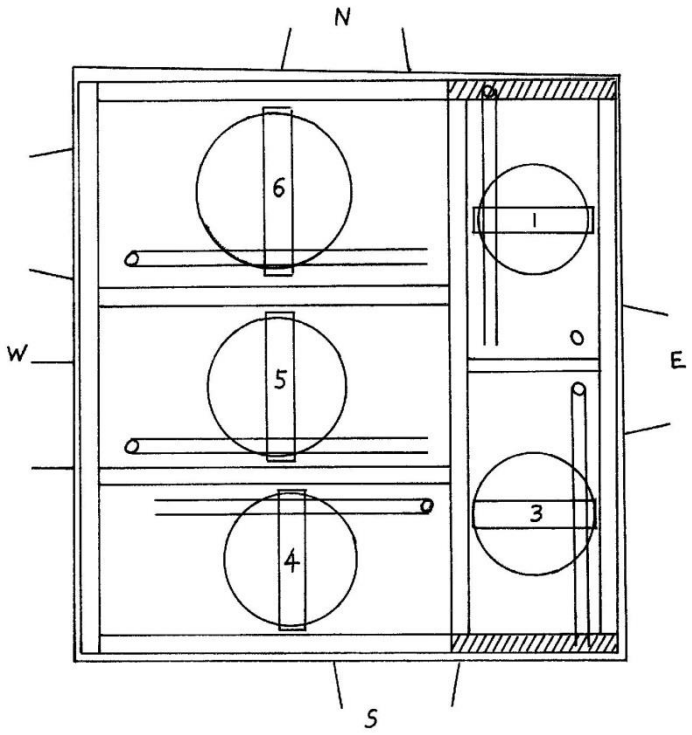
APPENDICES

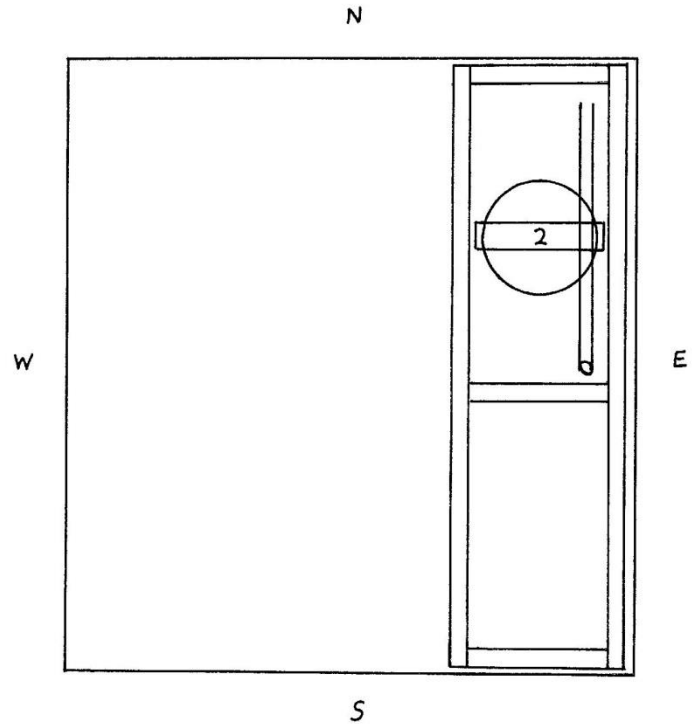
BELL-FRAME LAYOUT AT YARNSCOMBE

(Not to scale)

Lower Tier



Upper Tier



SIDE-FRAMES OF THE TREBLE, SECOND AND THIRD BELLS