CHURCH OF ST WINWALOE

EAST PORTLEMOUTH

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

Inspection carried out on Tuesday 11th February 2014, on behalf of the Devon Church Bell Restoration Fund, by Ian Smith and Ian Campbell (Trustees of the Fund), met and accompanied by Andy Coton (Fabric Committee Chairman) and Gerry Gurney (Local Ringer). Ian Smith and Ian Campbell are also Bells & Belfries Advisors to the Guild of Devonshire Ringers. This report also includes some of the findings of the late Prebendary John Scott, former Bells & Belfries Advisor to the Diocese of Exeter, from his visit in November 1995.

HISTORICAL

The church stands at an elevation of about 380 feet on the east side of the Kingsbridge Estuary opposite the village of Salcombe. It dates from the late 12th or early 13th century, though may be on an earlier foundation. The tower is thought to have been built between 1400 and 1450.

The Inventory (Survey of Church Goods) of 1553 lists four bells, one of which, the present tenor, still remains. The others will have been recast over the years. Interestingly, Ellacombe in 1865 records only three bells. Of these three bells the 2nd was cast by Thomas Pennington II of Exeter in 1626; the treble would also, from Ellacombe's notes, appear to be an early 17th century bell; and the tenor was the bell we still have today.

In 1912 John Taylor & Co of Loughborough recast the existing treble and 2nd bells, cast three new lighter bells, and rehung all six bells in a new frame of cast-iron on a steel foundation. In 1981 the bells were again rehung, this time on self-aligning ball-bearings.

TOWER

The west tower is built in local rubble and is approximately 58 feet in height. It is of three stages and would appear to have been commenced in typical South Hams style, with clamp buttresses and a tower stairway centrally against the north face. However the buttresses terminate at the top of the first stage, and the tower stairway terminates at the bottom of the second stage. The upper part of the tower is built in a much plainer fashion. The lower stage of the tower comprises the ground floor ringing room; the second stage comprises an intermediate chamber; the upper stage comprises the bell chamber and roof. There is a very slight offset in the N and S walls only between the first and second stages, and a much more pronounced offset in all the walls between the second and third stages. Electric lighting and power are provided at all levels of the tower.

The **Ground Floor Chamber**/Ringing Room measures 11 feet N/S by 10 feet 3 inches E/W to the Nave arch (13 feet 7 inches to the screen) and is 25 feet 7 inches in height. The walls are rendered. The S wall is unpierced; the W wall is pierced by an arched doorway to the outside with a large three-light window in perpendicular style above. The doorway, which is curtained, is reached by one step down from the chamber floor. The N wall is pierced centrally by a doorway to the tower stairs; the E wall comprises a tall archway through to the Nave, the lower 7 feet of which is enclosed with a screen of wood and glass with a central two-leaved doorway. The lower part of the N, W and S walls all bear slate memorial slabs. Seating is provided along the N and S walls. The floor is boarded and is covered with hessian matting. The ceiling of the chamber/floor of intermediate chamber above is boarded and is supported by four main beams running N/S with sub-beams in the central portion enclosing a removable trap.

The **Intermediate Chamber** is reached via 33 steps in the tower stairway plus one further step up to the chamber floor. The chamber measures 11 feet 5 inches N/S by 10 feet 3 inches E/W and is 11 feet 6 inches in height. The W and S walls are unpierced; the E wall is pierced 7 feet 1 inch above floor level by an opening 3 feet across by 3 feet 3 inches high giving access to a window which is now boarded and with just three small ventilation holes. The N wall is pierced just to the right (E) of centre by the opening to the tower stairway. Clearly a door was once fitted in this opening, though must have been removed together with its frame some time ago.

The floor of the chamber is boarded, with a central two-leaved trap approximately 4 feet square. The SE and SW corners of the floor are significantly affected by damp and are quite spongy. A steep staircase of 14 steps runs alongside the western half of the N wall and leads to a sliding trap in the NW corner of the floor above giving access to the bell chamber. There is an electric light above the doorway to the tower stairs and a power socket to the left.

The bell-ropes are drawn out of the vertical in this chamber as follows:

Treble	5 inches	4th	2 inches
2nd	5 inches	5th	10 inches
3rd	6 inches	Tenor	11 inches

None of the ropes are provided with either ceiling or ground pulleys. On account of the significant draw of the 5th and tenor ropes, these might benefit from their provision, particularly as the draw is at 90° to the direction of the pulleys below the bell wheels above. Having said that, if this has not proved a problem in the past it, is unlikely that it will in the future. Nevertheless well maintained pulleys will overcome any friction caused by the ropes dragging on the sides of the holes in the floor and also reduce wear on the ropes. Similarly the provision of flapper boards for these two ropes to prevent them flailing in the chamber is also a moot point.

It was noticed that there is a complete set of six clapper clamps resting against the W wall of the chamber. These may well have been used during the wartime ban on ringing to allow silent practice and could indeed now be used to silence a bell while teaching bell handling.

The ceiling of the chamber/floor of bell chamber above is supported by four oak joists running N/S, in turn supported by two joists running E/W near the N and S walls. The joist near the S wall is noticeably damp with some mould growth. Similarly the most easterly of the N/S joists is very damp at its S end. The E wall of the chamber was very wet, with water running down it.

The **Bell Chamber**, above offset level, measures 12 feet 3 inches N/S by 11 feet 3 inches E/W and its total height is 15 feet 3 inches. The offset is some 2 feet above floor level. The floor of the chamber is boarded with a central two-leaved hinged trap approximately 4 feet 2 inches square and with a lifting ring. The chamber is well lit by two 5 foot fluorescent tubes, one each on the N and S walls.

The walls of the chamber are of rough stone, each face being pierced centrally by an arched louvre of two lights. The louvre slats are of slate and are quite widely separated. Internally the louvre openings are enclosed with windows each of nine glass panes in a wooden frame. The windows are not particularly well fitting with significant gaps at their sides and tops. The gaps are only partially filled with wire netting of approximately 1 inch mesh. In the E louvre the top board has come adrift such that it is open to the access of birds; also the lower central glass pane is broken and is now boarded. In the S louvre the central right pane is missing and the replacement boarding has come adrift; there is also a significant gap in the netting on the W side. In the W louvre there is a large gap in the netting on the S side. Other than keeping out the worst of the weather, the windows are not very effective as they stand. Furthermore there is a significant amount of bird debris between the louvre slats and the internal windows. This should be removed as it will harbour damp and also possible insect infestations.

We would suggest a more effective way to cover the louvres would be to install a wooden frame immediately inside the louvre slats and affix to this stainless steel or heavy duty weldmesh of mesh size ¾ inch (20 mm). This would prevent the ingress of birds. Internally to this a layer of "Galebreaker" fabric would combat any wind and rain, etc.

There is a safety rail above the N louvre opening to ease access, together with some vertical steps which give easier access to the top of the bell-frame and the roof. The roof is accessed by a ladder leading to a trap in the NE corner. The unusual brick roof appears to be supported by a rolled steel joist (RSJ) running N/S from which two subsidiary RSJs run both E and W. They are all built into the tower walls but are heavily corroded such that that they are now entirely supported by more recently inserted steel brackets. There appear to be significant gaps between the steel joists and the brickwork of the roof. The roof access trap is surrounded by further small steel joists, that on the N side being heavily corroded and much wasted where it enters the E wall. We would suggest the entire roof structure requires further investigation.

BELLS, BELL-FRAME AND FITTINGS

The **Bell-Frame** is supported on a grillage of 12 inch by 5 inch rolled steel joists, three spanning the tower N/S and built into the walls at their ends. Five subsidiary RSJs run E/W between the two most westerly N/S RSJs. The outer joists are resting on the tower offset, the concern being that the space between the joists and the tower walls has been in-filled such that they are not well ventilated and a full inspection of their integrity is not possible. We did however note that an exploratory hole had been drilled through the web of the most easterly N/S RSJ in order to ascertain its thickness.

We understand that, about ten years ago, the grillage was thoroughly cleaned down, descaled, and painted with a zinc or aluminium-rich primer. This has clearly arrested much of the corrosion, though fresh corrosion is now taking place where the joists are in contact with the tower walls, and some of the metal is now very thin in places. More rubbing down now needs to be carried out on these areas and a fresh coat of similar paint applied. As a precaution steel brackets have been inserted underneath the grillage, three on the E side and one on the S in case the grillage should drop. Metal wedges and packing pieces have been inserted between the brackets and the RSJs.

The bell-frame itself consists of H-section side frames of cast-iron with steel cross bracing at the bottom and angled steel bracing across the tops of the H-sections and into the tower walls. The frames members are in good condition, with the angled steel above showing some corrosion where it meets the walls. Generally a coat of paint would be beneficial. Several loose sections of scaffold board are lying across the top of the frame.

The **Bells** are all of good tone. Bells 1 – 5 are all from Taylors' best period, and the tenor is a fine mediaeval bell from the Exeter foundry and easily matches the other five. There is no evidence of any cracks in the bells, though a total dismantling and much closer examination would be necessary to be absolutely certain. They have all been machine-tuned. Bells 1 – 5

were cast with flat tops. The tenor was originally cast with canons (supporting loops), though these were removed when the bell was rehung in 1912. This bell was 1/8th turned when rehung in order to even out the clapper wear on the soundbow. Even so the former clapper indentation was not great and is only noticeable on one side of the bell (SE), indicating that the bell was probably only swing-chimed in its former years, rather than being rung full-circle as at present. All the bells are now exhibiting significant, though not excessive, clapper indentations in the present strike positions. When the next restoration takes place it would be appropriate for all the bells to be quarter turned on their headstocks, though we suspect this will not be for another fifty years or so.

In addition to its original cast-in inscription, we noted that the tenor bell has been engraved in the waist with an additional inscription. Such an action on a mediaeval bell would certainly not be allowed today. We also noted that the bell retains the stubs of its original cast-in crown staple. At the next restoration these should be removed and any remnants carefully drilled out, such that any rusting of the stubs together with differential expansion between the iron of the stubs and the bronze of the bell does not cause the bell to crack. (This is now standard practice when old bells are restored.)

All the bells are now fitted with independent **Clapper Staples**. These are fitted with steel hinge pins from which the clappers swing and all are also fitted with grease caps for lubrication. During our inspection we screwed up the grease caps to force more grease into the clapper suspensions, though we noticed that that on the tenor was quite dry. This requires recharging with grease. Also we found the clapper staple on the tenor to be quite loose, and tightened it, ensuring that the clapper still swung centrally in the bell.

The **Clappers** are typical of the period in which they were installed. They have round tops with bushes which pivot on the steel pins in the clapper staples. They all have octagonal shafts and flights and somewhat squat balls, the faces of which have now become somewhat flattened. They would now benefit from annealing. They all have negligible up-and-down play, with sideways play as follows:

Treble	⅝ inch	4th	⅞ inch
2nd	⅜ inch	5th	½ inch
3rd	1¼ inch	Tenor	⅞ inch

This indicates that there is by no means any excessive wear in the clapper bushes.

The **Headstocks** are of cast-iron and are all of standard Taylors design with a socket at one end for the insertion of the stay. The headstocks of the treble, second and third bells have straight tops; those on the fourth, fifth and tenor are slightly arched. They are attached to the bells by means of four steel bell-bolts, with a resilient pad between the headstock and the bell. All the headstocks would now benefit from rubbing down and painting. The **Gudgeons** are driven into the headstocks and riveted.

The **Bearings** are self-aligning ball-bearings. Though the bearing housings are fitted with grease nipples, no attempt should be made to force new grease into these; that is the province

of the professional bell-hanger. The bearings show slight signs of grease leakage, indicating that the grease seals may be starting to fail or that the existing grease is starting to denature. However they are functioning well at present and we believe there is no immediate cause for concern. Bell bearings should be inspected by a professional bell-hanger about every 30 years.

The **Stays** which are socketed into the headstocks and secured by means of two bolts, are of "Hastings" design, are straight with a taper, and are fitted with a toggle or "dingler". The stays are all in good condition and quite robust, though the dinglers, other than those on the fourth and tenor, are very loose and rattly. We would recommend applying a little grease to them and monitoring their condition at least annually. The **Slide Bars** with which the dinglers engage would benefit from cleaning off and a little fresh grease applied. Otherwise they are in good condition.

The **Wheels**, which at some point in the past appear to have been painted black, are in generally good condition, though the nails securing the shrouding to the soles are corroding. We would recommend sanding off the tops of the nails and applying a dab of paint to arrest further corrosion. The shrouding on the wheel of the 4th bell is just starting to come away near the garter hole. This should be monitored and re-fixed if necessary.

The **Pulleys** consist of hardwood sheaves in hardwood boxes. Those on the treble and fourth bells are single; those on the second, third, fifth and tenor are all double. This simply relates to the way that the rope is drawn under the bell. They are all in good order, being free-running and with only slight sideways play.

The **Ropes** all have natural fibre bottom ends, with polyester tops machine-spliced in about 3 feet above the sallies. The bottom ends of all the ropes are in good condition as are the top ends on bells 1 – 4. On the fifth rope there is a rather short short-splice below the garter hole which runs over the pulleys when the bell is rung. If a splice is required at this point it is better to use a long splice, as a short splice will tend to make the rope jump when it passes over the pulley. However it is probably better to cut out a significant length of the worn rope and to splice in further down the rope where it will not run over a pulley nor rub on the guides if possible. As there is plenty of spare rope tied around the wheel spokes, it may be possible to "top-and-tail" the rope to get more life out of it. This involves cutting the rope above the sally and splicing in what is currently the top end of the rope at this point. Similarly there are two short-splices in the tenor rope, again at the point where they will run over the pulleys. The splice nearer to the garter hole is now in very poor condition such that the rope is in danger of breaking at this point. It should be repaired at the earliest possible opportunity.

DYNAMIC INSPECTION

Both the fourth and tenor bells were raised and the bell-frame inspected while they were being rung. We can report that there was no movement in the frame when this was done,

indicating that the bell installation is still firmly anchored to the tower walls. The bells handle well and we believe there is no immediate cause for concern with any aspect of the installation.

RECOMMENDATIONS

There is little of immediate concern with the bell installation other than the condition of the tenor rope and the ongoing problem of corrosion in the supporting grillage. We divide our recommendations into short term (items which require immediate or ongoing attention), medium term (items which should be attended to within the next 5 – 10 years), and long term (items which should be addressed when the next major restoration of the bells takes place).

Short Term

1. The tenor rope should be re-spliced as a matter of urgency – it is in danger of breaking.
2. The bird debris accumulating inside the louvres should be removed.
3. Ensure that the grease-caps on the clapper staples are kept charged with grease – that on the tenor needs re-charging immediately.
4. Apply a little grease to the stay "dinglers" and also the slide bars.
5. Sand off the heads of the nails securing the shrouding to the soles of the bell wheels and apply a dab of paint to prevent further corrosion.
6. Rub down and repaint any corroded areas of the supporting grillage, firstly with a zinc-rich primer, eg "Galvafroid", and then with either a machine enamel or good quality exterior gloss top coat.
7. Monitor the shrouding of the wheel of the fourth bell and repair if necessary.
8. Monitor the dampness in the ceiling joists and floor of the intermediate chamber.
9. Ensure that all nuts on the bell-frame and bell fittings are kept tight.
10. Ensure that the floors of both the bell chamber and intermediate chamber are kept free of dust and debris. We noted that cleaning was carried out just prior to our inspection.
11. Eliminate all birds from the bell chamber and make it secure from re-entry.

Medium Term

1. Rub down and paint the cast-iron sections of the bell-frame, also the headstocks, bearing housings and clappers.
2. Consider the provision in the intermediate chamber of ceiling and ground pulleys, and also possibly flapper boards, for the ropes of the fifth and tenor bells.
3. Consider covering the louvres internally with either heavy duty or stainless steel weldmesh of mesh size ¾ inch (20 mm). If the internal windows are to be removed a layer of "Galebreaker" fabric inside the weldmesh would exclude most of the weather.

4. Investigate the integrity of the roof structure.
5. If not done recently, have the bell-bearings inspected by a professional bell-hanger in order to determine the integrity of the grease seals and condition of the grease. This should be done approximately every 30 years.

Long Term

When the time comes for a full restoration of the bells the following issues should also be addressed.

1. The bells should be quarter-turned to even out the clapper wear on the soundbow.
2. The clappers should be annealed and machined to remove the flattened areas on their strike surfaces.
3. All remnants of the former cast-in clapper staples should be removed from the tenor bell.

General Maintenance

For advice on general maintenance we would refer you to an excellent booklet entitled "A Schedule of Regular Maintenance", published by the Central Council of Church Bell Ringers and obtainable from: Mrs B Wheeler, 2 Orchard Close, Morpeth, Northumberland, NE61 1XE. Price £3.00 inc p&p (cheque payable to 'Central Council Publications').

We append to this report a diagram of a bell with fittings, a diagram of the bell-frame layout at East Portlemouth, a paper by James Clarke (Consultant on Bells & Belfries to the Exeter DAC) on the preservation of metal bell-frames, and a list of the major UK bell-hanging companies.

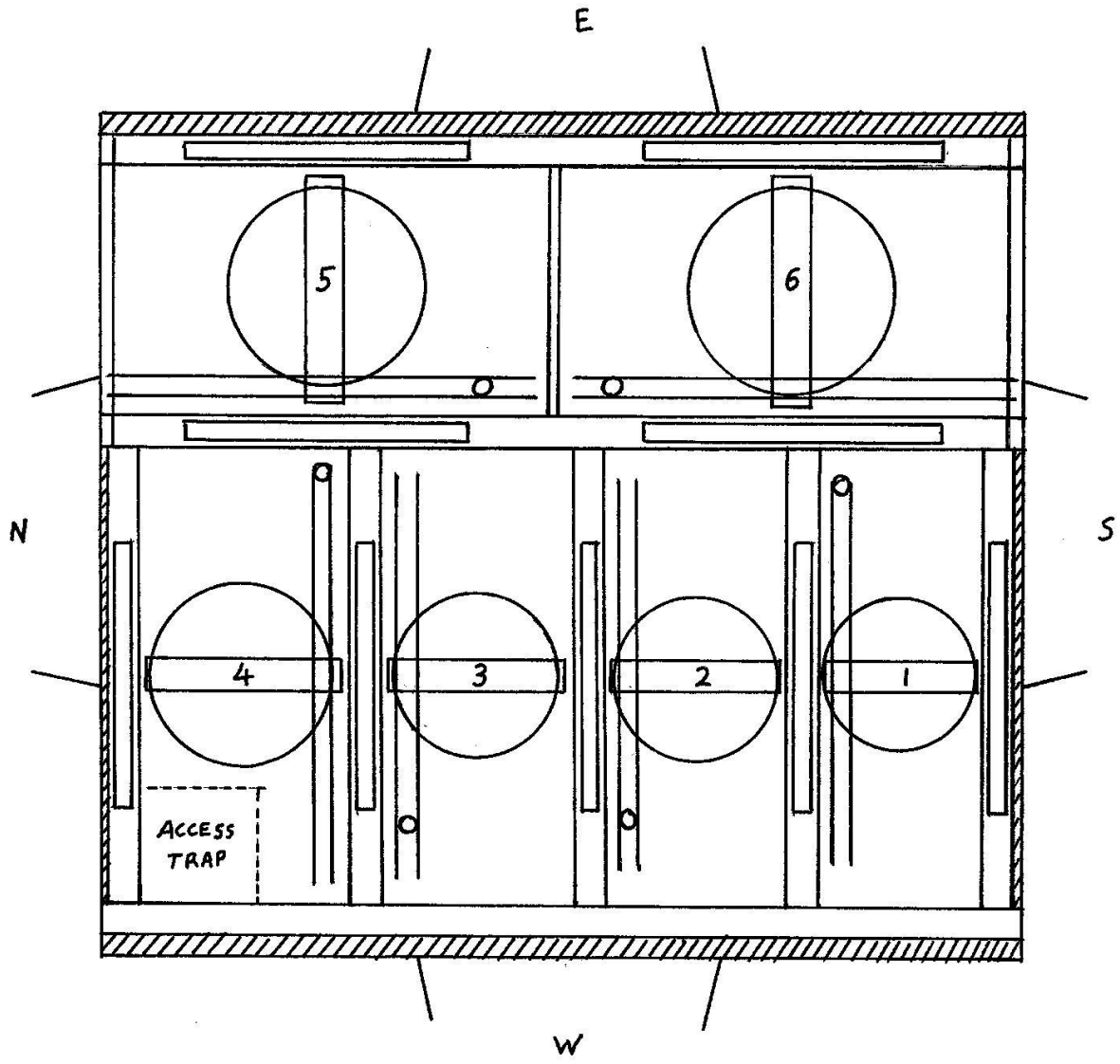
Ian Smith Ian Campbell

February 2014

APPPENDICES

EAST PORTLEMOUTH BELL-FRAME LAYOUT

(Not to scale)



Note. The cross-hatched areas indicate the position of masonry infilling between the support grillage and the tower walls.