

**INSPECTION OF THE BELL INSTALLATION
AT St GILES HARTINGTON
on April 30th 1999**

Request for Inspection.

The inspection was requested by Mr. Christopher Dullage the authorised leader of the proposed bell restoration project.

Previous Inspections.

The bells were previously inspected as long ago as 27th January 1968. A further inspection was carried out on the 17th May 1991. On each occasion the bell installation was reported to be in a derelict condition. As very little has been done in the meantime much of the present report is a repeat of what has been written before. It does, however go further in as much as it discusses the possible options for installing a full peal of eight bells in the tower at Hartington whilst recognising the desires recently expressed by English Heritage (E.H.) and the existence of the Council for the Care of Church's (CCC)1993 the Code of Practice on Bell Restoration (C.of P).

Tower.

The tower is located at the west end of the church. The western half of the ground floor area is occupied by a kitchen which has its own ceiling and is screened off from the rest of the church. The kitchen is 6" lower than the rest of the ground floor area. All this, together with the presence of a font, sitting on a large pedestal, in the centre of this area makes the ground floor area unsuitable as a place from which restored bells could be rung. There is a well lighted spiral staircase in the south west corner of the tower with 30 steps going first to a clock room and then via 18 more steps to the bell chamber and finally up to the roof. The steps at the lower levels have been repaired and are in good condition. Further up they are the original steps but are in a satisfactory state. All the steps are clean. Part way up the stair way to the clock room it can be seen that a previously used door way has been blanked off. From the inside of the church the door way is barely noticeable so well has the stone work been matched in. The door way probably led onto a previously used higher floor or gallery. The evidence of its existence is also barely noticeable.

The roof of the tower has recently been re-leaded. The tower does not appear to have a lightning conductor. There is a chimney going up through the clock room and the bell chamber to the roof in the north east corner of the tower. Is it still required?

Clock Room.

The present set of bells are able to be chimed from the clock room. This room has small windows set in the north and west walls and one in the south wall hidden by the clock case. There is a single electric light on the west wall. The hand wound clock, dated 1861 by Ellebys of Ashbourne, is housed in a large clock case located along most of the south wall. The clock weights fall in the north east corner. The drive to the clock face on the west side of the tower cuts across the clock chamber at a height of 93". The only other clock face is on the south side and is behind the clock case. The clock chamber is 140" high. There is a large amount of unused and probably unwanted material stored in this room. Unwanted material should be scrapped. Otherwise the room is reasonably clean. There is no door to the clock room.

Bell Chamber.

The bell chamber is immediately above the clock room so there is only one sound deadening floor between the bells and the ringers. This floor is in poor repair and has many gaps in it. It is ineffective as a sound deadening floor. There is a single set of double oak louvres on each side of the tower. These are in fair condition and are covered with 1/2" mesh wire netting, in very good condition, to exclude birds. They are also covered with boarding to keep out wind blown rain. All this is as it should be apart from the fact that some general maintenance to the boarding is now desirable. Some of it has been renewed fairly recently elsewhere it is showing its age. The boarding on the south side should be extended to the top of the louvres like it is on the other sides, as wind blown rain from prevailing winds comes from the south. The bells are at a level opposite the louvres. The bell chamber, as bell chambers go, is clean. There is a single light over the door to the bell chamber. The door itself is ill fitting and flimsy. It would need to be replaced by something more substantial in any major restoration.

The Bells.

The three bells all swing east to west and all have ropes falling on the west side of the tower.

Details of the bells are

No.	Diameter	Approx. weight	Date	Founder
1	33 5/8"	6 1/2 cwt	1884	Billington & Newton.
2	36"	7 3/4 cwt	1696	Wm. Noone.
3	39"	10 1/2 cwt	1636	Paul Hutton.

The inscriptions are

No. 1 **GOD SAVE HIS CHURCH 1884**

No. 2 **IHS NAZARENVS REX IVDEORVM FILI DEI MISERERE
H.G. V.W. WARDENS 1696**

No. 3 **DET SONITVM PLENVM IESVS ET MODVLAMEN AMANVM 1636
P.H.**

Bell No. 3 is the only one on the diocesan list of bells scheduled for preservation. It has canons (the loops on the crown of the bell used to suspend it from its headstock), as do all the bells, though one has broken off. This bell has a wrought iron cast in crown staple that supports the clapper. This would be drilled out in any major restoration as cast in crown staples are a cause of bells becoming cracked. The bell has been quarter turned. There is now some wear at the clapper strike point so this bell would be quarter turned yet again if used in a major restoration.

Bell No. 2 is very badly cracked from the cast in crown staple in the crown of the bell. One crack has propagated half way round the bell. A second crack on the opposite side of the bell stops at the inscription band. When the bell was rung in 1991 it sounded quite dreadful. Following recommendations made in the 1991 report this bell now rests on wooden joists which straddle the lower frame work. These joists are intended to catch part of the bell if it broke but they additionally stop the bell from being rung, which is good.

In the last 20 years or so it has become possible to repair weld cracked bells. As a technique the method is very good. There have been hardly any instances of a welded bell cracking a second time. The tone of the cracked bell is fully recovered in that it sounds as good or as bad as it did before it was cracked. Unfortunately there is no way of knowing beforehand whether a cracked bell will sound good or bad so in a major restoration like that proposed for Hartington a preferred course of action would be to have the bell recast. This bell has definitely not been quarter turned, but if it were weld repaired it would have to be because it is heavily worn at the clapper strike point. Bell No.1 has recently been identified by Mr G. A. Dawson as having been cast by Billington and Newton who were "steam fitting and press tap manufacturers, mill, forge, and engineers' brass founders, Vulcan works, Longport, Staffordshire". This bell has unusually shaped squat canons. There is only one other bell known by these founders. It is at Barthomley in Cheshire where it is No.6 in the 8 bell peal. Much of the inscription lettering on the two bells is identical.

The frequency analysis of bells 1 and 3 show that they would have to be retuned if they were used as part of a major restoration. Presumably so would also No. 2 if it were weld repaired.

Bell Frame.

This a very tall low-sided double queen post design of wooden frame. The frame is categorised as "Pickford type 5.O (five letter o) with straight side braces or as Elphick type U. It has the figures 1604 M A ??? carved into the top cill in the south west corner. The ??? indicates there may have been other letters now no longer distinguishable. This is presumed to be the date the frame was made. The bell frame has recently (December 1998) been added to the list of diocesan bell frames scheduled for preservation. As such, any attempt to scrap it, despite its obsolescence, would likely be resisted by E.H. and other conservation bodies. The frame is carried on two 9.5" wide beams at the west and east ends, respectively 7.5" and 9" deep running north to south. These beams rest on the floor which in turn is supported by 4 large old beams and one newer one which run east to west. In addition there are large stones or bunks of timber between the lower side cills of the bell frame and the floor. The frame has severely rotted away in places and has been attacked by wood worm. The bell pits of No.1 and No.3 are cut away in places to allow the bell to pass through the frame. The cut outs are some what larger than are needed for the present bells suggesting larger bells may have occupied these two pits in the past. Some of the wooden dowels are loose or missing. In 1991 the No.3 bell was rung up to frame height when large and unacceptable frame movement was observed. This was despite the fact that the frame is wedged against the tower walls at all four corners at the upper level and at the south west corner at the lower level. The most the present frame could be used for is swing chiming as at present or to have the bells struck by an Ellacombe apparatus. It is beyond economic repair for a major restoration.

Bell Fittings.

In general the bell fittings are of a later vintage than the bell frame. The best guess is that the bells were "restored" in 1884 when the an old No. 1 bell was presumably needed to be recast and all the work was done by Billington & Newton.

Main Wheels.

These have very large diameters. They are in fair condition and firmly attached to the headstocks.

Headstocks.

All the headstocks are made of elm. In places they have been attacked by woodworm. The steel straps holding the bells to the headstocks are badly corroded.

Main Bearings.

All these are plain bearings. They are full of dirt and congealed grease. The gudgeons or pivots on which the bells rotate are fitted onto their respective headstocks by means of single bolts through the headstock and by sweated on rings at their outer ends. The gudgeons seat in plain brass bearings which dovetail into the top sills of the frame. The brasses are not easily inspected but are probably now worn out.

Clappers.

All wrought iron clappers are flattened at the strike points. The busk boards which connect the clappers to the cast in crown staples of bells No. 1 and No. 2 are badly worn and the clappers can more or less be made to swing in any direction in which they are pushed. The independent clapper of bell No.1 is loose and worn at its pivot point.

Stays and sliders.

The bells are all fitted with an unusual design of stay. They consist of a metal peg mounted vertically off the end of the headstock which engages with a bolt type slider mounted on the queen posts.

Ground Pulleys.

These are wooden rope rollers. They are worn, worm eaten and jammed with dirt, so that they do not rotate easily and in one case not at all.

Summary.

The present bell installation is derelict. The frame is beyond economical repair, the bell fittings are worn out. One bell is cracked, the other two are out of tune with each other. It is probably safe to gently swing chime the two old bells which are not cracked.

Recommendations.

The cross sectional area of the tower is sufficiently large to accommodate a peal of eight bells all hung on one level. More than eight bells, say ten, would have to be accommodated on two levels. It is recommended that the full potential for an eight bell peal should be the favoured option chosen from those described below.

Option 1. Do nothing. Maintain the present situation as far as cleanliness and tidiness is concerned. Leave the question of restoration to the next generation as those in the past have done.

Option 2. Repair weld No.2 bell. Hang the existing three bells on new fittings for swing chiming in the present wooden frame. Ring from the clock room as at present. This would partly restore the installation to what it was like in 1884. It would be deficient in that the bells could not be rung full circle. As the frame design is such that it does not lend itself to strengthening modifications and there would be doubt about the long term use of the existing frame even for swing chiming. It is doubtful whether any bell hanger would give a guarantee for work to this specification. Although there are no costs available for such a proposal at Hartington, elsewhere similar proposals have, after consideration, been judged to be poor value for money. E.H. have hinted that they may support such a scheme from the Joint Churches Lottery Fund. An alternative to this an Ellacombe apparatus could be installed. This is a system where by hammers are caused to hit the lips of the bells which otherwise are hung dead.

Option 3.

Dispose of the old bell frame entirely. Install a brand new frame for eight bells all on one level all on new fittings. The eight bell could be completely brand new or could make use of some or all of the three old bells. A design feasibility study has been carried out. This shows that such a peal of bell cannot be rung from the existing clock room floor. Ringing from a Ringers Gallery positioned slightly above the ceiling of the present kitchen offers an ideal solution from the ringing point of view.

Potential for using existing bells in restoration scheme.

Bell No 1,2,3, each provided with a brand new set of fittings could be of potential use as bells 6,7 and 8 respectively in a peal of eight bells with the following reservations,

	HUM	PRIME	TIERCE	QUINT	NOMINAL	
No.3	207	391	476	595	770	Hz
Error	+145	+28	+51	+53		Datum
No2	CRACKED					
No.1						
Hz	274	478	608	787	1008	Hz
Error	+146	-90	+10	+64	+66	Cents

Bell No3. This bell is listed for preservation so cannot be recast and the canons would have to be retained. It is typical of an old style bell having a sharp hum but it is atypical in also having a sharp prime. Some modest re-tuning to flatten the prime and hum is advocated to improve the tone of the bell. This was recommended by Taylors in their report of 2nd August 1991. There is also the alternative of placing it on the Keltec list for use elsewhere. If reused the bell would have its cast in crown staple drilled out and be quarter for a second time to present an unused part of the bell for the clapper to strike against.

Bell No.2 is cracked. The alternatives here are to weld and then re-tune the bell to the required note and then treat like bell No.3. A preferred alternative is to recast it reproducing the inscription.

Bell No.1. This bell is typically an old style bell in that the hum is sharp and the prime is flat. It is however more than half a semitone sharp relative to being a good match with No.3. If it is to be used in a major restoration it needs to be re-tuned as recommended in the Taylor report of 2nd August 1991. The alternative is to recast it or dispose of it via the Keltec list. This bell is already drilled out for an independent clapper. It would be quarter turned and have its canons removed.

In summary it is recommended that No.3 be re-tuned, No.2 recast, No.1 re-tuned or recast. The alternative recommendation, to have a completely brand new set of bells, should be given equal consideration.

Quotes already received.

Hartington have supplied copies of the following bell founders quotations

- (1). Taylors dated 3rd September 1996 an update of 2nd. August 1991.
- (2). Eayre & Smith 3rd September 1996 an update of 10th. September 1991.

Both these reports are in agreement with each other and with this present report. The bell founders conclusions are also consistent with this report though they offer more intermediate options. The cost quotes were summarised in a document (dated sometime in 1996) provided by Christopher Dullage on 10 Th. March 1998. A full eight bell installation using the existing No.1 and No.3 bells was, in 1996 £56k with the usual exclusions for building work etc.

Suggested Immediate Actions.

There are two potential "show stoppers" in this project if the ultimate aim is to have a peal of bells hung for full circle ringing. In order of importance they are:-

- (1). Provision of a Ringers Gallery. Will EH, CCC, and DAC agree to having one.
- (2). It is almost essential that the entry to the gallery be from the spiral staircase.

Not show stoppers but having a major influence on costs are:-

- (3). Preservation of all or part of the old bell frame.
- (4). Use of some of the old bells in the restoration. It is recommended that the best way of resolving these issues is for the parish to call a site meeting of all the interested parties.

Sundry subsidiary Actions not covered by bell hanger's specification.

Repair Louvres? Cover top of south louvre.

Remove chimney in clock room?

Better doors to bell chamber and clock chamber.

Lightning conductor?

Creation of trap door in clock room.

Building work not covered by bell hangers quotation.

Advice given in good faith no liability accepted.

G.A.Halls.

DAC Bells Adviser