LINCOLN CATHEDRAL

A compilation of eighteenth and nineteenth century

documents relating to the bells and in particular

GREAT TOM
and the quarter bells.

Lincoln Cathedral from the Brayford. *(David Belton)*

Transcribed and edited
with additional notes by
John R Ketteringham MBE, PhD

Published by John R. Ketteringham
2004

First published in 2003 by John. R. Ketteringham

Typeset and printed by John R. Ketteringham

Books by John R. Ketteringham

The Church That Moved (1983)

Lincoln Cathedral : A History of the Bells, Bellringers and Bellringing (First published 1987; Second Edition 2000)

A Lincolnshire Hotchpotch (1989)

A Second Lincolnshire Hotchpotch (1990)

Lincolnshire People (1995)

James Arundel of Locksley Hall, North Somercotes (1995)

A Cathedral Miscellany (1997)

Lincolnshire Women (1998)

A Third Lincolnshire Hotchpotch (1999)

Lincolnshire Bells and Bellfounders (2000)

Participants in the Lincolnshire Rising of 1536 and some inscriptions on Lincolnshire Church Bells as Sources for Genealogists (2001)

Lincolnshire Natives and Others (2002)

A Tribute to Jack L. Millhouse (2003)

A Tribute to Rodney B. Meadows (2003)

Lincolnshire's Greatest Beekeeper : An Appreciation of the life of Richard Watson Frow MBE (2003)

Lincolnshire Drawings by David Vale : An Appreciation (2003)

CONTENTS Page

INTRODUCTION

There are preserved in the Lincolnshire Archives Office (LAO D&C A/4/14) a large number of papers relating to the hanging and casting of the Cathedral Bells which date from 1763 to 1834. The majority are from bellfounders giving proposals for the rehanging of the bells but after "Great Tom" was cracked in 1827, as the result of a report in the "Lincoln, Rutland and Stamford Mercury", a number of suggestions were submitted for the repair of the bell. Several of these are eccentric in the extreme but the wealth of material available gives a valuable picture of the thinking in the late Georgian and early Victorian period.

In an Appendix I have included a short biography of the more significant letter writers (see page 78).

CHAPTER ONE

1763 - 1827

The first letter was written by James Harrison I who was the son of Henry Harrison who moved to Barrow-on-Humber from Wragby, Yorkshire in about 1697. James was the younger brother of John who became famous as the inventor of an instrument for determining longitude. In some quarters it has been suggested that James was probably the genius who allowed John to take the instrument to London and obtain the credit. It was James who established the bellfoundry at Barrow and when he died in 1766 the foundry passed to his son Henry. (See biography of James Harrison I on page 77).

1.

Barrow
July ye 15th 1763

Revd Dean

A Gentleman my Aquaintance has latly favoured me with a line of yr want of some repairs (or Hanging) ye bells in ye Lady Steeple of ye Minster. I have had considerable experience My life is almost one continual Scene of Bellhanging. I presume to offer this with my Service in this affair which if agreeable to you you have at command ye best Assistance in ye power of

yr most humble Servant
(signed) Jas Harrison
Bell founder (or bell hanger)
at Barrow
near Barton

Addressed overleaf :
To the Revd
Dr York
Dean
Lincoln

The second letter from Samuel Turner is written on a broadsheet headed "A LIST of the Peals of Bells hung by Samuel & Robert Turner Bell Hangers to any Part of England". Turner actually signs himself as Bell Hanger at Messrs Pack and Chapmans, Whitechapel, London.

2

July 5th, 1772
Sr

I find you have Six very good Bells at your Minster but much out of repair in the hanging part, therefore have taken the liberty to trouble you with these lines to offer my service to rehang them, and if favoured with a line from you will wait on you and give my Estimate, there no person can do such work better than myself neither so well owing to my continual practice in that branch and may depend on their being done in a workmanlike manner now this part of the year is much the best if it was agreeable to you to have them done far beyond the winter time therefore Solicit the favour of your answer to Sr

Your Hble Sert
(signed) Saml Turner
Bell Hanger at Mfsrs
Pack & Chapmans
Whitechapel
London

Addressed overleaf to :

The Revd Doctor Richardson

at The Minster
at Lincoln
Lincolnshire

At a Chapter Meeting on 19 January 1784 "it was agreed that the Lady Bells be put into order and new hung if necessary" but later correspondence suggests that nothing in fact was done at that time.

The writer of the next letter was William Ludlum a mathematician and vicar of Cuckfield, Suffolk (See biography on page 79).

3

Leicester Jan. 11 1785

Dear Sir

We are told the Church of Lincoln has it in contemplation, to recast their peal of Bells in the South Tower of the Cathedral. Give me leave on this occasion, to mention a Bell founder, Mr Edward Arnold, now residing at Leicester, but who lately resided at St Neots. I shd not have ventured to mention any one, had I not personal knowledge & actual Experience of his skill & abilities in that curious and difficult art. He cast a peal of eight for St Martins in this Town. - We are famous, & I think justly so, for a fine peal of Bells at St Margarets cast in 1632 by Hugh Watts of Leicester. The four Trebles indeed were cast by Tho. Eayre of Kettering in 1740. Had not Arnolds peal been a very good one, it wd never have stood the comparison with that old one. Arnold also cast a peal of Six for Stavely, (or Staley) in Derbyshire of whch Dr Gisborne, (a Brother to the Physician) is rector; who I dare say wd express the same satisfaction to you as he did to me, in what Arnold did there.

Arnold also cast a peal for Northampton. The Town was divided. The Great London founders of Whitechapel were employed at one church & Arnold at the other. As I am informed there is no comparison in the musical tone or tune of the Two peals. - There has always been a succession of founders at a Great Foundery Whitechapel. They are a rich company require not your old bells to cast, but have stock of metal to bring the new bells before they take away the old; Will cast Bells in any number, of any price - Leaden ones if you please. In short they are great Traffickers but no artists by what I ever heard or saw of them. - And so was found at Northampton.

There is a Founder at Nottingham, as I perceive by his advertisement, of what knowledge or Experience I know not - As to those puffing Advertisments in the news papers, they are easily procured from those they call The Ringers - perhaps for a little ale. - Of all people the worst judge either of tune or tone.

Arnold has also been employed at Ely, & many other places in that neighbourhood, & about St Neots. His having fully supplied that neighbourhood is I imagine one reason of his removing to Leicester - & having business here. - I forgot to mention He was employed by the late Mr Fortrey at Norton.

I have no particular attachment to the man, nor much personal acquaintance but did not refuse his request to write to you in his favour, as I am sure I do it in perfect consistence with Truth & Justice.

I am Sir Your affectionate humble Servant
(Signed) W Ludlum

Addressed overleaf to :

Revd Willm Gray
Vicars Court
Lincoln

We then come to that fascinating character James Harrison II who developed the foundry which his father Henry Harrison had opened in 1770 at Barton and the foundry at Barrow was eventually closed (See biography on page 78).

Harrison was something of an eccentric and his sole interest seems to have been in bells. He spent considerable time in making mental calculations before casting a bell and if he wasn't satisfied with the result he would break the bell up and start again. It is said that his calculations were made in a bed which was actually set up in the foundry. He would stay there until his calculations were completed! The bells were cast in a cellar at the dead of night to avoid any sound which would, according to Harrison, affect the tone of the bell! His main theory was that bells had far too much metal in them and a better use of metal would improve the tone. When Harrison died in 1835 the foundry closed.

4

Barton October 15th 1806

Gentlemen,

Understanding that it has been in contemplation to have a new peal of ten bells in to Lincoln Cathedral; I have taken the liberty to offer the annexed Estimate of the expence of doing such work in the most masterly manner; at the same time I beg permission to lay before you a more particular explanation respecting the improvements alluded to and the superiority of bells formed according to these newly discovered rules over bells of the common form as cast to this time with a concise account of the progress I have made in perfecting the Art of Belfounding. It was my particular study and delight for more than ten years to trace out and deduce from first principles the concurring parts and most advantageous proportions for bells. I was very pertinacious in my researches and constant in my experiments on every occasion having from the summer of 1793 to that of 1803 since [not] cast one bell in which I did not try some experiment and my indefatigable application was at length crowned with complete success. For by such a course of almost continual study and constant experiment on each speculation for such a length of time, I have been able fully to investigate every particular relating to proportions in disposing of the metal to the utmost advantage for bells of all manner of tones and of course to cast the loudest and gravest bells that can be produced with a given weight of metal at the same time that the most free vibrations and harmonious sounds is also afforded in consequence of the

metal being so disposed; and bells cast on this plan have a greater flow of sound and continuse [sic] sounding much longer than those cast according to the common plan. But as the analysis of their proportions involves a great number and variety of considerations and consequently of calculations, far more than may be imagined, so this has not been accomplished without considerable expense and loss of time - and as might be expected with frequent and gross blunders, in as much as this branch of science appears to have been wholly invaled [sic] in darkness and obscurity to this time no part having hitherto been demonstrated either by men of science or the bell founders themselves so that I have had the whole to develop - Indeed the best methods of Belfounding hitherto known seem to be no other than the result of along the blind practice, in the course of which having once hit upon such arrangements of the metal as produced fine tones they consequently had an opportunity ever afterwards of imitating such as patterns in casting others of the same pitch of tune, without troubling themselves about discovering any reasons for the concurrence of their parts or whether the metal was really disposed to the best advantage either for producing the loudest and most durable sounds or the most free and pleasing tones : - And tho it could not happen otherwise but that in such a continued course, such proportions would be chanced on as produced very harmonious and pleasant sounds, yet a maximum in any aspect is certainly not attainable by such unenlightened methods - and especially to make the loudest and gravest and most durable sounds with given weights - Hence 'tis no wonder that the generality of bells are a great deal heavier than might suffice for the sounds they give - over an average I judge about double weight, and often considerably deficient in tone. Bells cast on the new plan vibrate in much wider ranges than common bells - the considerableness of which advantage becomes more conspicuous when 'tis considered that the loudness will be as the squares of the distance to which the parts vibrate. But the bells so formed are heard to a much greater distance they are notwithstanding more soft and and tolerable to the ears of those who are near them than those of the common make : this is to be attributed to their parts being more free to vibrate, so that they require a much more moderate stroke of the Clapper, for the Clash of the Clapper being left at the same time that the vibration and flow of sound is greater much better please the Ear as more nearly rezempling [sic] the softness of musical strings. This new form has likewise a most symetrical and handsome Appearance, much more so than for hanging short even to revolve in circles scarce greater than the diameters of the bells, whereby they are very easy to ring and have the less power to sway the frame and steeple by reason they admit of being fixed so near their Centres.

I have hinted above that no investigation of the proportions of bells seem to have ever been made by the Belfounders and that neither does it appear to have been sought into by men of science. For certainly had the Philosophers of any age or Nation traced out the concurring proportions of bells or had they ascertained the sizes of bells equally loud and differing in their pitch of tune we certainly should have had definitions thereof - whereas there is no books extant that I know which tho treating largely and clearly on other scientific subjects yet makes no more than superficial mention of bells shewing neither the principles of their constituent parts not affording any sufficient reasons for their proportions but on the contrary actually throws a false light on the subject, X from which I cannot infer otherwise but that this mistic art has remained unexplosed [sic] to this day - Indeed the many various and complicated circumstances to be evolved and the differing experiments indispensible on each specilation rendered a thorough analysis (by means of which only it becomes practicable to account for and calculate all the parts of bells mathematically true) next to impossible to any person not in the practice, and may be one cause of so late an investigation - Nor is it to be wondered that in so occult and complicated a science I should with great application spend so many years in tracing bringing out of obscurity

and perfecting what appears to have been so imperfectly known before - and surely had I foreknown it to have been so arduous, so Hercluean a task as I found it to be, certainly nothing would ever have induced me to have attempted it but should have continued to Jog on in the old beaten path of practice without theory imitating such as had been cast and were esteem'd good as my predecessors have constantly done, and my contemporarys continue to do

I am, Revd Sirs
Your most obedient
humble Servant

(Signed) James Harrison

On a separate page Harrison wrote the following which he obviously intended to be inserted where shown :

X Father Mensomme (from whom the rest seem to copy) discusses of the proportions of bells of considerable length, and as tho he favoured the public with a secret as the proportions he mentions : and I am certain the very first trial must prove the fallacy of what he describes - indeed there needs not any trial to shew his description fallacious as that plainly appears upon the face of it - Thus for instance he says Belfounders take one fifteenth part of the diameter at the skirts for the thickness of the brim - which if it were strictly true and that all bells were cast in this proportion then would all bells whether small or great afford one and the same identical sound or pitch of time all other parts being supposed also duly proportional - whereas the difference or variety of notes depend chiefly on the different proportions of the thickness towards the diameters in bells of the common make - which it seems he had no conception of and consequently that he had no knowledge whatever of what he thus continued to describe.

Again - he says that the width of the upper part of the vase of the bell is one half of the width of the skirts - Alledging as a reason for its being so that the octave (which is the most perfectly consonant of of any interval of tune) vibrates in the ratio of 2 to 1 and consequently the vibrations of the upper and lower parts being supposed (according to his notion) to correspond with their widths must afford the utmost consonance [sic] when in this proportion.

If this was the case and the vibrations depended upon this principle then it follows that every part of the bell must vibrate in different times and consequently that there must be an infinite number of intermediate sounds produced betwixt the skirts and the top of the bell, from which must result the most rank discord that can possibly be imagined. - Besides it cannot for a moment be supposed that the thin edge of the bell has such power to resist the vibrating motion of the ponderous thick part which lags so near it, swelling from the edge somewhat in form of a convex curved wedge - but that on the contrary the vibrations of the edge must be allowed to be accelerated and almost intirely [sic] commanded by those of the thick part of which indeed it is only the gradual termination - and the bell being considerably straiter [sic] in this thick part or brim than at the edge it would of course be infered that the vibrations of the lower parts would be too quick to produce a ratio of 1 to 2 with those in the upper parts so that he is inconsistent with himself - But the fact is the vibrations of the different parts depend also on the thickness and curvature of the same parts respectively as well as on the widths and for this reason the different parts of bells being of different widths afford no proof that those different parts vibrate in different times.

This description of what he terms "The diapason or Scale of music" is still less to the purpose - However, as the proportions he assigned to bells and the reasons thereof are so evidently essential matters - what can be expected in the more intricate and abstruse cases ? In fine any further examination of the rules he lays down is altogether unnecessary as they are inapplicable for producing musical peals of bells of any kind as I have shewn in the first instance - and only serve to mislead such as are unacquainted with the matter - and only serve to mislead such as are unacquainted with the matter - Perhaps the Bellfounders of whom he made his inquiries may have imposed on him as one asking questions about that with which he had nothing to do.

Nothing more is heard for ten years and then Harrison writes again:

5

Barton 7th Novr 1818

Revd Sir

A Report having lately reached me purporting that all the Minster Bells except Great Tom are to be recast into a grand new Peal of Ten, and that it is also wished that Great Tom should be rung and consequently that it is become very desirable to have its tower firmly secured for this purpose &c &c - I cannot speak to the truth of these reports but whether true or not I am persuaded a letter from me on such a subject will not be ill received. I sometime since conceived a Plan for securing the Broad Tower in which tower, should the above work be done, I would advise all the bells to be hung and Great Tom in the midst but in such Manner as not to interfere with the Peal- I have annexed a rude Sketch of the Plan of the frame wherein it will be observed that great Tom being in the Midst has consequently the whole Mass of that extensive Tower in the direction of its swing: and though the base of this Tower is very Great yet it is rendered still greater by the position of the frame being anglewise within it. Add to this that it is encompassed by the other bells and its frame connected with theirs - a circumstance that contributes very powerfully to keep its frame firm and steady, as having at once a much greater base and the whole inerta [sic] (if I may so call it) of all the other bells together with their Frames also to cope with besides. But the floor as well as the Tower will require to be properly supported and secured for this purpose, of which I likewise sketched a design sometime ago.

Indeed whether the bells be done or not, I think on examination of this Tower, it will be judged absolutely necessary that something be done tosecure it;for I observe that the ill constructed carpentry of the belfry floor and Roof is actually forcing the Walls outward, and in fact have parted so as to occasion a considerable cleft, which consequently must soon get worse although it seems not to have been attended to. This circumstance gave rise to the design I mentioned, which will tye [sic] and strengthen, and in short effectively secure the Tower and at the same time render the floor firm as a Rock; and I flatter myself that besides being completly efficacious, it is also on as cheap and durable a Plan as may be devised - I suppose it will also be found indispensable to apply something similar to support the Roof, the frameing of which is equally injudicious, and by this means tye [sic] and brace the Top of the Tower, instead of distressing the Masonry and forcing the walls asunder as in the case at Present.

With respect to the mode in which great Tom now hangs in a single frame, - it is easy to shew the inefficacy since bells in some part of their swing scarce press at all downwards and at that moment exert the greatest force horizontally - I have known single frames slide to and fro upon the floor from this cause - and consequently

required to be secured in the Steeple lest their ends should get any play in the Walls - whence the instability of a single frame for a great bell is apparent, besides the Steeple having in this case the whole brunt of the swing to sustain - on the contrary - where there are a number of bells in the same framing, they not only have a less effect on the steeple but the frame stands much firmer on the floor, since no single bell has power to move all the other bells and frames; for the Greater base and extent of the framing in conjunction with the eight of the other bells operate most effectually to render the frame stable and to diminish the effect of the swing on the Steeple.

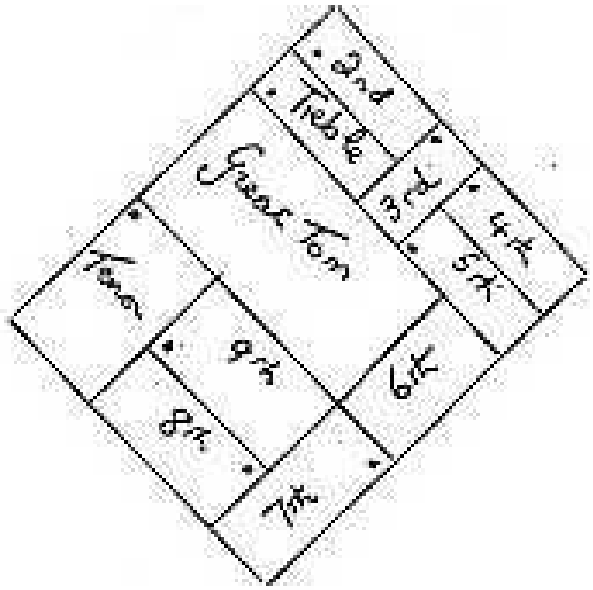
Should this Plan be adopted all the floors of the two West End Towers might be taken away, the uppermost windows where the bells now hang might be glazed, and these Towers beautify'd [sic] within and thus present a magnificent appearance to a beholder who looks up the inside.

As to my ability for casting the bells - I believe I can give such references as will be satisfactory respecting the improved form which I have adopted for bells, and the perfection I have by indefatigable labour and experience attained - the metal being so much more advantageously disposed of that no Peal of bells of the common form of a like weight can consequently equal.

I shall have occasion to Pass through Lincoln in a few weeks when I shall take the liberty to wait upon you. - In the meantime I remain

Revd Sir
Your obedient Humble Servant
(Signed) James Harrison

Perhaps you will not think it inexpedient to lay these matters before the Revd the Dean and Chapter.



This drawing being merely to shew the situation of the bells, it was not necessary to do it to any scale or regular proportions, is therefore only sketched by the Eye.

The letter was addressed to :

Revd Willm Gray
Vicars Court
Lincoln

To the gentlemen of the Cathedral Church Lincoln

An Estimate of the Expence of recasting the two old Peals of bells namely the peal of eight and the peal of six now in the Cathedral, into a very capital and grand peal of ten harmonious bells to be found with all advantages of modern improvements and discoveries - viz the metal to be arranged according to mathematical calculations for affording the loudest, gravest and most lasting sounds that can be produced with given weights and in consequence the most likely and free tones - Also tuning the new bells into perfect tune - together with the probable expence of the frame - and hanging the new peal in the most durable and masterly manner with every improvement of which it appears susceptable.

(Signed) James Harrison

The weight of the metal is judged to be about seven tons for which it is proposed to allow £168 per ton	£1176 0 0
and the same weight when recast into new bells of the improved form, and executed in a peculiar manner, the moulds being finished by the Machine and apparatus I have constructed for doing them perfectly regular, even and smooth - and indeed so complete as not to be exceeded -will be £224 per ton	£1568 0 0
The difference of which or expence of recasting is	£.392 0 0
Instead of chipping or hacking the new bells into tune (which, the usual method, often impairs their tone) such variations as may happen in executing and occasion their tones to deviate, are intended to be rectify'd by the Engine I have invented for that purpose, and by which they are done with great truth and regularity as smooth and bright as a Clockmaker can turn brass at £1. 1 each bell and £1 per ton	£..17 0 0
As the substance of the lower beams of the frame will in a great measure depend on the support which they may have from the beams of the Chamber floor - so the expence of it cannot be estimated so near; nevertheless allowing it to be sufficiently stout and good it perhaps may cost, tho in no case will exceed	£.120 0 0

Ten bells hanging in the most improved manner (different in several respects from the common way) with all new materials - as wheels, yokes, hoops and turn'd gudgeons, side Irons, Crossplates and dogs, yoke bolts, wheel staples, stay Irons &c &c - Also Pulleys, stays, slides &c - with all labour - Self, Carpenters &c at £12 each bell	£.120 0 0
	£.257 10 0
Expence of recasting brought forward	£.392 0 0
	£.649 10 0

The waste of the metal in casting to be supply'd by the founder and the new Clappers to be weigh'd with the new bells in consideration of it - Also as the new bells are intended to have Springs to their Clappers (which is one of the improvements alluded to) these are likewise weigh'd along with them and no separate charge made either for the Springs themselves or the trouble of adjusting them.

Likewise, as there is a greater number of old brasses than will be wanted of new ones, So the expence of recasting or exchanging these will be very trivial.

It is expected that some of the wheels, yokes and irons will do again, which of course will deduct from the above expence, as will likewise any part of the frame which may suit to be the work'd up again - And the remainder of the old Materials will doubtless cover the expence of taking down, hoisting up &c with all contingent charges.

If the estimator should have the happiness to find his proposals approved of by the Gentlemen of the Church - He designs to come to Lincoln and make temporary convenience for recasting the bells and doing every part of the work upon the spot - and as the expence of Carriage to and fro will be hereby saved, he hopes the Gentlemen will make a suitable allowance towards such temporary convenience, as it is a constant rule to add the Carriage to the other espences.

The two old peals of bells now in the Cathedral, if Cast upon the new plan into a peal of ten - the weight of the tenor will be about 32 cwt - its diameter about $5^{1}/_{4}$ feet - and I hesitate not to assert that such a Peal in England whatever tho there are some of much greater Weight. It would also exceed to the sweetness of the tones, and it would be heard to a greater distance.

CHAPTER TWO

Letters dating from 1827 to 1834 relating to the repair of the crack in 'Great Tom' and the eventual recasting of the bell.

A crack was discovered in Great Tom in December 1827 and the immediate reaction of Edward Betham the Surveyor and Clerk of the Fabric (Clerk of Works) was to visit John Briant of Hertford. Mr Betham was Surveyor of the Cathedral for many years and had achieved a high reputation for his work in restoring South Cockrington Church for Lord Monson in 1810 as well as for his work at the Cathedral.

John Briant was at that time 80 years of age and had retired from Bell founding having sold this side of his business to Thomas Mears in 1825. He had achieved a very high reputation as a bellfounder and the twenty complete rings which he supplied to a wide area fully sustained his reputation. Briant's strict integrity and leniency towards debtors no doubt was the reason for his straitened circumstances which led to his admission to the Marlborough Almshouses at St Albans where he died on 27 February 1829 at the age of 81.

Mr Betham reported the result of his visit to Briant to the Dean as follows :

6

Eastgate, Friday Noon
4th Jany 1828

Very Rev Sir,

I enclose you a letter, I found on my return from Mr Briant of Hertford, and upon its envelope I have copied the Queries I put to him respecting the fractures in Great Tom &c - and I trust you will find his letter a sensible & rational Answer - With due submission I would beg leave to suggest, as the least expensive, that Mr Briant should be employed for making the Clock strike upon Hugh Tenor Bell as he is well acquainted with its situation with respect to the Clock and would bring or send all things necessary for the purpose. I have seen from experience that a common House clock maker & Watch repairer is Not fitted for this sort of work as themselves, the consequence of which (beside the danger of injury to the Clock or bell) is that by the time occupied &c the expence is greater than if a proper Church Clockmaker is employed: besides it will be matter of some consideration (which none but those used to it can well give) how much the Weight which draws the Clock hammer will require to be Reduced when applied to so much lighter a Hammer as will be required for so Comparitively smaller a Bell.

I also enclose a Letter from the Revd Mr Willson and have the honour to remain.

Very revd Sir
Your most obedient & humble Servant

(Signed) Edwd Betham

Addressed to :

The Very revd The Dean of Lincoln
Deanery
Lincoln

7

31 December, 1827

Copy of Queries put to Mr John Briant, of Hertford, for many years a bell-founder (which he has lately declined) and church and turret-clock maker, aged nearly eighty years, by Edward Betham, surveyor to the Dean and chapter, respecting the crack discovered in Great Tom o'Lincoln, which was particularly described to Mr Briant.

First. Could such an accident occur by the accidental or intentional pressure, by any person, upon the bell at the time the clock was striking?

Second. It has been thought right to discontinue the striking of the clock, and tolling with the clapper for the present: but Mr Briant is particularly requested to state, with as little delay as possible, whether any further injury would be occasioned by allowing the clock to strike, and the bell to be tolled with the clapper as heretofore?

Third. Whether any temporary improvement in the tone would be obtained by cutting a piece out of the bell as far or a little beyond the present crack?

The following appears on the original at this point :

Note : Mr Betham, and no doubt Mr Briant knew this expedient to have been tried and acted upon for full twenty years with the 6th bell of th e o ld peal of eight in Peterbrough town church, but certainly the tone of it was anything but pleasant, though perhaps not quite so bad as before that operation was performed.

Fourth. In case Mr Briant should not think it safe to adopt any of the above plans, it is proposed to let the clock strike upon the tenor bell of the peal of eight in the opposite tower of St Hugh.

The quarters now strike upon the 4th and 7th of that peal. The treble bell is broken: therefore upon which two of the b e lls would Mr Briant recommend the quarters to strike in the absence of the treble, the clock striking upon the tenor in the key of F? Would 2,5...8 do?

Fifth and Lastly. What would be the probable expense of recasting this stupendous bell, taking into consideration the getting down and up again, and having to pass through one groined stone ceiling?

And would it be more readily done at Lincoln or in London?

Briant's answer to these queries was as follows :

8

Hertford, January 2nd, 1828

Dear Sir, Agreeable to your request contained in your favour of the 31st December. I do myself the pleasure to answer your enquiries.

First. I entertain no doubt that the fracture was not occasioned from either of the causes you have named.

Second. By continuing the clock to strike upon the bell, or tolling with the clapper, will probably extend the fracture.

Third. I am confident the cutting out of a piece of the bell as you suggest would not produce any sensible improvement in the tone. Such an operation upon a bell in a peal, as at Peterboro' might not be so perceptible when rung with other bells: but upon a single bell, as at Lincoln, it would be exceedingly palpable. Any attempt that may be made will be attended with great trouble and expence, and be eventually abortive.

Fourth. As you are so unfortunately placed in respect to your peal of eight in having the treble cracked and thereby reduced to the necessity of having your quarters strike offensive to the musical ear, it is difficult to recommend which of the others would be best. I should rather that would be left to the musicians of your own neighbourhood. To my fancy the 4th and 7th would be the least objectionable.

I shall now take the liberty to offer you my opinion as to the cause that has produced the misfortune to your Lincoln bell. You state that the fracture is perceivable seven inches upwards from the extremity of the skirt (besides which there is probably a still further fracture that is not perceptible to the eye), and which, in my opinion, has been occasioned by the line of the momentum of the clock hammer being in too perpendicular a direction with the bell, and striking on a thinner part than the extreme thickness of the sound bow, instead of having its impetus inclined to a more horizontal position. Most likely that part of the fracture above the sound bow was done before it extended to the skirt. at which time the tone was very little impaired.

It is worthy of remark that during my late visits to Lincoln I felt a disappointment in the difference of the tone of this bell to what it was when I first heard it about twenty years ago. I thought its vibrations of shorter duration, but then I attributed it to the possibility of age having in some degree dulled my ear. But now I believe my faculty of earing [sic] was not impaired, but that the fracture then existed, and has since increased to its present fatal termination.

I will, in the course of a short period give you the desired information as to the expense of recasting, and also the fruits of my best experience as to the place of founding it - they require more consideration than the time, between this and the departure of our post allows. I trust you will rest assured of receiving, and that you will command, my best advice and services, either as regards the clock or bells.

Mr Shaw requests his respectful compliments and the acceptance of his thanks for your kind attention while at Lincoln.

Vale,

(Signed) John Briant

The Clerk of Works added the following footnote at [*] to this letter :

These observations apply I conclude, to the presumed position of the old clock hammer, and which was pointed out to Mr Briant. The clock now, and for upwards of fifty years, has struck upon the opposite side of the bell.

(Signed) E. B

Hertford, January 8th, 1828

Dear Sir, - I received your second letter duly, and now proceed to answer it. It would be of no use whatever to drill any hole - rely up it, no more good would result from such an experiment than making the excision you mentioned in your first. It is in truth a cracked bell, and my experience of now more than upwards of half a century has never seen any remedy applied to one, although frequently attempted, nor do I entertain the least prophetic knowledge I ever shall; and I should be extremely sorry that any friend of mine should make an attempt to effect what I feel convinced ois impossible to be accomplished.

In reply to the material question, contained in your first letter, as to the probable expence, and the most eligible place to recast the bell at. I offer the following as in my opinion after the most mature deliberation. It is now upwards of a century since a bell of this magnitude has been founded, consequently no living experience derivable from founders concerned in them is now available to guide us. We must, therefore, place our confidence for success in the account that has been handed down to us by others, aided by our own, and this will concur in giving the most decided preference to London for this reason : - We know that there is a furnace of sufficient capacity that has been proved over and over again, and has at all times been capable of producing that heat to the metal which is the desideratum for ensuring a good bell; and allow me to remind you heat is of all things what we have most to combat with for success.

I have no fear of a good article with a proved furnace; but the great uncertainty of effecting a cast with a new one is greatly decreasing the probability of success. Not that I think it wholly impossible and did I feel myself equal, as I have had so considerable experience in building furnaces both for myself and others, I should have had no repugnance to make an attempt; but the anxiety and care it would create upon my mind would be so great as to divest me of that equanimity I find necessary to retain at my advanced years.

Exclusive of the great risk of a good cast in a new furnace, there would also be a great additional expense in consequence. A proper furnace would cost about £60, besides which there would be many incidental and necessary expences in a new place of casting, all which would be avoided if founded in London; and the expense to be considered against this is the amount of carriage. Whether water carriage is available I cannot tell, probably not. If so, and land carriage is resorted to you can be supplied with a new bell before the old one is remove and the same conveyance that brings the new one to Lincoln can carry the old one back to London. I have made some enquiry as to the probable amount of the carriage, and, from the best information I can obtain, it would be less in proportion than one to two as to the erection of a furnace. but under every consideration London is the preferable place; nor is there another furnace now in England sufficient to contain the requisite quantity of metal.

In consideration of my opinion upon the difference of a new and an old furnace, we have an elucidation of it at Oxford. The great bell there had a new furnace erected to cast it in, and after casting and recasting three times, produced the worst of all the great bells in England. St Paul's, which was recast in 1709 in London, turned out a good one the first heat - the proved furnace in London being capable of producing the requisite intenseness of heat, but which the new furnace at Oxford could not effect after three attempts. And in a work of this magnitude I submit, with great deference, no experiment ought to be tried; yet, if the Dean and Chapter should desire to have it

founded in their cathedral, so far as my best judgment and experience might be rendered useful, it would be one of my highest gratification to promote their wishes.

It would be impossible, not having particularly noticed the groined roof where you propose to take this stupendous bell up and down, and also some other matters connected with it, to state anything like an accurate sum, but I think the operation of recastingwill be from £200 to £250.

In undertakings of this nature, which so seldom occur, I am exceedingly happy that itis to be effected by so liberal and learned a bodyas the present Dean and Chapter of Lincoln, as upon their arrangements everything depends; and I entertain no doubt a proper regard will be had to obtain the greatest excellance, in preference to adopting a system that has of late been resorted to by inferior bodies, to induce persons contracting to execute their orders at so low a price as to sacrifice all other considerations, ofwhich there is a notable instance recently at Liverpool.

Having myself declined founding, I hope readily to receive your assent, as well as of those concerned, that I am not influenced by any other feelings in this affair, than a most ardent desire to be instrumental in producing as good a bell as the old one, which was the most superior great bell in England and in the attainment of which object I hope I shall not be found to shrink from any exertions. On the subject of a new or an old furnace, I have personally conferred with Mr Mears, the London founder, whose opinion and mine are in unison in this respect. Should it be thought well, we shall be happy of an opportunity to examine the place, and to confer with you upon any further steps in this business, of which you will be pleased to let me know. Any communication for the succeeding three weeks will find me, if addressed to King's College, Cambridge where I am going to fix a new turret clock.

I am, dear Sir, most respectfully your obdt. servant,

(Signed) John Briant

10

Hertford, January 15th, 1828

Dear Sir,

I have discovered since I wrote last that my Amanuensis has fallen into an error in stating the probable expence of recasting your great bell: the expence there stated is from £200 to £250, instead of which it should have been from £200 to £240, the latter being the extreme amount I conceived it could possibly come to; even if in recasting, the next bell should come heavier than the present one; and it would be quite impossible for any founder to cast it exactly the same wt. I much regret that such a mis-statement should have occurred, but be assured it was the accidental error of the writer, and not the individual who dictated it, which my rough calculations and copy of letter will evidence. But I have discovered an error of such greater consequence, and I congratulate you, and all those interested for a new bell, that it is one which will show that a bell of the same weight as the present one, can be recast for considerably less than even the lowest sum already named (£200).

The error alluded to, is in the accuracy of the weight, this has been variously stated, but none of them less than 95 cwt. On referring to some observations I made twenty years ago, and which I had no opportunity of referring to when I last wrote, on account of my books and papers being at St Albans, from whence I have just

returned, I find the true diameter is 6 feet $3^1/_2$ inches. Now, we have a mode of ascertaining the weight of bells by their diamr up to about 5 feet 6 inches to a great nicety, and although this, which is beyond all rule that we have on account of its great diameter, yet we can ascertain sufficiently to know it cannot be any such weight as 95 cwt. I believe 88 will be the actual weight, and in this I am confirmed by the opinion of Mr Mears, the London founder, a man who has cast more great bells than all his competitors have small ones; and he lays it at rather less. Therefore, taking into consideration the reduction in weight of metal to be cast, and the risk to the founders is thereby reduced, I think it may be recast in London for £165, taking the weight at 88.

I have at this instant such imperious claims on my time at Cambridge, that I cannot do all I wish, and I mean, as to ascertaining the precise weight; but when I return, which will be in about a fortnight, I will, by taking the cubic inches of metal it contains, which I can very well ascertain, knowing the exact thickness in every part.

I am, respectfully,

(Signed) John Briant

In the meantime *The Lincoln, Rutland and Stamford Mercury* dated 4 January 1828 reported that :

Within these few days great tom of Lincoln upon which the Cathedral clock hammer strikes has astonished the lovers of his musical tone with a different sound from which he formally sent forth, jarring and disagreeable.

The report goes on to describe the crack in the bell and then states that :

The loss of the service of the bell is a public one and any method of repairing it communicated through our paper will be thankfully accepted, and may prevent further injury to Tom, it being at present suggested to saw or cut out so much of the metal as the crack has reached.

This appeal brought the following reply which was published in the next edition of the paper dated 11 January 1828.

11

Spilsby, Jan 9, 1828

Mr Editor,

It was with much regret that I was informed by your last week's paper, of the accident which has happened to the unrivalled bell in our magnificient cathedral. Let us hope, however, that your call upon the genius of a county (which has produced a Harrison as a mechanist, and a Newton as a philosopher) to repair this grievance, will not be made in vain. If nothing better is suggested, perhaps the following method might be attempted with a fair prospect of success: I would fuse the metal immediately contiguous to the fissure with a powerful blow-pipe, beginning at the skirt, and ascending as the metal became fused through; to effect which, the vast thickness of the bell might render it expedient to use two blow-pipes, one inside, one out - As the metal becomes fused, it would require being retained in its place by two moveable instruments having large flat heads; and as they proceeded to the top of the fissure, more metal would require adding to perfect the operation; but lest the expansion by heat should have a tendency to extend the crack upwards, it would be prudent to have

the skirt perfectly united previously to submitting the upper part of the rent to the action of the blow-pipe; and the width of the part heated should on the same principle, be kept as narrow as pos s ible. I should recommend a blow-pipe for this purpose on the principle of the well-known oxyhydrogen blow-pipe discovered by Mr Gurney (the celebrated inventor of steam-coaches), though to conduct this operation where intense heat in as small a compass as possible would be desirable, it might be advantageous to use the improvement in it suggested by Mr James Wilkinson, of Ludgate-hill, who has rendered the apparatus still more secure by introducing strata of asbestos within the tube. Hoping that this plan, or something better, may have the effect of restoring that harmony which has hitherto extended so far, and lasted so long, I am, Sir, your's,

An Individual whose Birth-day is the same as that of the Patient for the recovery of which I am prescribing.

No more letters of this nature appeared in the Newspaper but the report sparked off quite considerable correspondence with the Dean and Chapter. However, the following letter from Mr Robert Hepworth is addressed to "Ro Mason Esqre, Town Clerk's office, Lincoln" and is mainly concerned with "the purchase of the lease of the premises belonging to Mr Preston" but the following extract is of interest here :

12

Spring Gardens, Doncaster
5th Jan 1828

Mr Mason,

...In perusing the Doncaster Paper of this Mornings date I there saw that the large Bell commonly called tom of Lincoln was broke, no doubt there will be many opinions as to its being mended again & to which I answer all the men in England cannot mend it but it will have a jarring Tone, but at the same time I beg leave to say if the Bell be not cracked in length more than what the Newspaper says one foot, if you will not let the Bell be meddled with I will engage to make it have the very same tone it had without ever being moved from the Beam it now hangs upon, it probably may not be quite so loud, but that I cannot speak positively to until I see it. Now Sir if you deem this worth notice and will send the Length of the Crack the thickness of the metal and the circumference of the Bell's Mouth together with its whole height, I will soon tell you whether it may be done or not, however whatever you do, mind and not let the Bell be struck with anything or rung any more until you take Advice respecting it for it is a Thousand to one but the Crack goes to the very Top if strucken [at this point part of the letter is obliterated by the seal] something done to [it].

On paying my Expenses to Lincoln and back I should have no Objections of co ming so far, and if I cannot do it I will not charge anything, but first I should like to hear what exact length the crack is as everything as above stated. If you could at the same time draw the Figure of the Bell, with all the likeness of the Crack upon it, it would still be all the better.

Please excuse my long scrawl and am Sir
Your Most Obedient

(Signed) Robt Hepworth

Three letters follow from Sir John Thorold of Syston near Grantham who was High Sherriff of lincoln and seems to have been a friend of the dean. Strangely, none of the letters give the day upon which he wrote them !

13

Syston Park
Jan 1828

My Dear Sir,

Seeing in the last County Paper an account of the lamentable misfortune which has happened to Great Tom, also a request for information as to the mode of repairing the damage, I trouble you with this to mention that I have a very rare & curious Treatise on the Art of Casting bells &c: "Di La Pirotechnia : Lit : X : Composti per S : Vanoccio Biringuccio" 1540. In this work is given the method with a Diagram for repairing by soldering a Crack in a Bell.- vide Page 100 - It appears to me to be very practicable & I have long made these matters a particular Hobby Horse. if you think it worth while to see the Book I shall be most happy to entrust it to your care with the hopes it may prove usefull : I fear there may be some little difficulty to render the method clear from the ancient Italian, however the chapter of the head is but short. With our united best regards to yourself & [?].

I remain
Yours most Truly,

(Signed) J H Thorald

Addressed to:

The Very Revd The Dean
oflincoln
Deanery
Lincoln

Despite close scrutiny of the letter and a study of Dean Gordon's family records it is impossible to decide to whom Sir John is referring in the last sentance of his letter! There is extensive underlining on this and the other letters from Sir John, presumably by the Dean.

14

Syston Park
Jany 1828

My Dear Sir,

I feel much obliged by your most explicit letter on the misfortune of the bell. I have again looked in the Biringuccio & at the end of the Chapter he speaks confidently & from actual experience of the complete success of his method. At all events it would be worth a trial before the radical Cure is resorted to by Mr Mears. If the joint can be effected (& I really see no reason why it should not) the Jar would of course cease & the bell be as good as ever. I do not know Mr Hepwroth but from his writing I should suspect quackery. If solder is to be applied Fire isrequisite & who in their senses would allow fire to be applied in the Tower ? Also, if not in the Power of Man to mend the Bell how is he to perform the Cure? Cutting would certainly ruin the Bell in Tone. The Large Works now cast in Bronze are jointed by means of heat

in lieu of the ancient Noble method of casting them whole. As the Diagram of the method is given an able artist would soon determine whether the mode is practicable & likely to succeed. In the affair I would venture to advise the [?] consulting a person whom I know to be the most skilful Founder in London. Formerly a Bell Founder & I am confident if any man can repair the Bell he can. I will however write to him by this Post and communicate his opinion to you he has done much work for me. I fear my knowledge of Italian is so small I cannot be of much assistance in rendering the Original. I beg you will consider me much interested in the fate of Great Tom & I shall be most happy to be of any assistance in restoring him to his former Glory.

With our united best regards to all
I remain
Dear Sir
Yours Most Truly

(Signed) J H Thorald

15

Syston Park
Jany 1828

My Dear Sir,

I have received a letter from the person I mentioned to you relative to mending the Bell. He says that he entertains no doubt but that it can be restored by the mode I mentioned to him from Biringuccio but that he would, to make his opinion certain, procure a moderate sized Bell, upon which he would try the experiment & then ascertain whether the Tone would be affected by it. He also mentioned that to make the cure more sure that, in case he should be thought fit to make the Trial, he would wish to have a small portion (ie) about the size of a Nut, sawn off the ear of Tom to have it Assayed in order to obtain the exact alloy to form his metal for soldering the joint & if it was sent to me I would forward it to him. He also wishes to know the thickness of the metal where the crack is, which may readily be found by the application of a pr of calliper compasses - I think from his letter he seems to understand the matter & to wish to proceed on a rational plan, without ignorant pretension or Quackery. The bell must he says come down & be laid in an horizontal Position to effect any Junction of the fracture.

I saw a most absurd Plan mentioned in the County Paper of the use of 2 Blow Pipes, but how a mass of many Tons Wt is to be heated by such Zephyrs I am at a loss to conceive independant of the extreme hazard & danger to be encountered in the Use of the Air recommended for the purpose. I should be happy to hear that you have received the Book safe, also your opinions on what I have ventured to suggest on the subject in question.

I remain
Dear Sir
Yours most truly

(Signed) J H Thorold

Nothing more is heard from Sir John and the writer of the next letter is William Dobson a bellfounder of Downham Market. He was the grandson of Thomas Osborn with whom in about 1801 he went into partnership and took over the Bellfoundry in 1806 when Osborn

died. Although he cast a large number of bells he never seems to have been particularly prosperous and in 1833 the foundry was taken over by Thomas Mears. Dobson died on 11 July 1842 at Charter-house, London.

16

Downham, January 7th 1828

To the Very Revd
The Dean of Lincoln

Revd Sir,

Observing in the papers that you have had the misfortune to crack the large Cathedral Bell and presuming that it is your intention to have it recast; I have taken the liberty of addressing you and of requesting that I may be permitted to send you my proposals for executing the business feeling confident from my great experience in works of that nature that in the event of my being employed I should be capable of completing it to your proper satisfaction.

I have the honour to be revd Sir
Your very respectful
and obedient Servant

(Signed) Will Dobson

PS The list which accompanies this relates only to entire Peals; in addition to them I have cast upwards of 400 bells amongst which are the 11th Bell at St Mary the Great Cambridge various Bells for Dublin, Dundalk, Portadown, Drumchree, Liverpool, Sephton, Blackburn, Rochdale, Manchester, Macclesfield, Dewsbury, Leeds, Ripon, Boston, Lavenham, Lynn, Fakenham, Chelmsford, Southampton, Leicester, Derby, the King of Grand Burny, Africa, the City of Columbia, America, a Colony of Germans in the Wabash of Indiana State, America, and St John's New Brunswick.

The list to which Dobson refers is, in fact, a broadsheet on the back of which he has written his letter.

He also encloses with his letter four testimonials; the first of these being from Sir Robert Smirke RA who was an architect of great renown. He was responsible for building the British Museum and Covent Garden Theatre as well as being responsible for the rebuilding of York Minster after the fire of 1829. It seems that he was in charge of the building of Tyldsley Church for which Dobson had supplied a ring of six with a tenor of 11 cwt and Sir Robert's letter is concerned with the payment.

17

Stratford Place

Septr 21 1825

Sir,

I am requested by Mr Ormerond to send you the enclosed Bill for £335 which sum with the £30 advanced to you while you were at Tildsley makes the amount due to you for the peal of bells you have fixed for him in the new Church there.

He requests to tell you that your Bells have given universal satisfaction.

I am Sir
Your very obedt Servt

(Signed) Robert Smirke

You proposed in your letter that the payment shd be made here in London, but have not mentd. to whomit shod be made for you. I therefore send it enclosed.

Addressed to:

Mr Willm Dobson
bellfoundry
Downham

The next letter appears to be from the incumbant of a church in Ripon for whom Dobson was to supply a single bell.

18

Ripon May 21 1827

Sir,

In compliance with your wish for an immediate reply to yours which I received yesterday I lose no time in forwarding to you my Decision. Relying upon it that the lighter of the two Dorsetshire Bells is such as satisfactory to yourself you can recommend I have no hesitation in accepting your offer of it on the terms proposed. I shall also thank you t o send me "Stock, Wheel, brasses, Gudgeons, Screw'd Iron Work & Roller" Complete. The whole will come to Ripon by Canal from Hull. Altho' I have the pleasure of numbering Messrs Allen & Whitacre amongst my particular Friends, I have been in both their Churches on Week Days, it so happens that I have never heard the Sound of either Bell. Not so, however, with another very dear Old Friend of mine, The Revd Hammond Robinson of Liversedge. The Ring of Bells with which you have supplied him has delighted me again & again & never more so than when I attended to preach the Consecration Sermon before our Good Archbishop. They are universally considered as doing you a great Credit & had a peal been wanted here (which is not the case on Account of the vicinity of my new Church to the Minster) I should certainly have applied to you for it in Preference to Mr Mears, or any other.

I am Sir
Your most obedient & humble Servant

(Signed) E Kilvington

Addressed to:

Will Dobson Esq
Bell Foundry
Downham, Norfolk

Dobson had supplied a peal of eight bells with a tenor of 20 cwt to Poole in 1820 and the first of the next two letters is from the Churchwardens at the time of hanging the new bells and the second letter is from the Churchwardens in 1829.

19

Poole Octbre 30th 1829

In the year 1820 this town & county built a new Church and Tower at which time we as Church Wardens contracted with Mr Dobson of Downham for Eight Musical Bells. We beg t o inform you that he fulfilled his contract with us much to his credit, and gave universal satisfaction, the Bells are allowed to be of a very fine tone, in perfect unison and certainly reflect great praise to the founder. we can in consequence strongly recommend him to your notice, and to assure you that...in erecting them he proved he understood his business in every respect.

We are sr yr Obt Svt

(Signed) J B bloomfeld
. Robert [?]

Addressed to:

Kay Clegg Esq

20

Poole

30th Oct 1829

We the present Churchwardens do hereby certify that the bells in the Church Tower of the Parish of St James which were cast and put up by Mr Dobson of Downham are now in good order, that they have been much rung and that they have been very much admired. They are allowed to be the most musical bells in this part of the country.

(Signed) Jno Sydenham
. John Turpin.

Addressed overleaf :

Poole November one 1829

Kay Clegg Esq Nr Oldham Manchester

The next letter appears to be from the Rector of Downham to the Chancellor of Lincoln Cathedral.

21

My Dear Sir

Your letter has this moment only reached me which must plead my apology for not.....paying attention to its contents. Mr Dobson is well known to me & I can strongly recommend him to your notice as superior to any Bell Founder in the Kingdom. He has cast bells for several Friends of mine, to all of whom he has given the greatest satisfaction. Amongst other places he has sent them to my Brother's Parishes in Ireland, Liverpool &c. Upon other subjects also you will find him

equally intelligant. Mrs Thackery writes in kind regards to Mrs Pretyman & yourself with

Yours very truly
(Signed) J R Thackery

73 Marine Parade
Brighton

Addressed to :
Revd G T Pretyman

Next is a most interesting and important letter from Dr Samuel Parr (See biography on page 78). Dobson had written to him asking his opinion of a peal of bells which he had cast for Liverpool and the following is Parr's reply :

22

Sir,

I was very happy to do justice to your skill as bellfounder to the new peal of Liverpool & if my proposal for a large single Bell should be adopted I hope that Mr Cartwright who is an intelligent as well as an ardent man in the service of the Church will prevail on the Parishioners to employ you. My ears are offended by the discordant Sounds of Peals near to each other & different both in their size & key notes, & this torment I have often suffered at Birmingham where in one of the churches there are twelve bells, with a Tenor weighing 36 cwt and in the other Church there are Ten Bells with a Tenor weighing 27 cwt & having its note in E flat which to my Ear is very displeasing.

You know that at St Brides London there is a fine Peal of twelve Bells with a tenor weighing 28 cwts a half & by this additional Metal & very extraordinary skill in the founder these bells produced a very fine bright & full sound rather above E flat. The only instance which my ear could ever endure is E flat in the Tenor of Cirencester, the weight of which is about 27 ct. But when I am consulted; I always recommend 3 or 4 hundred additional weight in order to produce D & the finest Bell of this size is the Tenor in St Mary's Cambridge. The tenor at Liverpool is about +3/-4 of a hundred heavier than the Tenor of St Peter's Mancroft, Norwich. The Norwich Peal of twelve bells was cast in London & the sound of the Tenor calls out most delightfully when the bell is sinking but in full peal the sound is not sufficiently ["full" crossed through] strong & this I ascribe partly to the want of 1 or 2 hundred weight of Metal & partly the position of the Bell which is hung rather too low. On conversing with a Mathematician we agree upon the difficulty of adjusting axis, but he came oveer to my opinion that the Bell could be raised 2 feet or three if to the same were added four stout beams at the bottom, four stouter at the top & four much stouter still in the Centre, where we know by our Science the chief force would fall during the Motions of the bell. I listened very attentively to the Liverpool Tenor which is hung in the Centre & I give you credit for having provided so full a tone from 42 hundred weight but the sound would have been improved if the Bell had hung somewhat higher on the frame & if I had been present to measure I would have told them with mathematical precision what to do. Once more Sir, I will commend you for your skilfulness & whensoever I speak upon the subject I will take care to communicate the favourable opinion which I have of you.

You are right in supposing I am extremely fond of Bells, and you will not be wrong in assuming that neither in practice nor in theory I am quite a novice. To this hour I, with unusual dexterity, can set either a large or a small bell, so balanced, as not to require a stay, and I can ring in a round peal of six or eight, the treble, the fifth, and the tenor, and these three, you know, are the trying situations for the ringer, but my experience with eight bells goes only to round ringing, though my theoretical knowledge extends much farther in changes. When a schoolboy I was the first person known in the parish to raise, without aid, and to ring a tenor which weighed 23 cwt 3 qrs and 2 lbs, but I understood the compass, the hunt, dodging, snapping, and place-making, and I disliked what the College Youths call firing. We had only six bells, and I performed pretty well upon the grandsire six in the College single, the Oxford double Bob, the Court Bob, and the Treble Bob. This was the boundary of my practice in changes, but my speculations extend to Triples and ringing the observation or second Bell, on a peal of seven to the double Bob major, the Bob major reverse, the London Court Bob,the Norwich Court Bob, the Oxford Double Bob upon eight, and to the Bob of 5,120 with a produce of fifteen courses on tenor twelve, to the London Court Bob upon ten, and even to the Oxford treble Bob maximus upon twelve.

You see that I have not forgotten the language of ringing; and now I will tell you the books which I am chiefly indebted for my knowledge in Bells, and some of which, if I point them out to you, cannot fail to be of service to you. It is useless to enlarge upon two Latin books which have great celebrity among learned men if they are fond of Bells; one is very generally known among scholars, and was written merely from memory, by an unhappy man who worked as a slave among Turks in a stone quary, the book is called "Magius de Tintinnabulis" it is a duodecimo. There is another duodecimo not very generally known, but replete with curious history, and written by a learned and most zealous member of the Church of Rome: his name was John Baptista Pacichellius, and his work was printed at Naples in 1693. These books will be of no use to you, but if you have any scholar in the neighbourhood fond of ringing like myself, you may mention them to him. Now I will tell you of a book which I read when a boy,which I continue to read with great pleasure, and which I earnestly advise you to read if you borrow fron any of your neighbours the English translation of the French ori g inal; you must inquire for the seventh volume. The English title of the book is "Nature Displayed", the name of the ingenious author was Abbe de Pluche, and sixty or seventy years ago his work was in high estimation, though he had a strong leaning to Cartesian Philosophy. You would do well to read his admirable chapter upon Bells in their materials, their proportions, the founding of them, &c, and as in the account of the preparation for casting there are some intricate calculations, you should desire the schoolmaster of your town to assist you in understanding them. Pray attend to the two scales proposed by Father Mersenne. You will be much interested by a curious tale of the vibratory effects produced on pillars standing at a distance by one of the bells which hung in the south tower of St Nicaise at Rheims. What is there said upon the cannons of a bell, the waist, &c, the diameter, the thickness, and the weight of the clapper, I have often had occasion to compare with what occurs in other books.

Since I was a boy I have obtained much information under the articles Bells and Foundries from the improved edition of Chambers by Dr Reece, from the British Encyclopadia, and from Dr Reece's Encyclopadia. And now I have set before you the whole aspect of my reading & I venture to assure you that if any of these books be within your reach you will not waste your time in studying them thoroughly every one of them contains something or other which the rest do not. In my village church I put up a peal of six bells & I gave some useful directions to Mr Ruddhal of Gloucester

whose scale [sic] has long been admired, he did me justice, for two of the six bells are exquisitely fine, & the fourth only is faulty. In Chambers Dictionary in several of the Encyclopedias you will find a curious experiment made by Mr Reaumeur. He published a memoir upon it in 1726. Lead you know is not a sonorous body but he prepared a body of lead & threw the thickness entirely upon the middle & when the body was struck it was found to be elastic & sonorous he therefore well argued if such an effect is produced upon lead it must be produced yet more upon Bell metal; composed as it usually is of one part Tin & three parts copper which is best when red. Now if my memory does not fail me while I am dictating to my scribe the thickness of the Brim is generally about one fifteenth of the diameter. But I should be glad to have the experiment made by some of our Bell founders if they could be prevailed upon to cast a bell of eight or ten pound weight to transfer the thickness from the Bottom or Brim to the [*] The experiment may be made & even repeated at a [*] expence, & if a spirit of competition was once raised amongst the bellfounders the truth of Mr Reaumeurs opinion would be brought to the test & very great improvements I think would gradually be made in the sound of large bells.

I was pleased with what you said upon the degree of warmth which is so advantageous in casting, and I am sure that even the note as well as the "tone" of the Bell must very much depend upon the skill of the founder in his choice of good materials, of good strong earth, of well regulated fire and smoke, and yet more perhaps, in the shape which he gives to the mould. One or other of these circumstances has enabled me to account for similarity of sound in Bells, the weight of which is unequal. Lincoln Great Tom is in A, and so is St Paul's, and so is Christ Church, Oxford, but the weight of Lincoln is less than St Paul's nearly by a ton, and less than that of Oxford bell by three tons or more, if the common representations are accurate. Again at Lavenham, in Suffolk, there is a peal of six bells, the tenor does not weigh more than twenty-three hundred, and yet the note is not very distant from D in the Cambridge tenor, which weighs 30 cwt.

I hope not to tire you & if you should be employed to cast a great bell for Liverpool I will answer any questions which you may produce to me. Pray desire Mr Carter to let the Note be B & you know that from six thousand & a quarter to seven thousand you will have metal enough. The clock bell at Canterbury which weighs more than 7000 lbs is far superior to the great bell at Gloucester, which weighs thre e tons and a quarter, and as you will have only a single bell you will run no risk in employing a large quantity of metal, for the dominant note will be invigorated by it.

I am, Sir,
Your obt. hbl. Sert,

(Signed) S. Parr

Hatton, Jan 22, 1816

Note : At [*] words have been obliterated by the seal

Dr Parr had certainly heard and examined many of the more notable bells in existence at the time and had interesting and knowledgable opinions of them. He also seems to have been quite a keen practical ringer.

The newspaper report continued to produce suggestions for the repair of Great Tom from a wide field some of which were rather eccentric. The following letter from the Rector of Crowland recommending one of his parishioners is interesting.

23

Revd Sir,

Lest the singularity of my address should be wrong construed I beg leave to say, that, with the exception of the Sub-dean who I fear may be absent I have no personal knowledge of any connected with your remarkable Minster. The Cause however I trust will [?] explain & apologise for the liberty I have taken.

A Parishioner of mine a most ingenious mechanic, has just called to shew - & has shown to demonstration by the fact that he can restore the injured Tone of your mighty Tom, by a process at once simple & easy to be accomplished - In confirmation I beg leave to stake my judgment & reason on the complete efficiency of his plan, and that the expence in addition to his travelling &c wd be not great - say ten or twelve pound in the whole - As the proof he has given me is so clear & will be given previously to carrying into execution. I [?] this communication wd be thankfully recd from

Sir,

Yours respectfully,
(Signed) J S Blundell

Rector of Crowland Abbey
Crowland Abbey
Jany 14 1828

Addressed overleaf:

To any of the Revd Clergy
connected with the Minster
Lincoln

On Business connected
with the Minster

It seems that this letter must have brought an enquiry from the Clerk of Works, Mr Betham, and the following letter from Mr Charles Vellam has several notes in the margins which for the sake of clarity I have inserted in brackets within the text.

24

Sir,

With permission from the Reverend Mr Blundell our kind Rector whose goodness in representing me to the Reverend Body the Clergy, the Dean and Chapter of Lincoln as a person capable of undertaking the repair of the Great Bell in the Cathedral of that Place as in duty bound I am truly thankful for his kindness towards me on this occasion, and with due submission I beg to observe that if it be possible to restore the Tone of the Bell in question without recasting it I am the person capable of doing it. In answer to your letter of the 2nd Inst you observe I did not answer the Queries put to me in your former letter which you conceived I neglected doing on the Ground of my plan being discovered. I beg to assure you Sir that was not the case altogether. I expected on the receipt of the Letter sent to you I should have had to take a Journey to Lincoln to see the Bell and its situation where I could have answered those Queries

more to my own satisfaction personally than by Letters. On the other hand I must confess it would much wound my feelings to beat the Bush and another take the Bird, as I live I look at the honour of the undertaking in a much greater degree than I do at the emolument arising from it. Your next observation is my operating on a small scale is in your opinion no criterion as to operations on a large one. I have repeated trials on a small scale which have resisted Blows in a three fold proportion greater than required to draw out the full tone of the Bell without any injury being sustaind by the force applied, I admit the enormous Size of the Bell in qurestion to be a very great contrast (nevertheless, I see no fear on that score, I am aware of its ponderosity (sic) its dimensions also, and its enormous Clapper which is thirty times the weight it need be to draw out its Tone if my information is right, when I was shown the Bell some years back the person showing it informed me its [*] Clapper weighed half a Ton if so 42 lbs would be an abundant weight, 36 lb is as near a thirtieth part as can be and is sufficient for the purpose) but I feel confident if I can make the part wounded as secure on the Bell in question which hope do no reasonable force can injure it at any time.

The asterisk [*] had been inserted by Mr Betham and in the margin he writes as follows :

* December 4th 1778 Great Tom's noted Tongue weighed 26 cwt 0 qrs 11 lbs = 235 lbs. At which time I presume the clapper was taken out and probably the position of the Bell in its yoke (w hich has been) changed. The Bell is stated at 94 cwt = 10528 lbs. E.B.

The Clock Hammer weighs	104 lbs
But does no[t] strike more than	60 lbs
Lost by the weight of the Hammer Tail or the Iron Rods which connect it with the Clock below	44 lbs

The letter continues :

I have never heard or Read of such a thing being done or even attempted to be done on a large scale netheless it is worth a trial both for antiquity and the saving of a great sum of money as if practicable the saving is a great consideration. The Queries which your letters contain I will answer as well and as clear as I am able -

Querie 1st If the Frame contains a sufficiency of Space there will no necessity of taking out the Bell, it must have its wheel, its Axle &c taken off & be lowered on blocks in a Inclined Position in order for its repair.

[The Clerk of Works Note reads :

"1st Will it be necessary to remove the Bell from its Frame ?"]

2nd. Heat will be required in the operation and a Stove must be constructed for the purpose, the fewell [sic] will be Coke or Charcoal or both as occasion may require. The oxyHydrogen Gas & blowpipe is dangeerous to attempt or make trial of as to the premises the operators life also the degree of Heatrequired will be considerably below a red heat and applied to the fissured part & no other except what it may draw from it

in heating. water shall be on the spot in case of anything happening but in that case I see no fear of its being wanted.

[2nd. will any and what description of Fire be necessary to complete the Job?]

3rd. This is a compound Query and difficult for me to answer. In the first place I cannot perform an operation on such a ponderous body without assistance which I must bring with me, I intend my Son coming and another person also which will make three in number and as to time I cannot consider it to be complete in less than two weeks exclusive of the Journeys on the occasion, after the bell is repaired its Position must be altered as it would be very unreasonable for either the Clapper or Hammer of the Clock to Strike on the part where the fissure now is, the person I should (neither of them do strike upon that part but the Clock Hammer strikes in a opposite direction) bring with me is skilfull in bell Hanging having assisted very much in altering the position of the largest bell in Crowland Abbey which is very Ancient and was much indented by the strokes it had received from its Clapper & the Hammer of the Clock, its position had been reversed many years since, this person altered its position so as in my opinion it will be preserved for many years to come. The bell in question after repairing must be Hung in the same way for if it was practicable to reverse its (great Tom having been already twice changed in his position it is not I think possible to prevent either the Clock Hammer or the Clapper striking if not upon the fissured part in an opposite direction) present position it would be better to have it otherwise than to strike either in the fissured part or in an oppositeone as the motion of sound or vibration on a bell is Rotary in consequence of which if struck in an opposite direction the vibration would meet in the weaker part of the bell. In consideration of all these alterations which will take up much time & labour materials and travelling expences all things considered I will undertake the repair of rehanging the bell for the sum of £25 that is to say I will make the experiment for that sum of money 'tis impossible for me to say positively I will perfect its tone I will use my utmost endeavours so to do and that is all any Mechanic can say as I firmly believe it to be a scheme yet untried on a large scale particularly on so large a bell as the one in Question if I fail in the attempt the money will scarcely remunerate the three of us for the labour & expence it will put us to in proceeding thro the business and the wound of my feelings would receive by a failure in the attempt is beyond my power to describe. If I should make the bell to retain its tone for six months I hope that it is sufficiently long enough on trial of it as if it will stand one day it may stand 100 years at the end of six months I should expect the sum of £35 more in the case of failure if employed on the business [3rd the utmost expense of every kind that would be encured by the D & C in the completion of it? and the length of time he would engage that the bell should retain in the perfect tone he would restore it to?]

I hope this answer will when laid before the Reverend personages to whom the business belongs prove satisfactory as to the pursuit of my wishes to exert my Talent as a mechanic to the best of my ability waiting your answer. I am Sir your obedt & Hble Servt

(Signed Charles Vellam Crowland
June the 14th 1828

[This appears an honest proposal & the terms not exhorbitant - The greatest objection is the application of Fire in the Steeple, from which if an accident did occur it might & probably would extend to the Roof of the Nave EB]

The Clerk of Works also added the following :

(Copy)
Mr Betham
Surveyor to the Dean and
Chapter of Lincoln

The above is a copy of the direction of this letter which being charged double Postage was cut out and delivered to the Postmaster at Lincoln

Note: Obviously this letter must have been written on January 14th 1828 and not June 14th [Ed]

The report of the cracking of Great Tom seems to have been reported in a number of newspapers and the following three letters were written as a result :

25

14 Jany 1828

Reverend Sir,

I haveing read in the Public prints that Great Tom of Lincoln, viz the great Bell has been cracked. Should you and the heritors of the parish think proper to appoint any Gentleman in London in whom you can confide to speak to me on the subject of repairing the Bell I will convince him by occular demonstration how the Bell may be made to have as good a sound as formerly at a small expence, and this I will undertake to do - without removing the Bell from its present situation or having the Bell recast, which will be a considerable Saving by the Parish.

Be pleased to write me post paid to the care of Mr Ribean [?] Bookseller, Blandford Street, Manchester Square as I am going out of Town for a few Days he will forward it to me.

I am Revd Sir
Your Obedient Servant
(Signed) Robert Boston

Addressed :

To the Revd The Minister
of the Cathedral
Lincoln

26

New Mills
Near Disley, Stockport

Jany 14th 1828

My Lord,

Having seen a paragraph in the Macclesfield Courier relative to an accident which has happened to the Great Bell Tom of Lincoln - I take the earliest opportunity of informing you that I have seen a similar crack remedied by passing a saw thro' the whole extent of the Fissure and of such a width as to separate its sides in such a manner that they will not touch.

The adhesion of the sides being the only cause of the monotonous Jar.

I am, My Lord
Your Lordships
Most humble Servant

(Signed) John Potts

Addressed :

To the Right Reverend Father in God
The Bishop of Lincoln
Buckden Palace
Buckden
Hunts

27

Bennett Thorpe, Doncaster

Jany 19th 1828

Revd and Honoured Sir,

Observing in the Doncaster Gazetter of the 18th inst. that an eminent Bell-Founder has been consulted on the best Mode of remedying the Fissure in the Great Bell of Lincoln Cathedral and that faint Hopes are entertained of any efficient plan being pursued for the above purpose; and further, that it is expected a New Bell will be cast in London at the Expense of the Dean and Chapter. I beg leave very respectfully to suggest before such expence be incurred that the following Means be employed if such measures have not already been recommended to your Notice.

Let the fissure of the Bell be examined whether it consists of one single Line without any lateral Fractures or Cracks extending Sideways from its principal Fissure, Suppose it to be ascertained that the greatest length of the lateral Fracture is 2 Inches, let a fine toothed file be provided which shall cut wider than the lateral Fissures say it will cut $2^{1}/_{8}$ inches wide; Then let a hole or holes be drilled into any convenient part of the principal Fissures for the Admission of the File and let the person using the file accurately pursue the Line of the Fissure that as he proceeds in his work his File may take in and cut away every the least part of the Crack on both or either side, Let the principal Fissure be thus filed to both its extremities.

If there be no lateral Fractures, the operation may be performed with a small File. It is I presume unneccesary to remark that the ragged surfaces one on each side of the Fracture being in direct contact, the vibrating motion of each of these ragged surfaces is interrupted and rendered irregular by their giving and receiving a reciprocal Impulse. The perfect and musical Tone of the Bell (resulting from one uniform Vibration) is destroyed, and the jarring sound is produced. Or it is only necessary to make the above remark for the purpose of saying that the cause of the jar will be removed by the above Expedient, Nor will the aperture formed by the file, in the Body of the Bell, be productive of any effect which may be deemed injurious. I know not whether the Bell announces the Hour of the Day & night; but if so the Hammer ought in future, to be made to strike upon the contrary, or some other side there of, to what it hitherto has done, either by altering the position of the Bel l or the Hammer.

I remain
Honored Sir,
Your obedient Servant

(Signed) George Sanderson

Bennett Thorpe, Doncaster
Jany 19th 1828

Addressed :

To the Revd
The Dean of the Cathedral
Lincoln

We next have another letter from Sir John Thorold.

28

Syston Park

Jany 25 1828

Dear Sir,

I send you per Lincoln Coach a Bell mended according to the Process I advised & which to me seems most effectually done by the Person I mentioned to you. He speaks most confidentally of perfect success in the restoration of Gt Tom. At all events I really think a trial ought to be made before resorting to the final result [sic] of Recasting the Bell as his method would be attended with comparitively moderate expenditure.

I remain
Dear Sir
Yours Truly

(Signed) John Thorold

Mr Danyel [?] (my operator) served his time with Mr P Yorke an eminent Bell Founder of Bridgwater & has himself when with him cast a bell of 36 cwt also mended several which were cracked. He also repaired in 1815 a large Warwick Vase for Messrs Rudall & Bridge which had a crack 18" long when restored the flaw could not be discerned.

In the Box with the Bell is the Piece of Metal sawed out of the Bell & when the superfluous metal is removed the full [?] of the Joint would then appear. Would it not be advisable for Mr D to inspect the Bell & give his opinion.

Addressed :

Very Revd the Dean of Lincoln
Deanery
Lincoln

The next letter is a typically lengthy epistle from James Harrison.

29

Barton, Feby 2nd 1828

Revd Sirs,

The misfortune announced in the newspapers of the renowned Tom of Lincoln having got broken, occasions the present address. As I apprehended all attempts to restore it to its former tone short of recasting, will prove abortive, I have taken the liberty to intrude myself on your notice as a Bellfounder.

As the expence of carriage of so great a weight (for which there certainly is no adequate convenience either with regard to the vehicles of conveyance or the means of placing it on such vehicles or of shifting it from one to another etc) must be great, I have thought proper to offer my service to recast it at Lincoln as the expence of making temporary convenience for casting it will not perhaps amount to more than would be attended in the carriage to and fro.

I wish to awake your attention by mentioning the great pains I have taken to improve the rules for arranging the measuring of the different parts of bells, in which I believe I have at length succeeded with every particular measure whatever. I am now moulding a very deep toned bell for Lord Yarborough in which every measure is mathematically determined, so as I expect will not only occasion a perfect concurence of all the parts and thence produce the most melodious tone - but at the same time afford the greater flow of sound with the minimum weight of metal.

To effect this improvement has been the principal work of my life and as long as any one measure remained undetermined an error that might spoil the whole; but I believe my investigations have at length enabled me to be correct in every measure, and which I doubt not but the casting of this bell will confirm so that I expect to have it in my power to inform you of my complete success before the end of the present month.

The advantage of bells cast by these improved rules is very great. Experience shows that they may be cast equally deep toned as bells cast by the usual methods, and afford a greater flow of sound that will be propagated to a greater distance with little more than half the weight of metal. But it is proper for me to confirm this by more than mere assertion seeing there is an opportunity of doing so at no very great distance from Lincoln. I invite the comparison between the four largest bells in the peal at Gainsborough, cast by Lester & Pack of London, the tenor 20 cwt in the key of F and the four bells at Laneham (about 11 or 12 miles from Lincoln and almost the same distance from Gainsborough) cast by me; the tenor somewhat deeper toned than F and weight about $10^{3}/_{4}$ cwt. It is necessary to observe that the products of the "old house" (Lester & Pack) are in general allowed to surpass the latter production of that foundery; and I am well persuaded the present firm would not engage to cast a better peal than that at Gainsborough of the same weight. Whereas I cast Laneham bells several years ago before my rules were brought to the present perfection they are allowed to equal the generality of bells in mellowness of tone, and were heard at Sturton-le-Steeple the first day they were rung. The greater flow of sound and the greater distances to which it is heard is occasioned by the vibrations being performed in wider ranges; at the same time from the lighter blows of the clappers and the softness of the tones of these bells, they do not strike the ear so keenly near the church as bells cast by the usual methods in which the weight of metal and clash of the clapper is much greater.

Perhaps it is unneccessary to say anything more to excite you to an inquiry so manifestly advantageous as that of casting a great bell equal to the old one of much less metal or of casting one with a much more magnificent sound of the same weight. Nevertheless I will quote a passage or two from a letter I have received from the Revd Joseph Wardle of Rothwell near Leeds where it is in agitation to have a new peal of eight bells viz "I now candidly state to you that I have ever felt a partiality to the tones of the three bells at Methley without ever having asked the question by whom they were cast or at what period" and again "I take it for granted you have mentioned only Methley bells as being in the neighbourhood I shall be obliged by your mentioning in your next the other Churches for which you have cast peals of bells with the numbers and the weight of the tenor bells". And further "the reflection which just strikes me is - either your metal must be of very superior quality and consequently much more expensive or I think you stand on such ground (only requiring little more than half the weight of metal by your improved method of casting) as would inevitably ensure your engagement with us".

As an explan a t ion it is necessary to state that the peal at Leeds was cast by Mr Mears of London and the tenor bell exactly in the same key as Methley tenor which peal was cast by me - The tenor at Leeds is 27 cwt and that at Methley only 14 cwt 7 qr 10 lb [sic] but the peal is heard much further than that at Leeds; and with respect to softness and sweetness of tone, they are scarcely comparable. I observed in my letter to Mr Wardle that Mr Mears long list of peals of bells cast at the Whitechapel foundry was absolutely a credit to me since there was not in that whole list three bells any way comparable to Methley bells of less than double weight.

I shall be extremely happy to receive any comments from you - and I remain

Revd sirs
Your very obedient servt

(signed) James Harrison

Addressed to :

The Dean & Chapter
of Lincoln

The next item is particularly interesting. I conjecture that the Clerk of Works, Mr E Bethem, had been in touch with Thomas Mears probably on the recommendation of John Briant and as a result Mears sent him the following rough estimate. It is on one of the Broadsheets which Harrison had scathinly referred to above and is headed "copy" in Betham's handwriting.

The address is as follows :

The Very Revd The Dean
of Lincoln &C &c

Mr Betham makes the following note:

With Mr Mear's rough Estimate
of the Expense of recasting Bells

Feb 4 1828

30

(Copy)

Lincoln Cathedral Bells - Great Tom - Six in the Rood Tower - Eight in St Hugh's Tower	£	s	d
To recasting the Large Bell	176	0	0
Carriage of Old & New Bells	.25	0	0
	201	0	0
Taking down of old & hanging the new about	.30	0	0
	231	0	0
To recast (as many as are required) of the two peals into a Peal of Ten musical Bells, the Tenor to weigh 20 cwt (whole Peal 130 cwt)	282	0	0
Carriage to and from London	14	0	0
	296	0	0

Total quantity of metal in the two (old) Peals estimated at 1243 cwt little more or less

When the Revd The Dean and Chapter should desire details I will give them every particular Item of the Expense of hanging &c

Feb 4 1828

The next letter from William Dobson implies that he had recently visited Lincoln and seen the Dean. He seems to have had a scheme for repairing the bell but does not make it clear what this is.

31

Downham, February 1828

Revd Doctor,

Since I had the honor of addressing you on the 7th ultimo I have applied my mind to the consideration of the possibility of restoring the vibration of Great Tom without incurring the heavy expense of having so large a Bell recast, and I have at length thought upon an expedient which if adopted I have no doubt will prove successful.

I have observed several pararaphs in the papers containing schemes all of which if tried will terminate in disappointment; one for sawing out the Crack and anotheer for boring a hole at the upper extremity of it, all absolutely ridiculous: in the course of my practice I have recast upwards of twenty Bells which have been mutilated in a similar way. The Blowpipe scheme, the most feasible of all, I have no hesitation in pronouncing to be impracticable - a very small casting might probably be united by such a process, but to attempt the experiment on such a body of Metal as the very thickest part of that stupendous Bell presents, would be an act of folly which no rational man would be guilty of. Atho' I feel the utmost confidence in my own plan, which has not been hastily formed but is the result of the most mature deliberation, I am too sensible of the falibility of human intentions to enter upon so great an undertaking unsanctioned by the opinion of some gentlemen eminently skilled in such branches of science, as will qualify him to decide on the merits of my continuence. Sir Humphrey Davy or Professor Brand would I have no doubt take the trouble of

examining the details of my plan and favour me with his judgment on its possibility. If I were assured of my humble pretensions being h o n oured by your favourable attention, my scheme should forthwith be submitted to one of these gentlemen, and on its receiving the support of his approbation I shall be happy to acquaint you with the terms on which I will engage to execute the business.

I have the honour to be Revd Doctor
Your very obedient Servant

(Signed) Will Dobson

P.S In the postcript of my last letter, in enumerating the single Bells which I had cast I omitted to mention the large one in the Cathedral Church of Bangor.

Addressed to :

The Very Revd George Gordon DD
Dean of Lincoln

It seems that Mr Betham the Clerk of Works must have replied to Dobson intimating that the Dean and Chapter would only consider at some future date having Great Tom recast. Dobson's reply which is given next is particularly interesting :

32

Burslem, Staffordshire
June 7th 1828

Edward Betham.,

Sir,

I presume from your favour of the 2nd inst. (which I had yesterday Evening at the place where I am engaged in putting up a peal of bells) that the Dean and Chapter and yourself have misunderstood the terms of my proposal. You say "rather than incur the expense in an attempt to repair the Bell, the (Dean and Chapter) would at once have it Recast". Now my meaning is, if I fail the whole of the expense will devolve on myself and the 150£ will be paid in the event only of my succeeding in the reparation of the Bell if, however, I have not been misunderstood, I shall be glad if the Dean and Chapter will permit me to send my proposals for furnishing them with a new Bell and in case I am honoured with the order I will engage to deliver the New one before the Old Bell is removed from the Cathedral. I have been informed that an iron founder has made an offer to Recast the Bell, if that be the case I have no desire to compete with such a person: my entire time and attention have been devoted to the acquirement of a perfect knowledge of the business which I profess and I flatter myself that I have not been wholly unsuccessful; it therefore might not be expected that I should engage in so important an undertaking without desiring an adequate remuneration. I feel no desire to enter into any insidious observations regarding the propriety of one Tradesman invading the legitimate province of another but really I should almost as soon think of applying to a Tailor for a good microscope or to an Optician for a Surcoat as to employ an Ironfounder to cast a Bell: a person whose practice has been confined to the casting of Iron cannot be supposed to have a perfect acquaintance with the composition of Bell Metal nor of the precise degree of heat calculated to ensure that richness of tone so highly desirable and without which a Bell is of little value. I remember an acquaintance which will serve to illustrate the justice

of my remarks. The largest Bell in the Cathedral Church of Bangor was some few years since broken and an Ironfounder of Liverpool (an exceedingly clever man, I have no doubt, in his own estimation) fancied that he could cast one in every respect calculated to fill its place, it was cast accordingly and the very first blow which the Clapper struck upon the Bell after it was hung in the Cathedral, split it! about three years ago it was sent to my Foundry.

I still cling to the hope that the Dean and Chapter will determine on having the Bell repaired, if however they resolve on having a new one, I will make them as liberal an offer as any other Bellfounder in the Kingdom.

I shall remain another fortnight during which time I shall be happy to hear from you.

I remain
Sir
Your very obedient Servant

(Signed) Will Dobson

The letter was addressed to:

Edward Betham Esq.,
Surveyor to the Dean and Chapter
Lincoln

but this has been crossed through and readdressed to the Precentor presumably by Mr Betham

In the meantime the Clerk of Works seems to have been in touch with Robert Boston who had in a letter dated 14 January 1828 said he could repair Great Tom without removing it from the tower!

33

London 9th June 1828

Sir,

Yours of the second inst I have received.

I do not wish to put the Dean and Chapter to much expence, if, therefore, he will send money to bear my expence and get some materials, I will come down and I will be bound to give the Great Bell its proper tone, and will leave the price to himself, as I am confident that I will accomplish the Job to the satisfaction of the Dean and others whomsover.

I am Sir
Your obedient servant

(Signed) Robt Boston

To Mr E Betham

Next we have yet another letter from William Dobson :

Downham Aug 16 1828

Revd Sir,

Not knowing whether you have yet contracted with anyone for the Reparation or Recasting of the Cathedral Bell, I have taken the liberty of forwarding my proposals for recasting it, which I have calculated in such very reasonable terms as will I trust induce you to honour me with the execution of the business. On the terms I name, I will either take down the old bell and recast it or I will deliver the new bell before the old one is taken from the Church; but I presume you will prefer the former from the supposition you may...[part missing] materials of the old Bell are superior to the metal used by founders of the present day. Altho' such a prejudice very generally prevails I by no means subscribe to its correctness because I positively know that the metal of Bells 200 or 300 years old is very inferior to the composition I have adopted. I merely mention this thing concerning it (as it is) probable that your mind may be influenced by such an erroneous idea.

Begging the favour of hearing from you as soon as your decision is formed.

I have the honour to remain
Revd Sir,
Your very obedt servt

(Signed) Will Dobson

William Dobson of Downham Norfolk will engage to remove the Great Bell from the Cathedral Church of Lincoln and replace it with a perfect new one to fix the old Stock and Clapper on the New Bell, finding all Carriage attending the business; to defray the expense of taking down the old and putting up the new Bells including the use of Ropes pulleys &c making no extra Charge whatsoever for the Sum of Two hundred pounds to be paid on the completion and approval of the business. Provided that if the New Bell weighs more than the old one the extra metal to be paid for at Seven pounds per Cwt and if the old Bell exceed the new one in weight, the surplus metal to be allowed for by the said William Dobson at the price of Five pounds per Cwt.

The above is my Proposal

(Signed) Will Dobson

Downham
Aug 16 1828

Addressed

To The Revd George Gordon DD
Dean of Lincoln

It seems that the Cathedral authorities had been trying to assess Dobson's ability to recast Great Tom and Dobson had got to hear of this :

35

Downham November 19th 1828

Sir,

I have recently seen my friend the Revd J R Thackray (Rector of Downham) who not long since had a letter from the Chancellor making some enquiries about me in reference to my application to be employed in recasting the Great Tom; which induces me to suppose that the Dean and Chapter are on the point of coming to some decision.

I now write to request that you will do me the favour of giving me a few days notice of the time of their meeting that I may have an opportunity of attending and paying my personal respects to that honourable Body.

Hoping you will pardon my troubling you with this application.

I remain Sir,
Your very respectful Servant

(Signed) Will Dobson

Addressed to:

Edward Betham Esq.,
Surveyor to the
Dean and Chapter
Lincoln

Mr Betham replies as follows :

36

(Copy)

Lincoln Nov 20 1828

Sir,

Your letter dated the 19th Inst was received by me a few hours after the Revd The Chancellor of this Cathedral had left Lincoln and I have submitted the same to The Very Revd The Dean, now in residence, and when I receive any instructions requiring your attendance here you may rely upon my giving you as much notice as I can.

I am Sir
Your very obedient Sert

(Signed) Edwd Betham

Addressed to:

Mr Wm Dobson
Bell Founder
Downham Market
Norfolk

It seems that the Cathedral authorities may have contacted Dobson some six months later and that he had travelled to Lincoln as the rather peculiar letter which follows indicated. It is now apparent that Dobson had the ambition to cast the largest bell in England at that time :

37

Downham, Norfolk,

July 27th 1829

To the Very Revd Geo: Gordon D.D
Dean if Lincoln

Revd Sir

During the conversation I had the honor of holding with you on the 3rd Inst you seem'd to approve of the idea of augmenting the weight of the Great Bell but felt a difficulty in deciding upon the extent of such augmentation. As you entertain the design of placing the new Bell in the Central Tower, I beg leave to suggest that the Bell ought to be made to correspond with the splendor and magnificence of the Building (the Tower), which unquestionably is the finest in the whole kingdom. Altho' Humility is a great virtue, there is a possibility of carrying it too far and I think that the most fastidious would acquit you of presumption were you to introduce a Bell weighing something more that the mighty Tom of Oxford, which is computed to weigh 7 tons, 15 cwt.; a spirit of emulation is laudable and praiseworthy, and indeed to such a spirit is the grand and stately Cathedral of Lincoln indebted for its vast magnificence. I have often thought that the dignity of this great Empire was compromised by those who had the management of St Paul's; had my spirit presided, not even the Kremlin itself should have outdone me. The commanding situation of the Building is admirably calculated for the display of such a Bell, it would be heard many miles around (if St Paul's could be heard at Windsor, may we not presume that Tom's notes will reach the Turrets of Belvoir?) and the clock which was evidently too powerful for the old Bell, will, I am confident, be sufficiently so for a new one on the scale I have suggested.

The weight of the present Bell is computed by some to be 4 tons, 8cwts., and by others 4 tons 14 cwts, we may Adopt the intermediate weight, and call it 4 tons, 11 cwts., and the Ladies' Bells [sic] may probably weigh 2 tons, 16 cwt., together about 7 tons, 7 cwts. So that about 10 cwts of metal in addition will produce a Bell heavier than any other in the Kingdom. Herewith you have my offer for carrying the plan into effect, which I have made more with a view to the acquirement of Fame than fortune, and if I be honored with the execution of the business, no expense on my part shall be spared to render it perfect and compleat. In the event of your having the larger Bell, a new Frame and Hanging will be required which, under my superintendence and direction, might be furnished by your own Carpenter, I therefore have not included them in my proposals. Begging that when the question is brought forward, my humble pretensions may meet your favourable consideration.

I have the honour to remain,
Revd Sir Your very respectful,
and obedient Servant,

(Signed) Will Dobson

Proposals :

	£
William Dobson of Downham Norfolk Bellfounder will engage to break and take down the large bell (the Great Tom) also take down the peal of six Ladies Bells in the Cathedral Church of Lincoln, carry the same to the Foundry and recast them into a single Bell: to carry the New Bell to the Cathedral and draw it up unto the Centre Tower (a sufficent apperture in the Groin Arch being made at the expense of the Dean & Chapter) ready to be affixed to the Hangings, including the use of Ropes, pulleys and tackle, also to give proper instructions to the person or persons employed about the construction of the Frame and Hanging for the sum of	280
Additional Metal about 10 Cwt at 7£ per cwt	.70
	350

The sum of £200 to be paid on completion of the Business and the remainder within Twelve months

There is nothing more until March in the following year and it seems that Dobson must have made a further visit to Lincoln at about that time :

38

London March 10th 1830

To the Very Revd Geo Gordon DD
Dean of Lincoln

Revd Sir,

I caught so violent a cold on my way from Lincoln to Downham that I have been exceedingly ill ever since and until the present moment have been unable to apply myself to the subject of the Great Bell. On leaving you, I had some conversation with the Precentor about two bells for the Quarters, when that Gentleman suggested the plan of taking the four small Bells from the peal of Eight (which have been a long time useless) to recast into two Bells instead of purchasing New metal for that purpose, and wished me to make you acquainted with my proposals for so doing, which I shall now proceed to do, at the same time recapitulating my offer of the 27th of last July (in one of the Items of which you will find a difference from a trifling reduction in the price of metal) in order that the whole may appear at one view. I hope and trust that you will determine on having it done, on the Scale I have proposed, the magnificence of the Cathedral demands it, and I am confident that you will never regret the circumstance of your having acceeded to it. Hoping also that the order may be given sufficiently to admit of the completion of it previous to the Winter.

I have the honour to remain
Revd Sir
Your very obedient Servant

(Signed) Will Dobson

Proposals

	£
Recasting the Great Tom and the peal of Six (Ladies Bells) into a single Bell as particularized in my letter of the 27th July 1829	280
Additional Metal about 10 cwt at 6/10 per cwt	65
Recasting the four small Bells of the Peal of eight into two new Bells for the Quarter Chimes including taking down the old Bells and drawing up the new ones and all expense of Carriage	27
. £ s Additional metal 2 Cwt at 6/10	13
	£ 385

If Dobson's proposals had been accepted the Cathedral would have been left with a large bell and two quarter bells in the Central Tower and a ring of four in St Hugh's Tower! He seems to have been getting impatient as the next letter shows :

39

Downham
May 13th 1830

The Very Revd Dr Gordon
Dean of Lincoln

Revd Sir,

Although the subject of "Great Tom" so engrossed my mind as almost to supercede every other consideration, I find on looking over my letter which I had the honour of addressing to you on the 10th March last, that I omitted to state the mode of patment. I now write to say, that, I will leave that part of the business wholley to your own arrangement; assuring you that whatever you may propose will be satisfactory to me. My anxiety would be much relieved, if you would do me the favour of informing me, whether there is a probability of the business coming soon.

I have the honour to be
Revd Sir,
Your very devoted Servant

(Signed) Will Dobson

The Dean's reply is very much to the point :

40

Deanery
Lincoln
May 14th 1830

Sir,

From what you saw when you were here a few months ago, I think you had been fully aware that the D&Chapter were in all respects quite undecided as to the steps they shd

pursue with regard to the Great bell. Since that time the subject has not been at all considered. And though I am at present alone here & can therefore only speak my own sentiments. I believe I may safely say that there is no probability whatever that anything will be done this year at least. I will take care that your letter which I have this moment received, shall be laid before the Chapter at the earliest opportunity & agreeably to your request have lost no time in answering it.

I am Sir
Yours etc.

(Signed) Geo Gordon

There is nothing more until the following February when a Mr Bishop submits a scheme for repairing the bell.

41

Saracens Head
Lincoln
Feb 14/31
Revd Sir,

I beg most respectfully to request your attention to a proposition I should take the liberty of submitting for your consideration respecting the great Bell of the Cathedral. My Business has afforded me, as I think, the full means of forming a correct opinion and I have no hesitation in asserting [my] firm conviction that the damage done or that it has sustained may at a small expence be so far obviated as to restore permanently the original Tone of the Bell within half a note at the most.

I propose to undertake the work on the following terms say, that I shall receive for it, if successfull the sum of Twenty pounds including labor of every assumption [?]. If unsuccessfull, I trust that the Sum of Five Pounds to pay for the whole of the time, labor employed will not be deem'd too much but should it, so confident am I of success, I will do it Gratis. You will allow in the present state of the Bell it cannot possibly do harm while it may, and I feel convinced will, restore the same to its original beauty.

Should this proposition be deemed necessary of notice and you will do me the honour to address to me as under I shall be happy to enter into any further explanation that may be desired.

I have the honour to be very respect[fully],
Sir,
Your mo. obed. Sert,

(Signed) Thos Bishop

Messrs Thos & Jas Upfill
Birmingham

To The Very Revd,
The Dean of Lincoln

Birmingham,
Mar 21/31

Revd Sir,

Your favor of 16th is duly to hand. In reply I beg most respectfully to state the taking out the piece of the Bell where the Crack is was a plan devised by me when at Lincoln immediately after the accident and have not fail'd to raise it each half year to some individual or other when there but finding no one attempted to repair it when I last was in Lincoln I took a Mr Barrow with me up to the Bell and pointed out to him the proper way to take the pieces out and for if it is not properly taken out it will as you observe have a harsh discordant sound. I took a file with me to the Bell [and] have pointed out to Barrow the proper way to take it out and on my return to his Shop made him Crack a small Bell in proportion as the Bell in Question is Crack'd when he was satisfied it was equaly as deep in proportion I made him crack it still deeper. It was his opinion that I could not restore it to its original Tone but I pledge myself in a 1/4 of an hour I did do so to half a note at which he expressed his surprise. Now with respect to the crack in the great Bell it is not crack'd into the thick part which gives me a still greater advantage. I have ascertained the start of the Crack and am well satisfied of success. So confident am I of Success if I do not restore it to its original beautifull Soft Tone I will not receive 1/- for mens time Tools etc which it will take - I want No Fire and the time it will occupy will be about 3 days.

With respect to Soldering that never will do independent of the risk by Fire. If Soldering would thoroughly repair bells, Bellfounders never would be at the expence of recasting them when they are so unfortunate as to have a trifling fault in Casting. But if a fault was in the mouth or margin of the Bell that might be cut out but the Bell would not be so eyable consequently not so saleable. In this case it would but slightly deface the Bell the piece being so small requisite to be took out - The Mr Barrow the person to whom I have aluded is one of the firm of Pool & Barrow whitesmiths of Lincoln. If, Revd Sir, you wd be kind enough to give him a audience with you I have no doubt he wd satisfy you of the propriety of trying my experiment.

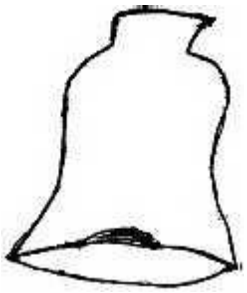
Trusting you will do me the favour of allowing me the Trial.

I remain Revd Sir,
Your most obdt Servt
For T & J Upfill

(Signed) Thos Bishop

NB. The manner in which I shall take the piece out will allow the Sound to run round the mouth of the Bell and restore its original Melody.

[Here Bishop appends the following drawing of a bell with a piece taken out of the lip]



To the Very Revd the Dean of Lincoln

43

Wells, Norfolk
May 18 1831

Revd Sir,

Your favor of 11th inst I have this day duly received through the medium of Messrs Thos & Jas Upfield Birmingham (whom I trust you will allow to have the [?] of repairing the great Bell when I have completed it as they are my employers) and in answer beg leave most respectfully to inform you I shall return to Birm[ingham] off this Journey within 3 weeks from this time when I will do myself the pleasure of coming over to Lincoln unless you may be pleased to allow me to defer it till the middle of July at which time I shall be in Lincoln on my regular Journey which will save me some expence. If, Revd Sir, it would not be troubling you too much should be obliged by your sending me a line saying which times you request & I will be punctual.

Your most obedt Servant,

(Signed) Thos Bishop

The Very Revd
The Dean of Lincoln

Although Mr Briant had warned the Dean and Chapter that any attempt to improve the tone of the bell by cutting out any part would fail this was ignored and Thomas Bishop was allowed to carry out his experiment. In June 1831 whilst attempting to trace the flaw Bishop broke off a large piece of the rim and a further piece was removed by Mr Poole.

Mr Betham recorded the pieces removed as follows :

44

An Account of the Metal taken off the Rim or Skirt of Tom o' Lincoln in June 1831, during the attempt of Mr Thos Bishop of Birmingham, and afterwards by Poole of Lincoln, to remedy the defect occasioned by the cracks, the first of which was discovered in Decemr 1827, which was extended and two additional ones made, by striking the Bell with the Clapper 4th March, 1828.

Marks upon the respective pieces	cwt	qrs	lbs
ABRICE*******RI	-	2	$13^{3}/_{4}$
CHARD	-	1	$7^{1}/_{2}$
S**********	-	1	$6^{1}/_{2}$
CLA	-	1	$1^{3}/_{4}$
TON*****ARCHIDIAC	-	3	5
CONVS	-	1	6
LINCOL	-	2	$3^{3}/_{4}$
N**********	-	1	$7^{1}/_{2}$
Total taken off under Mr Bishop's direction	3	1	$23^{1}/_{2}$

**********LAVRENTIVS		3	-	6
STANTON******DECANVS******	ROGERVS*			
***** PARKER		2	1	8
PRE		-	-	3
**********		-	2	8
These were separated from the bell in one piece and in attempting to break it into 2 parts, for convenience of removal, it became separated into 4 pieces as above		5	3	25
Without any Inscription		-	-	$6^1/_2$
Total taken off by Pool after Bishop left		6	-	$3^1/_2$
Taken off under Mr Bishop's directions				
8 pieces weighing		3	1	$23^1/_2$
" by Pool				
5 pieces		6	-	$3^1/_2$
Total taken off 13 pieces		9	1	27

all of which are deposited in the closet upon the Staircase which leads out of the upper NORTH Transept.

(Signed) Edwd Betham
June 17th 1831

Mr Betham attached the following letter addressed to the Dean :

45

Eastgate, Lincoln

June 18th 1831

My Lord,

In consequence of the additional quantity of metal taken from the Bell by Pool since I sent to your Lordship an account of that taken off under mr Bishop's directions, I have prepared, and send herewith, an Account of the whole quantity taken off, which will render my former Account useless.

I have the honour to remain,
My Lord,
Your Lordship's
Most obedient Servant

(Signed) Edwd Betham

The following letter is undated but would probably have been written on 15 June 1831 :

46

Saracen's Head Inn

Tuesday Morn

Revd Sir,

Accept my most sincere thanks for your Kindness.

When I asked yourself and his Lordship if I might have the smallest piece of those taken out of the Bell I did not perfectly understand the answer. Wd you, Revd Sir, please say thro bearer if I may take the small piece to which I alude part of which I will have refined to ascertain the different metals which information I will furnish you with.

Your most obliged & obdt Sert

(Signed) Thomas Bishop

NB I saw his Lordship on horseback leaving pro tempore Lincoln therefore could not see him

47

Birmingham

June 16, 1831

Revd Sir,

I beg leave once more to trouble you respecting Great Tom I have since I left Lincoln tried a further experiment with the Bell I before had tried on and find by taking the greater Part of the Skirting from it it does not materialy alter the tone therefore think it proper [..?..] to dictate to you that it would be advisable to let Poole & Barrow continue to drill until they get to the end of the break taking care to take it out greater to my former instruction - I wish Pool & Barrow to act for me with their time in takeing the piece or pieces out and when I come to Lincoln in July next will pay them.

I remain very Revd Sir,
Your much obliged obd Servt

(Signed) Thos Bishop

P.S. I really think good luck will attend me.

The edition of the "Lincoln, Rutland and Stamford Mercury" dated 17 June 1831 reported the attempt to repair "Great Tom" as follows :

48

There is reason to fear that Great Tom's restoration will be found impracticable, except by recasting. The drilling plan has been pursued with much ingenuity and perseverance by Poole and Barrow, under the directi o n of Mr Bishop, and 28 stone weight of metal has been taken out; but though the fissure seemed to have been eradicated, the tone was not restored. There was no improvement certainly perceptible as compared with the harsh shrieking sound emitted just be f o re the

bell was disused a few years ago, but it is all that can be said for the operation. The fine mellow musical Tom was no more; but in its stead, some hoarse gong, that seemed to :

"Set the city's teeth on edge,
"Proclaim the universal world ajar,
"And fright the isle from her propriety!"

Within the last day or two the workmen have discovered a remarkable interior flaw in the bell, communicating with the fissure and probably the original cause of its having occurred. This flaw or discolouration (owing to the metal's cooling too fast in casting) has at present the appearance of going quite round the bell, and Mr Poole is engaged in tracing its extent: it has, of course, existed ever since the casting in the time of King James I., and had it been detected must have caused the bell to have been condemned at once as a "waster" and the founder to have gone to work afresh.

THURSDAY – GREAT TOM IN RUINS! - The bell - the WHOLE bell - exists no longer. On Wednesday night, while the workmen were driving in a wedge in the progress of tracing the flaw above-mentioned, a large piece of the rim or skirt broke off, weighing 6 cwt., and about 8 feet long: the total weight broken off the bell is about 9 cwt. Tom, when entire, weighed 9894 lbs. The project of restoring the tone had been considered as abandoned before this last occurence.

Not surprisingly, James Harrison is anxious to recast great Tom and writes as follows :

49

Barton, August 8th 1831

Very Revd Sir,

Being informed that you have come to a determination to have Great Tom recast, I have taken the liberty to send you the Leeds Mercury of April 9th of the present year, in the first column of the first page of which, and third advertisement, some mention is made of the improvement I had effected in bells some years ago. And as I have since that period finally completed my analysis, wherein every dimension, whatever for bells of all sizes, and in whatever keys, and clearly defined, it is therefore a fact that I am now far betteer qualified to cast bells of the sweetest tones possible, and to adapt the proportions of their component parts so as to produce the utmost sound that a given weight of metal can yield: so that it is absolutely in my power to cast Great Tom somewhat larger in diameter than at present, and produce a most sweet and mellow sound, that will be heard to a much greater distance than the old bell was, and at the same time spare a ton of metal - And as I propose to cast it of a deeper tone that it was before, its sound will of course be more grand and noble.

I have a work now in the Press respecting bells which will be out in two or three weeks. It is intended to be handed to all the Philosophical Societies of Europe, and especially those of England, France and Russia, also to the most eminent Scientific men &c and I shall take the liberty to send you a copy, which I must request your acceptance of, as I doubt not but it will fully convince you of my attainments in bell casting &c.

Any communication from you respecting Great Tom will be received with much pleasure by

Very Revd Sir
Your most obedt Servt

(Signed) James Harrison

The advertisement mentioned by Harrison in the second sentence of the above letter reads as follows :

50

TO THE EDITORS OF THE LEEDS MERCURY

- GENTLEMEN - I have been informed, that the mention of those great improvements which I have effected in the proportions of church bells, inserted in your paper a few months ago, has given much umbrage to some who, because they understand the science of ringing changes on bells,would it seems, be thought also to understandwhat relates to their make and the proportions of their parts. Some of these, I aam told, sneeringly intimate that publication had better not have appeared. What! Ought not the public to be apprized of what all who are in want of bells are so greatly interested in knowing?

The opportunities of comparing bells are few. It is necessary to a just decision that the peals should be in the same key or nearly so, and the nearer to each other the better; - indeed the comparison must be infinitely more evident and decisive when the bells are within hearing of each other.

Methley bells were mentioned as being precisely in the same key as those at Leeds, and only a few miles distant. Methley tenor is 14 cwt 1 qr 2 lb, and that at Leeds 27 cwt, and as to which have the most rich and mellow tones, I believe those in the neighbourhood, who frequently hear the bells at both places, will decide in favour of Methley.

Laneham bells were also mentioned as being actually deeper toned than those at Gainsborough,(only ten distant) although little more than half the weight; and yet the former excel the latter both in mellowness of tone and distance to which they are heard. Laneham tenor is $10^{3}/_{4}$ cwt Gainsborough tenor is 20 cwt.

More instances might have been adduced, but the fact of a thing having been done, unquestionably evinces its possibility. I will, however, now add that the advantage of my improvements does still more incontestably appear by the bell I cast for Christ Church at Hull. Its key is the same as the largest bell in the Trinity Church, and the churches are scarcely more than a mile apart. Christ Church bell is heard farther than any bell in Hull, although it is pent up in a belfry with exceeding small south windows, and which are rendered still less by four clock dials, occupying the whole of their upper parts, so that only a part of the sound can possibly issue; whereas almost the whole of the four sides of the Trinity Church tower are windows, and the sounds of course are scarcely more obstructed than if the bells were hung in the open air. Christ Church bell is a little more than $10^{1}/_{2}$ cwt nett bell metal, while that at the Trinity Church is not less than 24 cwt.

It may be proper to note that none of these comparisons are made with bells that have been cast by mere country bell founders, but with those produced for the very great number and excellence of many of the bells there cast.

I may add that the investigation of the mathematical measures of every part of bells,forproducing the greatest flow of sound with minimum weights of metal and at the same time rendering all parts of the bells consonous, has been the principal work of my life, and has not been effected without great expense,and sometimes in the onset committing egregious blunders. For not only those proportions which afford the greatest sound with the least metal, but those precise dimensions of every part which cause a perfectconcurrence of the whole, have been heretoforesocompletely involved in obscurity, that the analysis hereof has been an almost herculean labour: - it is in fact an entirely new science,and it may be added [to] the other sciences of Europe on a suitable compensation being obtained.

JAMES HARRISON

Barton-upon-Humber,March 29th, 1831

P.S. It is worthy of remark, that whatever has hitherto been published respecting the proportions of bells, is not only generally fallacious, but in some instances is directly opposed to fact.

51

Downham

Sept 15th 1831

Revd Sir,

Understanding that a Chapter is now about to be held, I presume that it is probable the question of recasting the Great Bell will be determined on. Being too unwell at present to leave home, I am under the necessity of foregoing the honour of waiting upon you, which I trust you will excuse. I have forwarded fresh proposals, presenting at one view, without any refinement my former ones, the amount of expense with which the business will be attended. The lowness of my terms will not, I hope create a suspicion that the work will be executed in an inferior style, I believe you are aware of my ambition to be employed in so grand an undertaking, and to that feeling alone, the sacrifice I am willing to make, may be attributed. I saw the mutilated remains of Great Tom and the discoloured fracture, conveyed a useful hint as to the care required in removing the Mould from the bell, Tom was evidently taken from the pit prematurely which produced a partial cooling of the Metal, the extra caution which a knowledge of this circumstance must naturally produce, will be no mean advantage to the Founder who may be favoured with the Order. It unfortunately happens that all my Testimonials (except the enclosed, which I beg you will do me the favour of preserving) are in Lancashire, where I have some business in view, or I could furnish you with a much greater body of evidence in favour of the manner in which I have acquitted myself in various parts of the Kingdom in addition if you refer to the Revd Geo Oliver, Great Grimsby and General Johnson, Wytham on the Hill near Bourne, you will receive reports favourable to my reputation as a Founder.

I have the honour to remain
Revd Sir,
Your very obedient and respectful Servant

(Signed) Will Dobson

To the Very Revd Geo Gordon DD
Dean of Lincoln

I will engage to break and take down the large bell (the Great Tom) supposed to weigh 4 Tons 11 Cwt also take down the peal of Six (Ladies Bells) supposed to weigh 2 Tons 16 cwt in the Cathedral Church of Lincoln, co n vey the same to the Foundery and recast them into a single Bell to convey the New Bell to the Cathedral and draw it up into the Centre Tower, ready to be affixed to its Hangings, `` including the use of Ropes, pulleys, Tackle & c also to give instructions to the person or persons in the construction of the Frame & Hangings etc.	}	£ 200
Additional New Metal for the purpose of making the new Bell the largest in the Kingdom (the present largest being the Mighty Tom of Oxford weighing about 7 tons 15 Cwt) about 10 cwt at £ s d 5 12 -	}	56
	}	£256

The payment of the money to be left to the arrangement and convenience of the Dean and Chapter. If more agreeable to the Dean and Chapter, the Ladies' Bells may remain in the Tower until the delivery of the New Bell. The New Bell to be delivered at the Cathedral within Eight Months from the time of receiving the Order.

The above are my Proposals

(Signed) Will Dobson

52

Barton
October 1st 1831

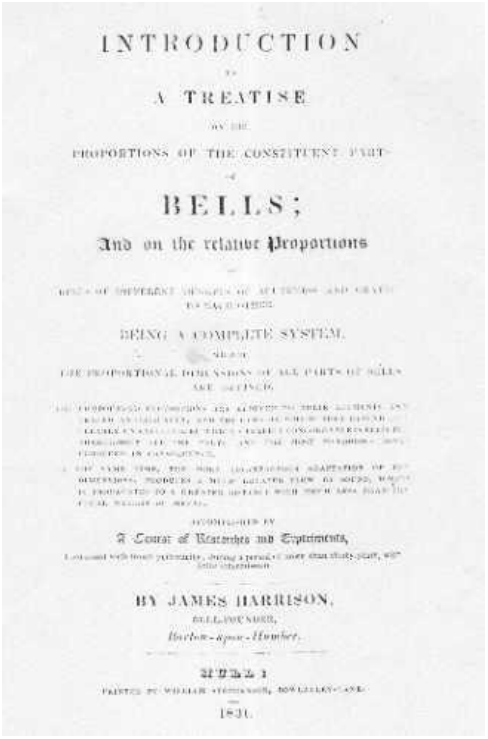
Revd Dean

I send herewith two copies of a publication respecting the proportions of bells, which I beg your acceptance of. Part of it is the same as the manuscript which I sometime since took the liberty to trouble you with; but to which I have made very considerable and very necessary additions. It is intended to be handed to all the Philosophical Societies of Europe and especially those of England, France and Russia, and also to the most eminent men. In consequence of Great Tom's misfortune, its perusal may possibly be not altogether uninteresting to you at some leisure hour. And certainly amongst the advantages of my improved method of casting bells, that of their being much less liable to be broken is deserving of attention. I shall be very happy to serve you in recasting Great Tom whenever you may come to a decision.

I am with great respect;
Revd Dean, your very obedt Servt

(Signed) James Harrison

The title page of the pamphlet mentioned by Harrison is reproduced below :



INTRODUCTION

TO

A TREATISE

ON THE

PROPORTIONS OF THE CONSTITUENT PARTS

OF

BELLS;

And on the relative Proportions

OF

BEING A COMPLETE SYSTEM,

BY WHICH

THE PROPORTIONAL DIMENSIONS OF ALL PARTS OF BELLS

ARE GIVEN,

ACCOMPANIED BY

A Course of Materials and Experiments,

BY JAMES HARRISON,

BELL-FOUNDER,

Barton-upon-Humber.

1831.

It seems that Mr Bishop had secured the piece of Great Tom he had requested for analysis :

53

Birmingham, Dec 8, 1831

Revd Sir,

Agreeable to my promise I have at last succeeded in getting a piece of the great Bell assay'd and feel a pleasure of informing you the component parts, it consists of 3 metals only, viz. copper, Tin and Silver.

The original quantity of each was to

1000 lbs. weight	700 lbs. Copper.
	299 lbs. Tin.
	. 1 lb Silver.
	1000

The trial of the piece gives the following answer to 1000 lbs.

	700 lbs. Copper.
	280 lbs. Tin.
	1 lb. Silver.
	. 19 lb loss Dirt
	1000

I remain Revd Sir,
Your obliged & obt. Servant,

(Signed) Thos Bishop

At last the Dean and Chapter undertook to have the bell recast and the Order to have this done was recorded in the "Order Book on Fabric Account" as follows :

54

1834 Jan 1st Ordered, with the consent and approbation of the Precentor & Chancellor that Mr Thomas Mears, Bell Founder of Whitechapel, London, be employed to recast the Great Bell &c &c and directed to send a Plan, Estimate, and Contract for the same.

(Signed) T Manners Sutton

This resulted in the following estimate from Thomas Mears :

55

March 27th 1834

Estimate by Mr Thos Mears for recasting Great Tom o'Lincoln and the six Lady Bells into one large and two Quarter Bells :

	Cwt
Weight of the present Tom supposed to be about	88
" " Six Lady Bells " " "	53
	141
Old Copper Balls, Weather Cock and Vane formerly upon the two leaden spires at the west end about	3
	144

	Cwt
A new Tom	100

	Cwt	
First Quarter Bell	14)	
Second Quarter Bell	30)	44
New Bells		144

Recasting the old metal at 37s 4d Per Cwt	£268 16 0
Carriage to & from London	40 0 0
Taking down & rehanging the new Bells with two new Stocks for the Quarter Bells	50 0 0
Mr Mears	£358 16 0
Contingent expenses in alterations that may be required to strengthen the Timbers under the Bells, and making the opening at the trap door a little larger to admit the large Bell and restoring the same &c	51 4 0
	410 0 0

Should there be more metal in the old Bells &c. than is above mentioned the addition will go into the new Bells.

If the carriage and getting down & up the present and the new Bells should cost less than is above stated, such reduction will be taken off.

To the Revd The Sub-dean &c. &c
Lincoln

56

Dear Sir,

I have since my return from Lincoln been much occupied in my mind respecting your great Tom and from the best conclusion I am able to state that if your Gentn. should desire a larger Bell than Oxford Tom I shall be enabled to accomplish the Casting of it. There will be of course the additional expence on the difference of metal and perhaps some little more for Carriage, and getting up in the Tower, but I wish not to have anything more than what is perfectly just. I should certainly be happy to make the Bell so as to give satisfaction to the very Revd the Dean & Chapter.

I am Dear Sir,
Yours very respectfully

(Signed) Thos Mears

Whitechapel
Bellfoundry
April 5 1834

The estimate was duly accepted and the next document is the agreement for casting the bell :

57

Memorandum June 6th 1834. The undersigned Thomas Mears of Whitechapel in the County of Middlesex, Bell Founder, hath this day agreed with the Right Worshipfull the Dean and Chapter of the Cathedral Church of Lincoln, as follows, that is to say,

First To break into pieces in the chamber where it now hangs the large Bell called "Great Tom o'Lincoln," so that the same may be safely and carefully conveyed through such openings as there now are in the several Floors through which the pieces will have to pass down to the Floor immediately over the stone groined ceiling, and from that Floor to be conveyed through the arched ap er ture in the south wall of the Tower to the Floor of the church.

Second To take down the six Bells now in the Rood or Broad Tower of the Cathedral, and if any of them are too large to pass through the present openings in the several Floors, then to break such, in the Bell Chamber, into parts sufficiently small to pass through such openings down to the floor of the church, and, the Dean and Chapter finding proper Planks to preserve the said Floor from injury, to remove the metal to the outside of the church.

Third To convey the said Metal, as also the part now in store, together with the old Copper, also in store, to the Bell Foundry at Whitechapel

Fourth To recast the above Metals, together with such additi o n al new metal as may be required, into three musical and proper tuneable Bells of the following dimensions and weights, at the least, that is to say, One large Bell to be called "Great

Tom o'Lincoln," of the diameter of six Feet and ten Inches at the mouth or skirt, measured from outer edge to outer edge; and of the thickness of five Inches and five eights of an Inch, or thereabouts, at the sound-bow, and in all other parts of such thickness, lengths and breadths, as the above mentioned diameter and thickness requires a full toned and properly proportioned Bell, of such size, to be: with proper Cannons and Crown Staple. The said Bell to be in the key of A, or as near thereto as a casting of such magnitude and weight can be expected to arrive at, such weight to be not less than five tons, and one quarter of a Ton.

One Quarter Bell to weigh not less than fourteen hundred weight, and of such dimensions as shall make its tone to be an octave above the large Bell.

One other Quarter Bell to w e i gh not less than thirty one hundred weight, and of such proportion as will produce a tone that will be in accordance with the large bell and the first Quarter Bell, so that the three Bells sound in the proportions of one, four, eight.

Fifth To recast the old Metals before mentioned at the price or sum of thirty seven shillings and four-pence per hundred weight; and to be allowed for such new metal as may be required after the rate of six pounds ten shillings and eight pence per hundred w e ight.

Sixth To convey the said Bells to Lincoln and into the bell chamber of the Broad Tower, and hang the same with proper Stocks and Gudgeons in the said bell Frame now there; and any alteration or strengthening of the said Frame, or of t he Floor upon which it rests, as also the securing of the Timbers of the Roof from which the Blocks and Tackles (to be provided by the said Thomas Mears) by which the Bells are to be drawn up from the Floor of the church, will be suspended; and the enlarging, if necessary, of the openings through which the said Bells will have to pass, to be done and executed at the expence of the said Dean and Chapter - The alterations, if any, required to the present clapper of the Great Bell to make it suitable to the new large Bell to be done by the said Thomas Mears - To attach a quarter wheel or some other suitable apparatus to the large Bell as will admit of its being tolled (not rung) when required.

The Dean and Chapter to provide such Planks as may be necessary to carry the wheels of the Truck or Carriage, upon which the large Bell will be conveyed from London, along the Floor of the church to prevent injury to the same.

The said Thomas Mears to be allowed the sum of ninety pounds for taking down the old Bells, conveying the same to the Foundry at Whitechapel, taking the new Bells to Lincoln, and hanging the same in the appointed place in the said Rood Tower, over and above the charge for recasting the old metals, and for the additional metal. But if the expenses attendant on such removal of the old metal and the new Bells should be less than the said sum of Ninety Pounds, then for such less sum as the same shall amount to.

To put on the Bells such Inscriptions as the Dean and Chapter may hereafter direct.

I do hereby agree to the several conditions of the preceding Memorandum of Agreement, and engage to have the new Bells at Lincoln on or before the 25th day of March next, and to proceed with the hanging thereof without delay if permitted to do so by the said Dean and Chapter, and also to insure the said Bells from any defects for one year from the date of the hanging of the same, if they be not improperly used, or

wilfully injured by any one during that period. Witness my hand, the said Sixth day of June, One thousand eight hundred and thirty four.

(Signed) Thomas Mears

Witness
Edwd Betham.

58

To the Right Worshipful the Dean
and Chapter of the Cathedral
Church of Lincoln

Revd Sirs,

In pursuance of your directions I have carefully examined the broad Tower of Your Cathedral with a view to ascertain its sufficiency to receive the large Bell for occassional tolling and for the Clock hammer to strike upon - The weight of the large bell being Five Tons or a little more and of the small bells together about two Tons - and I have no hesitation in stating my entire conviction that the Tower is of ample strength for the purpose.

I also beg to say that this opinion I consider to be reduced to a certainty from the fact that the Tower has hitherto borne with safety the vibration produced by the Peal at present hanging therein consisting of Six Bells whose total Weight is estimated at 53 Cwt; and which six Bells, being all hung one way and as I am informed have been frequently rung in the manner called firing or shooting, would undoubtedly produce a much greater strain upon the Walls of the Tower than double the weight of metal merely tolled –

The cracks which exist in many parts of the Tower are evidently of very long standing : and the precaution which was taken by Mr Betham of inserting a stone plug in the East side in the year 1824 and which was repeated in the following year on two other sidea of the Tower in order to ascertain if any alterations should take place therein, is upon the whole very satisfactory, in as much as they shew that the alterations in the Nine Years is very slight.

I nevertheless think it right to submit my opinion that the manner of framing the Timbers of the Roof of the Tower and of the bell Loft floor is very injudicious and has a tendency to thrust out the Walls - some of the timbers also are much decayed in the ends so as to have lost their hold upon the Walls.

I also think it very desirable for the permanent stability of the Tower that the masonry should be generally repaired and that the slight tendency which exists to a lateral pressure should be restrained by the application of Bands of iron or wood Ties and struts internally. This repair and strengthening is equally desirable and necessary whe t h er the great bell be placed in the Tower or not, and until it be applied I take leave to recommend that the stone plugs before mention'd, where now loose, have Wedges inserted, drawn moderately tight, and then they be occasionally examined (say once a Year at least). This will be the means of giving timely notice of any tendency to serious change; but of which from the length of time these defects have existed I do not entertain any apprehension.

With respect to getting up the Bell I am satisfied that the Timbers of the Roof are sufficiently strong for the purpose and that a Scaffolding be made with perfect safety to take out one or more of the stone Ribs of the groined Ceiling to admit the bell to be hoisted: and from a conversation I have had with the Masons on the subject I am satisfied they will accomplish it without difficulty or danger to the building

I have the honour to be
Revd Sir
Your most obed Servant

(Signed) Jas Savage

31 Essex Street, Strand
May 16th 1834

At long last, on 15th November 1834, the recasting of "Great Tom" took place and this was recorded by the foundry as follows :

59

Whitechapel Bellfoundry London

Saturday, November 15th 1834

The recasting of Great Tom o'Lincoln was effected this day: at 32 minutes after 10 o'clock A.M the opening of the aperture in the Furnace through which the metal was to pass into the mould was commenced, at 36 and 1/2 minutes the first appearance of the metal was exhibited and commenced running into the two channels which conveyed it to the mould, and in 16 minutes all that was required for the Bell had run out, and in 4 minutes more the whole of the surplus metal had run out into the reservoirs prepared for it. The metal was considered by all present who understood it, as in the most perfect state of fusion possible, and there is every prospect of the Bell proving to be a good one. N.B The date upon the Bell is March 25, 1835, by which day it is intended that it shall be in the Cathedral at Lincoln.

Joseph Swan, Surgeon 6 Tavistock Square
Thomas Winn, Alderman of Lincoln
James Schooling, 13 Artillery Place, Finsbury
Edwd Betham, Surveyor to the Dean & Chapter of Lincoln.
Chas Hildyard.
Chas Jepson Betham, of Xst's Hospital, London

Because of work which had to be done in the Central Tower before the bell could be hung, it was not, in fact, delivered to Lincoln until 13 April 1835.

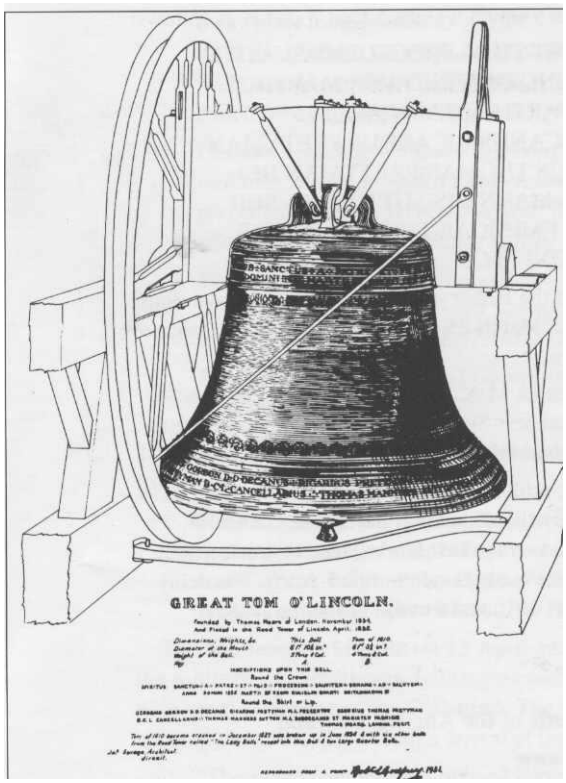
The inscription on the new "Great Tom", which weighs 5 tons 8 cwt is as follows :

SPIRITUS SANCTUS A PATRE ET FILIO PROCEDENS SUAVITER SONANS AD SALUTEM / ANNO DOMINI 1835 MARTII 25 REGNI GULIEMI QUARTI BRITANNIARUM 5

GEORGIUS GORDON DD DECANUS RICARDUS PRETYMAN MA PRECENTOR GEORGIUS THOMAS PRETYMAN BCL CANCELLARIUS THOMAS MANNERS SUTTON MA SUB DECANUS ET MAGISTER FABRICÆ THOMAS MEARS LONDINI FECIT

Diameter: 82 $^{1}/_{4}$ in Weight : 5 tons 8 cwt Note : A

For the full history of Great Tom see Ketteringham, J. R.
Lincoln Cathedral : A History of the Bells, Bellringers and Bellringing (2000)



An 1834 engraving of 'Great Tom'

CHAPTER THREE

...ALAS! POOR TOM

By Ray Ayres

John Ketteringham has kindly invited me to add a technical appraisal of the various proposals for the repair of Great Tom mentioned in the "Lincoln Letters". This I am delighted to do

The Great Tom episode is an important chapter in the saga of British bellfounding and while this historical correspondence has often been quoted in part, notably in a well-known biography of John Briant, the recent publication in Ringing World is the first time it has appeared in its entirety.

REVERED TOM

Great Tom was originally cast in 1610, during the reign of James I, by Henry Oldfield, the Nottingham founder, and at the time and for many years afterwards remained the largest bell in the country. Even after the casting of the heavier Great Tom of Oxford, Lincoln's Tom was still generally acknowledged as being much the superior bell. The fact that during Christmas 1827 Tom \vas found to have cracked, with the loss of those sombre resonant tones from whence he got his name was a national tragedy which might be likened to the failure of Big Ben today - and thereby hangs a tale.

As with any mishap affecting a much venerated national treasure, the first reaction is subconscious disbelief followed by a desire to discover some rational reason as to why such a thing could occur. Any suggestion, no matter how implausible, that seems to offer some faint glimmer of hope for minimising the damage and preserving as much as possible of what is left is likely to be given a sympathetic hearing. In this light we can very much appreciate the pressures and responsibilities facing Edward Betham, surveyor and clerk to the Cathedral, and it is much to his credit that he consistently adopted a very rational approach to often very conflicting advice.

Bellfounding at this period was at a low ebb. The Church of England itself was going through a difficult period and much of the 18th century boom in founding caused by the rise in popularity and general acceptance of English change-ringing was substantially over. Many of the old foundries, including Rudall of Gloucester, were going out of business. Eayre's foundry at St. Neots was finished as was its successor run by Edward Arnold at Leicester. Robert Taylor had moved with his sons to Oxford to concentrate on clocks and chimes. Other than Thomas Mears in London, then gaining a monopoly by buying up the goodwill of most of these old businesses, only John Briant - "a man in the Arnold tradition"- who had learned his craft at St. Neots, had first hand practical experience gained in the hey-day of 18th century founding. William Dobson, while struggling to maintain the Downham Market foundry started by his grandfather Thomas Osborne - who had been Joseph Eayre's foreman, could claim some technological descent, but Briant, still active as a clockmaker at over eighty and having sold his founding interest to Mears, might be relied upon for relatively impartial advice. Edward Betham therefore made a prudent start by consulting Briant.

Briant's views that the crack was unlikely to be caused by any unintentional pressure on the bell while the clock was striking and that continued use, even with a hammer of reduced weight, might extend the fracture were both reasonable. However, it was not so easy to advise on an alternative method of setting the clock striking. Lincoln Cathedral at the time had two rings of bells. The ring of eight in St. Hugh's tower, which was opposite Tom's tower, already struck the quarters on the 4th and 7th bells and therefore the clock linkage could be run to the

tenor to provide only a marginally less objectionable solution to setting the hammerwork up on 2, 5 and 8 which was the only other possibility considering the treble was also cracked. The other ring in the central tower, of which the back four were cast in 1593, being much lighter were consequently known as the Ladies' bells and in any case were a six only. Briant thought Tom's tone had deteriorated over the twenty or so years since he had first heard it and therefore suspected that the crack had been propagating for some time. He surmised that the clock hammer might have been set up to strike the bell at a tangent too far above the sound-bow and presumed the resultant crack to have extended down to the lip.

Betham, in deference to Briant, assumed that he meant the old position of the hammer since the bell had been half turned on its headstock fifty years before. The records for 4th. December 1778 in fact showed that the bell was also given a new clapper for tolling at this time, which far from weighing a fantastic half a ton or more as many thought, only weighed 2 cwts 11 lbs. or a very reasonable 1/40th of the weight of the bell, also the clock hammer itself weighed 104 lbs but only exerted about 44 lbs. drop on the bell, due to the counter balance effect of the linkage, and again this was by no means excessive. The important point, however, which was noted by the astute Betham, was that the crack had occurred on the OPPOSITE SIDE Of THE BELL TO THE PRESENT POSITION Of THE HAMMER.

RECONSTRUCTING TOM

The question now is how big was Great Tom? There were various opinions and none of them less than 95 cwt. Briant's notes showed that the diameter was 6ft 3ins. Now the starting point for most founders is that a 2 ton bell is 5 feet in diameter and strikes middle C. Great Tom therefore weighed 40 multiplied by the cube of ($75^1/_2$//60) or about 80 cwt. Without canons and if we allow an extra 7% or 6 cwt. for the canons we get 86 cwt. which compares very closely to Briant's own estimate of no more than 88 cwt. The height of this bell would have been about 5 feet and the outer curvature of the soundbow about 1 foot radius. The clock hammer, would strike at about 45 degrees or therefore around $8^1/_2$ins. above the lip. Briant's notes give the impression that the crack extended at least 7 ins. up from the lip while the newspaper reports mention a foot, which allowing both for professional caution on the one hand and journalistic licence on the other, $8^1/_2$ or 9 ins. seems a reasonable estimate and implies a position at or just above the thickest part of the soundbow which on the 1/14th scale of thickness would be about $5^1/_2$ ins. thick at this point. As for Tom's voice the note it struck was 523.24Hz x $60/75^1/_2$ or about 415Hz which corresponds to Ab relative to modern standard pitch of A = 440 Hz. By the pitch standards of the time (Old Concert Pitch A=428.5Hz and Handel's fork, to which standard many organs were still tuned, was A = 427cls), however, Tom would have been reckoned to be slightly flat of A. Tom was therefore virtually identical to the Loughborough Carillon Bourdon which at Ab, standard pitch, is 76 ins. in diameter, weighs 82 cwts. and incidentally took Taylor's two goes at casting even in 1923.

The limitation in founding is not so much the size of the bell as the proven capacity of the furnace. Briant as a practical founder was very sensitive to this point. He had a lot of experience building furnaces both for himself and others, and but for his age would have been willing to build one to recast Tom. He pointed out that construction alone would cost £60. Furthermore, it was upwards of a century since a bell of this size had been cast and Great Tom of Oxford (at 140 cwts -15 qrs) had taken three castings with a new furnace and still turned out to be one of the worst of the great bells of England whereas (the original) St. Paul's great bell cast in 1709 was a success from the start. Briant was therefore strongly of the opinion that Mr. Mears' furnace in London was the only one with the proven capacity and estimated the recasting would cost about £200, which was subsequently borne out by Mears' own initial estimate (4th. February 1828).

WELDERS AND CHISELLERS

Although Briant was of the opinion that once a bell was cracked there was no solution other than to recast it, Edward Betham was not going to make any decisions until he had explored all avenues. There were plenty of would be repairers and advisors, many delightfully vague, but those that supplied at least an element of technical description seem to fall into two main categories. The welders and chisellers.

Gas welding or braising was very much the latest technology Although Sir. J. H. Thorold of Syston Park came up with an old Italian bellfounding text that advocated something of this nature, Mr. Charles Vellom, introduced by the Rev. J. S. Blundell of Crowland Abbey, gives the best thought out approach. and obviously intended to lower the bell, if he could, and use a hydrogen and gas blow-pipe and a coke or charcoal stove. He was sensible to the risk of fire and mentions the precautionary provision of water on site. It seems however that he had mistaken the size of the bell since his comment that a 36 lb. clapper being about a thirtieth the weight of the bell would be perfectly adequate implies that he thought the bell was nearer 9 cwt. than 90 cwt. The intended use of the charcoal stove is not described, but if the idea was to use it as some kind of annealing furnace in which the bell could be placed this begins to make some sense.

.

The oxy-hydrogen burner was based on the torch developed by Gurney. Sir Goldsworthy Gurney at this period just before the advent of railways was having a degree of success with his steam carriages which were remarkable primarily for their high-pressure water tube boilers which tested to 200 p.s.i. were normally worked at 120 p.s.i. and were technically superior to anything the locomotive engineers would do for the greater part of the century. His welding torch was a by-product of this technology and if used with an annealing furnace, could have worked for small bells. Of all the alternatives to recasting, William Dobson, writing from Downham, reckoned that this scheme was the most practical, although to attempt it on a casting the size of Great Tom would be folly. However, he did seem to have had some not dissimilar ideas which he intended to put before Sir Humphrey Davy and Professor Bland although nothing was to come of it.

Today of course welding of bells is a practical proposition although Dobson's caution on something the size of Tom would still apply -notwithstanding the impracticality of lowering the complete bell to the ground because of the stone vaulting beneath it. Mr. Betham, on balance, might have found himself in sympathy with Charles Dickens who observed (in 1843) that "snorting high pressure devices were comparable to living on the first floor of a powder mill and leaning over the landing balusters with a lighted candle".

Drilling out the extremities of cracks to stop propagation or filing back and dressing out completely are all old established techniques for prolonging the life of defective castings and are still used today. George Sanderson of Bennet Thorpe, Doncaster (19 January 1828) described the scheme best by advocating sawing or filing out of the crack to eliminate the jarring of the broken surfaces, which as John Potts of Disley, Stockport (14 January 1828) pointed out, would contribute to the poor tone, and then drill out the ends of the minor fissures to stop further propagation. Neither gentleman probably realised that the bell was $5^{1}/2$ ins. thick at the crack and that bell metal was considerable harder and more brittle than the cast iron on which such techniques were usually employed. Sanderson made an important additional point that if implemented could have given Tom new life and that was MOVE THE HAMMER TO STRIKE ON A NEW AREA. It is worth noting that, but for the sheer sizes involved Sanderson's cutting out of the cracks and stopping of the fissures carried out preparatory to Vellam's welding and annealing process and final rehanging of the bell with the hammer repositioned would at least have provided a theoretically sound technique for

restoration if not without its practical difficulties. Longer term, however, Tom may still have been doomed by important factors to become apparent in the next series of events.

TOM DEMISED

Thomas Bishop was employed by Thomas and James Upfill of Birmingham. Birmingham was a rapidly developing centre of metal manufacture burgeoning in the wake of Matthew Boulton's Soho Foundry and the technical developments of engineers like Watt and Murdoch. Mass manufacture in Birmingham of enamelled white dials for longcase clocks, for instance, had quickly replaced the more expensive locally made brass dialwort. Local clockmakers became more assemblers of standard components made in Birmingham which were sold thorough agents like Bishop to local ironmongers and whitesmiths suck as Poole and Barrow in Lincoln. Bishop (March 1831) keen to develop any aspect of the metalwork business was quick to point out the dangers of fire from welding or soldering and advocated sweeping back the lip of the bell in a curve to take all the cracked portion out, but sti11 let the "sound run round the be11" The sixth at Peterborough had had a piece cut out in this way which at least did not make the bell sound significantly worse among the rest of the ring. Although Briant had predicted that such a course of action would involve a great deal of trouble and expense and be eventually abortive, Edward Betham obviously thought it preferable to the risk of fire and worth a try since even if it failed it would at least force the issue of recasting.

Fundamentally Bishop had not realised either the extent of the cracking or the importance of the sound-bow to the tone of the bell. His proposals might serve for a minor crack at the lip, but not one extending right across the sound-bow itself. What he also did not realize, until a large piece dropped off when he started work, was that the crack continued to run round the nodal circle above the sound-bow. At this stage he returned to Birmingham leaving poor Poole and Barrow removing other sections to try to find the end of the crack. Eventually thirteen pieces broke off weighing $9^{1}/_{2}$ cwt. which could be pieced together to read the latinized inscription round the lip: ABRICE RI CHARD S CLATON ARCHDIACONVS, LINCOLN LAVRENTIVS STANTON DECAVS, ROGERVS PARKER PRE the whole adding up to 8 ft in length or over 1/3 of the circumference. Such a crack would have taken some time to develop and Briant's suspicion of a gradual deterioration in tone was no doubt correct. Tom's tone, however, was now irrepairably lost for ever and the bell only fit for removal from the to\ver by smashing up. What was important, however, was the noticeable discolouration of the metal along which the crack had propagated implying poor alloying and too quick cooling in the mould which indeed suggests an inability of the furnace to raise such an amount of metal to an adequate casting temperature. Bishop's analysis of the metal from the soundbow showed nearly 30% tin to 70% copper whether this is indicative of the whole bell is doubtful, because of the poor alloying, but certainly in the region of the sound-bow the bell was much too brittle. ESSENTIALLY TOM HAD TOO MUCH TIN.

PHOENIX TOM

William Dobson had been scathing of the inferior quality of the metal in bells 200 or 300 years old and had consistently proposed casting and hanging of a new bell complete for £200 before removal of the old one. After a visit in July 1829, however, he pointed out that assuming Tom contained about 4 tons 11 cwt of metal, based on an average of the various estimates, and with a further 2 tons 16 cwts. from the Ladies bells, only a further 10 cwt. of metal would be required to produce the heaviest bell in the Kingdom which at 7 tons 17 cwts. would be 2 cwts, heavier than Great Tom of Oxford. He also proposed to recast the front four bells which included the broken treble, of the ring in St. Hugh's tower to provide the two bells to strike the quarters and install all three new bells in the central tower all for £385. Dobson badly wanted to do the job seeing this as his chance to cast the finest bell in the country and once it was established that Tom was irreparably damaged, he revised his quotation down to

£256 (15th September 1831). It was a great shame this offer was not taken up. The resulting bell, had it been successful, would have been comparable to Manchester Town Hall hour bell or the Buckfast Abbey bourdon. Edward Betham may have been cautious because of Briant's warning about proven furnace capacity. Whatever the cause for reticence Dobson was tragically forced to sell-out to Mears in 1833 and finished his days in the poor house. Incidentally we owe much to Dobson who was the first to write down any details of his founding techniques.

In 1834 Mears was finally given the job of casting a new Tom essentially to Dobson's scheme even to the extent of considering casting a bell larger than Great Tom of Oxford. In the event both the new Tom and the two quarter bells were cast out of a weight of metal made up of the original bell and the six Ladies bells plus some additional scrap copper. The total cost was just under £359 for the foundry and a contingency of just over £51 for work to the timber and traps in the central tower. The new bell was to be 6 ft 10 ins. diameter, 5 $^{5}/_{8}$ ins. thick at the soundbow and to be as near as possible in the key of A (old standard). The new Great Tom started casting at 10.32 a.m. on 15th November 1834, the metal started to run at 10.36$^{1}/_{2}$, took 16 minutes to fill the mould and a further 4 minutes for the excess to be run into the reservoirs. The new bell including canons weighed 5 tons 8 cwt. and was finally hung in place on the 13th April 1835 barely two years before Queen Victoria came to the throne.

BEN (Son of) TOM

Big Ben in many ways epitomises Victorian achievement and both the Westminster clock and its giant bell owe much to Sir Edmund Beckett Denison, Lord Grimthorpe and so for that matter does modern bellfounding. Grimthorpe later recalled "when we began the Westminster Bell business in 1855, I found there was as good as nothing of a practical kind to be learnt from books, and what little there was contradictory and some of it evidently wrong. Warners confessed they did not know how to make such large bells of the proper notes, they had previously copied all their bells from existing ones. I doubt if there was a fairly good peal of bells cast since about 1830 or perhaps earlier. Briant of Hertford, was a celebrated maker of both clocks and bells early in this century. There are some nice peals of his. The best peal of five bells I ever heard, at Castle Camps in Cambridgeshire, was by Dobson who lived at Downham but failed and died in the Charter House".

Grimthorpe therefore started from scratch and found wide variations in size, thickness and weight which is born out in the Lincoln Letters with James Harrison advocating light bells for a given note such as a 10$^{3}/_{4}$ cwt. ring in F (Laneham, Gainsborough) which is just possible but very light. In the event Grimthorpe was to err on the heavy side with a 1/13th scale of thickness, but his method of construction of the profile was adopted by both Warner and Mears and subsequently adapted by Taylor to give their present accepted profile. As important, however, was the composition of the metal alloy. With the help of the Royal School of Mines, Grimthorpe carried out a whole series of analysis and experiments including analysing some of the metal Mears still .had from - of all bells - old Great Tom of Lincoln and so incredibly, on this was based the specification of the metal alloy for Big Ben.

The first Big Ben was set out by Grimthorpe at Warners Cripplegate Foundry, but cast at the Norton Furnaces near Stockton-on-Tees by Charles Borham. Warner's nephew William Warner, who being in partnership with a firm known as Warner, Lucas and Barret, had the necessary furnace capacity. Incidentally this was the first time the basket moulding technique was used and Warners filed the original patent on it. Pouring the metal took an hour and after a not uneventful journey to London by schooner the 16 ton monster was set up in New Palace Yard, Westminster for testing where throughout much of 1857 it rang for a quarter of an hour each week until finally it cracked! The four foot crack appeared OPPOSITE THE HAMMER where the two circular waves meet to generate the opposite

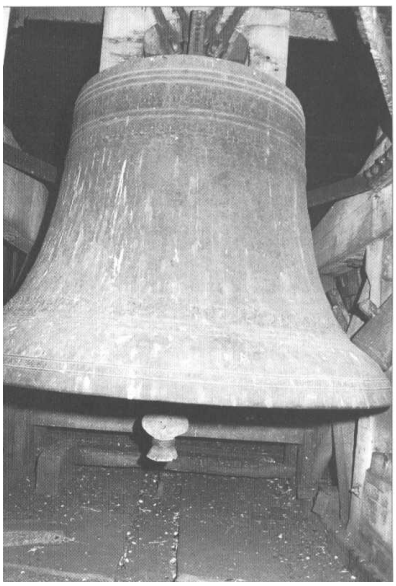
antinode. Various theories were put forward for the failure but whatever the cause Warners had had enough and now demanded too high a price for recasting. George Mears, however was prepared to undertake the task at Whitechapel. The bell section was reduced and the second Big Ben was cast on the 18th February 1859 and eventually set up in the tower and started striking on the 11th July 1859. By September, however, this second bell too cracked and once again OPPOSITE THE HAMMER! In 1862 the Astronomer Royal recommended a reduction in the weight of the hammer from $6^1/_2$ to 4 cwts., a platform to be placed underneath the bell in case any bits dropped off and the bell to be turned relative to the hammer so that the crack falls at a node rather than an antinode for the fundamental mode of vibration. So all $13^1/_2$ tons of Big Ben remains to this day. Alas! poor Great Tom might have survived the same way but for an earlier lack of understanding of sound wave generation.

TOM'S LEGACY

Lord Grimthorpe was very critical of Mears casting and made much of the fact that the second casting of Big Ben was undoubtedly porous in places. However, just as important was the alloy.

From his experimental results presented to the Royal Institution in 1857, Grimthorpe showed that the old founders generally used about 25% tin (3 to 1) or sometimes, as in Great Tom, a little more. This, however, was much too brittle to be safe. Current practice at the time used much less tin than this and for the Westminster Bells he specified 24%. (22 to 7). Subsequently, however, he rethought these proportions on the basis of 'chemical equivalents' to give more natural alloying properties and a true chemical combination of 6 atoms of copper to one of tin which taking into account the relative atomic weights gives 23.5% tin (13 to 4). Most founders, however, preferred as little as 22% ($3^1/_2$ to 1) as it made the metal much softer and easier for tuning. Grimthorpe himself, while admitting doubts over his original specification for the Westminster bells, was never prepared to go this far and finally advocated a lower limit of 23% tin.

The inevitable conclusion is. that both Big Bens and their venerable ancestor old Great Tom of Lincoln to which they owed much, all cracked the same way -OPPOSITE THE HAMMER -and all had too much tin. The two larger bells cast since, both by Taylors, the $14^3/_4$ ton Great George for Liverpool Cathedral and the present "largest bell in the British Empire" Great Paul for St. Paul's Cathedral at nearly $16^3/_4$ tons have all been more prudent in their tin content. This we owe to old Great Tom of Lincoln.



'Great Tom'

CHAPTER FOUR

AFTERMATH - THE QUARTER BELLS OF LINCOLN CATHEDRAL

In 1880 the Dean and Chapter of Lincoln Cathedral decided to replace the clock installed in 1775. At the same time, apparently as the result of pressure from the Cathedral Organist, Mr. John Young, it was agreed to augment the two quarter bells cast by Thomas Mears of Whitechapel,London in 1834 in order that the fashionable 'Cambridge Quarters' could be chimed. These were first installed at St Mary's Church, Cambridge in 1793 and the bells sound as follows :

First Quarter	:	1 2 3 4
Second Quarter	:	3 1 2 4 : 3 2 1 3
Third Quarter	:	1 3 2 4 : 4 2 1 3 : 1 2 3 4
Fourth Quarter	:	3 1 2 4 : 3 2 1 3 : 1 3 2 4 : 4 2 1 3

Details of the bells cast in 1834 were as follows:

	Diameter		Weight		
.	ft.	ins.	cwts	qrs	lbs.
1.	3	4	12	0	20 .
2.	4	3	23	3	14 .

Each bell was inscribed :

THOMAS MEARS OF LONDON FOUNDER 1835

Unfortunately no record exists of their notes.

The Revd Canon Hutton of Vicars Court, Lincoln contacted, on behalf of the Dean and Chapter, J J Raven the author of *The Bells in England* and W. Potts & Sons the clockmakers of Leeds. The former wrote on 15 March 1880 sending details of the 'Cambridge Quarters' and their history and Potts writes on 22 March 1880 as follows :

> ...on a peal of Eight the Quarters are struck on 2nd, 3rd, 4th and 7th bells...when there are only two quarter Bells as at your Cathedral the notes of the existing Bells have to be amended (we have ordered the Bell Founders to take particulars of these) where the two new bells are made to suit.

On 3 April 1880 the Chapter Acts record that:

> Nathaniel Clayton and Mrs Seely, the wife of the M.P for Lincoln, [had] each offered the gift of a bell for the improvement of the chiming of the quarters.

On 18 August the Bellfounders (John W Taylor & Co of Loughborough) sent details of the two new bells adding :

> We are very pleased to hear the bells are safely in the tower

However, Mr Young was not happy with the 'splice' and on 20 October 1880 Potts writes :

> We are sorry the opening of the clock will be delayed in consequence of the bells not being correct but the large qr bell has been found to be imperfect the decision you

have arrived at to have it recast and made [correct] will be most satisfactory to you. It would have been better if Taylor had drawn your attention to the Bell being wrong at the first when he came to examine them.

Taylors had written on 18 October 1880 ac knowledging an order to recast the largest of the existing quarter bells but after further deliberation the Dean and Chapter decided to have both existing bells recast the Dean commenting on 20 October 1880 :

> ...do you not think that the ne w team will imperiously demand a new Tom, and the new Tom a new bell tower?

In a letter dated 21 October 1880 Taylor's sent an estimate for recasting the two old bells but pointed out that they had tuned the two new bells to the existing "A" bell. The bells were duly cast but in a letter dated 9 December 1880 Taylors regret 'the mistake in the word ORATE the E can easily be cut off and TE engraved'. This refers to the inscription on the largest bell!

On 2 November 1880 Sir Edmund Beckett comments that Taylor knew of the flatness of the bells and that 'it was unneccessarily stupid of him to leave it so and, of course, he is liable for the expense caused thereby'.

In a letter dated 16 November 1880 Potts comments that Sir Edmund considered the Lincoln clock would surpass Westminster and Worcester but Mr Young was not at all happy with the new bells and on 18 December wrote to Revd Hutton as follows:

> In answer to your questions about the Chimes I am sorry to say that the Bells are not in tune with one another neither are they in tune with "Great Tom" nor is the tone at all satisfactory to my ear, the dominant note of each Bell not being powerful enough while the harmonics are too much so. This to a cultured ear is very disagreable indeed sometimes I have great difficulty in hearing the real note.

Young goes on to say that he does not agree with Sir Edmund regarding the qualities of 'Big Ben' and considers that the 'Chimes at Westminster Palace are not in tune...'

Next follows an interesting letter from the Dean dated 19 December 1880 addressed to Canon Hutton :

> I have had too much experience of the critic not to take his criticisms with several grains of salt; and I greatly applaud your cross-examnination. But last night I had unavoidable experience myself of the varied tones, having not got to sleep till near 4 am, and I am inclined to think that both the set & the velocity of the wind has some effect in altering the pitch of the notes (ie subjectively to the hearer). You will I daresay, often have remarked when an engine passes you whistling, that the note sharpens as it approaches you & flattens as it retreats from you. As the vibrations of the air must be affected unsympathetically by wind when the space within which much of the vibration takes place is broken by masses of stone, I am inclined to suspect that to the ear in any given place slightly different sounds are given from what would be given if the atmosphere were perfectly still & the space unbroken: so that sometimes a bell may sound a little too sharp & sometimes a little too flat. At times since the chimes began, I have fancied both of these errors: and although my hearing is of course hard, I do not think it is indiscriminating of harmony.

On 20 December 1880 Taylor writes:

> Mr. Young is expecting something that bells do not produce...When they were struck off everything appeared to give the greatest satisfaction. We cannot in the least understand Mr Young's reference to the bells...What Mr Young required we cannot possibly divine.

The following extracts from Potts letter which is also dated 20 December 1880 appear to result from a comment by Canon Hutton on the distance at which Great Tom and the Quarter bells could be heard:

> ...ding dongers are always heard a greater distance than any others ding dong will catch the ear more distinct than musical qrs with 5 hammers but you can have the hammers made heavier, any weight you dare risk the bells but, of course, we must not be answerable for any cracked or broken bells...

and on 21 December 1880 Potts reports that heavier hammers are to be fitted.

On 23 December 1880 Taylors write again:

> ...the Cathedral bells [are] causing us intense anxiety and disappointment...Never have we sent out bells more satisfactory to our selves...And even now they have stated nothing definitely, all that we can gather is that the whole lot is out of tune and of bad tone.

In a letter dated 1 January 1881 Potts comments that he had :

> had trouble several times...with him [Taylor], in fact, they was so bad at first our men said they would not do...he excels in dunning a character...and then sporting red coats in hunting 3 or 4 days weekly.

On 3 January 1881 Taylors comment:

> As regards the bells not being heard so far off that is a matter which will right itself. It is a well-known fact thatthe sound of bells carries further after use for a few months. We cannot say why but such is the case.

On 4 January 1881 Canon Hutton wrote to Taylors in quite strong terms to the effect that the bells were not satisfactory because they 'were not in tune with themselves or Great Tom'. He insists on Taylors 'sending a representative to hear for himself'.

On 5 January 1881 Taylor sends a rather apologetic letter undertaking to go to Lincoln to hear the bells and on 11 January 1881 the Dean writes :

> I cannot at all understand the problem of the quarter bells but feel pretty satisfied the truth lies somewhat in between the theories of Mr Young and Mr Taylor.

On 7 March 1881 the Dean wrote to Canon Hutton as follows:

> ...I suppose Young triumphs at the conclusion arrived at with regard to the chime bells. I do not gather from your note that anything has been done to improve them except hitting them somewhat h ar der (as the Govt. are doing with Ireland) & I shall be glad if the measure is succesful enough to produce acquiescence on the part of our minutely diminutive against. The slight flatness of Tom may symbolize the platitudinous distraction of old age in comparison with the sharpness of youth which

> is natural perhaps to bells as boys. I confess I do not feel courageous enough to attempt to reform Tom, which I suppose Taylor would suggest...

The Dean is, no doubt, refering to the decision of the Chapter to have the quarter bells flattened. The Chapter agreed that Canon Hutton's opinion of the bells alone was acceptable and that a second opinion was not needed. As a result on the same day Hutton wrote to the bellfounders instructing them to have the bells "flattened to the pitch of Tom's note". Not surprisingly Taylor reacts on 12 March 1881 by saying that he is most reluctant to do this and will only do the work if the Dean and Chapter 'take upon themselves the responsibility of spoiling the bells by flattening them...'.

No agreement seems possible and on 18 March 1881 the Dean and Chapter suggest that Dr Stainer Organist of St Paul's Cathedral be asked to pass judgment. Although Taylor agrees to this, he still considers that the matter could be settled locally.

In a letter dated 2 April 1881 Potts says he has :

> ...had a letter from Sir E Beckett yesterday and was not aware but you had given him an invitation for the Easter holidays...he cannot be idle, that is out of the question work he will have and money he has almost to any amount but more than he can ever spend, he is 65 now...he has got a pretty good stiff job to restore & complete St Albans Cathedral...

Apparently Sir Edmund was pleased with the clock and according to Potts considered that ''the quarters sounded very nice and the hours perfect'.

However, even after such an eminent favourable opinion, Mr Young is still not satisfied and on 30 May 1881 he writes to the long suffering Canon Hutton as follows :

> The Messrs Taylor came over on Saturday as arranged and I went with them into the cathedral bell Chamber and tested the Chimes. The result was they agreed with me that the A bell is too sharp it being out of tune with the other three bells and also with 'Tom".

On 5 June 1881 Mr Young writes 'Mr. Taylor Senr. came over on Tuesday and tuned the A bell and on the Wednesday I tested it with an A Fork and find it is in tune with it'.

At long last the correspondence ceases and the new quarter bells were to everyones satisfaction! It is fortunate that this correspondence has been poreserved in the Lincolnshiore Archives Office (LAO D&C CC/2/5/8. The letters are contained in a folder and are not paginated)..

The bells have sounded the quarters each day for 112 years and are still exactly as they were when first hung. I leave the reader or rather listener to decide on their merits!

Details of the new bells and 'Great Tom' on which the hours are sounded are as follows :

Treble

NOX NOCTI INDICAT SCIETIAM MARY SEELY ME FECIT FIERI ANNO DOMINI MDCCCLXXX

Diam. $35^{5}/_{8}$ in; weight 11 cwt 0 qr 10 lbs; note C sharp

Second

DIES DIEI ERUCTAT VERBUM NATHANIEL CLAYTON ME FECIT FIERI ANNO DOMINI MDCCCLXXX

Diam. $37^{15}/_{16}$ in; weight 12 cwt 3 qrs 14 lbs; note B

Third

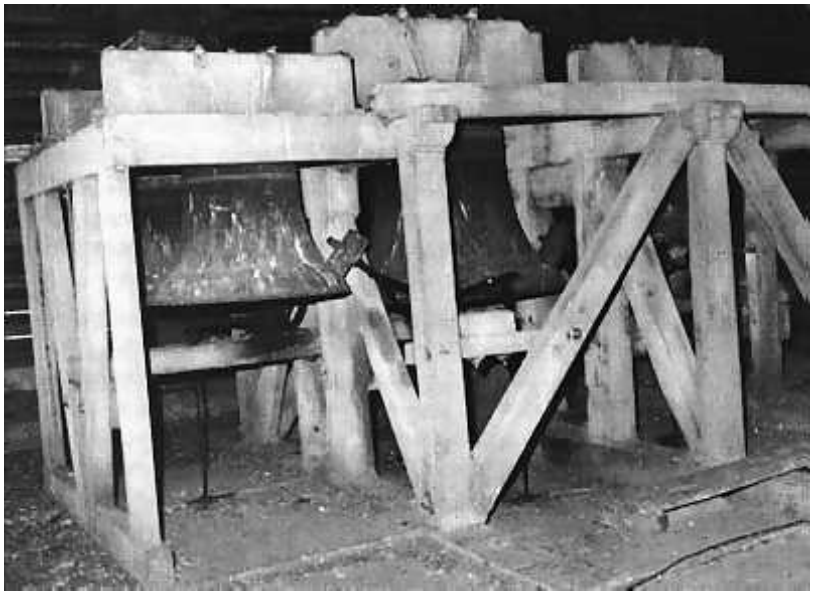
ME PROPRIO SUMTU DENUO CONFLARI FECIT NATHANIEL CLAYTON A S MDCCCLXXX VENIT HORA ET NUNC EST QUANDO MORTUI AUDIENT VOCEM FILII DEI

Diam. $39^{3}/_{8}$ in; weight 13 cwt 0 qr 14 lbs; note A

Fourth

ME VOCE FRACTA MALE CONCINENTEM PROPRIO SUMTU LIQUEFIERI ET DENUO CONFLARI VOLUIT AELFREDUS SHUTTLEWORTH A S MDCCCLXXX . VIGILATE ET ORATE NESCITIS ENIM QUANDO TEMPUS SIT

Diam. $45^{15}/_{16}$ in; weight 27 cwt 2 qrs 7 lbs; note E



The Quarter Bells

APPENDIX

SAMUEL PARR (1747-1825)

Dr Parr was born at Harrow-on-the-Hill on 26 January 1747 and was educated at Harrow School being top of the school in 1761. He went up to Emmanuel College, Cambridge in 1765 but was forced to leave after his father's death in 1766. He became an assistant master at Harrow in 1767 and was ordained deacon in 1769. He obtained the degree of MA in 1771 and in the same year set up his own school at Stanmore. The school was unsuccessful and in 1777 he became a master at Colchester Grammar School on the recommendation of Dr Johnson. He moved to Norwich Grammar School in 1779 and in 1781 he took the degree of LL.D. Dr Parr had been ordained priest whilst at Colchester and he was presented to the living of Asterby, Lincolnshire in 1780. In 1783 he was also presented to the perpetual curacy of Hatton, Warwickshire. In 1785 he settled at Hatton and taught private pupils but in 1789 he exchanged livings with the Rector of Wadenhoe, Northamptonshire.

Parr became very involved in political, matters and, in return for his support of the Whigs, had hopes of a Bishopric. He had a number of works published but, despite his very great learning, he was active in his parish and was responsible in 1809 for the recasting of the bells at Hatton into six and for adding two trebles in 1817.

He conducted massive correspondence with his friends and was known to many distinguished men particularly politicians. Parr's mannerisms and his verbosity made his writings very often difficult to follow - the letter reproduced above (22) being a good example.

The Rev H T Ellacombe in making the point that men of the highest talent and education have taken part in bell-ringing gives Dr Parr as an example :

> It is well known that the very learned Dr Parr was an enthusiastic admirer of the science of bellringing. His hard pedantry softened under its melody. He at one time conceived the idea of writing a treatise on Campanology. He had a peal of bells at his living at Hatton and was always drawing on the liberality of his friends for its improvement. He delighted to take his part steadily and fairly in the exercise of ringing peals both at Hatton and elsewhere.

The following extract from 'Lines on the Bells of St Peter Mancroft, Norwich' is also of interest :

'The celebrated Doctor Parr averr'd
That he more scientific ringing never heard
Than at S Peters; and quite well he knew
The art in theory and practice too'.

Much more could be said about this fascinating man.

JOHN BRIANT (Christened 8 June 1748 – died 27 February)

John Bryant, son of John and Catherine Bryant, was christened at St Martin's Church, Exning, Suffolk, on 8 June 1748. This spelling of the family surname is as given in the parish register and was as used by Bryant Senr., although John Jr always wrote it as Briant, both on his bells and in his voluminous correspondence. In order to distinguish between the two men, it is sensible to adopt the same procedure, referring to the father as Bryant and the son as Briant.

Bryant Senr. appears to have been a native of Exning, as there is a cluster of tombstones bearing that name in the churchyard His trade was clockmaking. Catherine Bryant's family

had connections with Hatfield, Herts., where they held copyhold property on the Hatfield estate of the Marquis of Salisbury. John Bryant was admitted tenant at the Manor Court on 23 Apri1 1756. This transfer implies that Catherine had died before that date. The departure of young John to school in Newmarket at much the same time may well have been as a consequence of her death.

John's father had large ideas for his son's future. He was to be thoroughly grounded in Classics, English and Mathematics, prior to entering a senior university and being ordained. He did, in fact, receive a very good education, as his surviving correspondence shows, but he himself had different ideas. He wanted to be a clockmaker, to work with tools. To that end, he became an apprentice clockmaker, almost certainly to Joseph Eayre at St. Neots, although there is no documentation to prove it, only circumstantial evidence. St. Neots was at that time one of the more progressive foundries in the country and there Briant learned not only clock and chime making, but bellfounding and general engineering in the company of men like Edward Arnold, Islip Edmonds and Thomas Osborn, all noted founders.

One outstanding characteristic of John was his ability to make, and retain, friendships. All the evidence shows that he was liked and respected by all who knew him. It was probably during his time at.St. Neots that he took bellringing and became a competent changeringer, like many of the leading founders of that penod.

In 1779, Bryant Senr. was living at Quickswood in the parish of Clothall, near Baldock, possibly in the capacity of clock keeper. John's first commission as a bellfounder was to cast a clock bell for this vast Elizabethan mansion, part of the Salisbury estates. In a classic case of family animus, the house was razed to the ground the following year, so the bell may never have been hung there, but was, with the ancient clock, transferred to a barn where both remain.

Father and son then moved to Hertford where they settled in another Salisbury property in Parliament Row, backing on to the east side of the castle. This was to be home, foundry and clock works for Briant until his retirement in 1825. The Job Centre now stands on the site. John Bryant died early in 1785. In his will, he left all his property to his son, as well as a bureau, his books, his chest of tools and three boxes with unknown contents. The Hatfield tenancy also passed to Briant on 1st April that year. He seems to have had little use for it so it was surrendered on 17th July 1788. This property still stands within the boundaries of the Hatfield estate.

At first, Briant's commissions were local; individual bells for Hertfordshire churches and some recasting for St. Andrew's Hertford, but his earliest major work was the recasting of the bells of St. Etheldreda's, Hatfield in 1786, still one of his finest rings. The Hertford foundry is known to have produced 441 bells (and there were probably more which have not been recorded, or have vanished without trace). At the same time, he built up a reputation for clocks; quarter clocks which struck the quarter hours on two bells (ting-tangs) and struck the hours on a third bell, and turret clocks which struck the hours onlyon a single bell. In this side of his business, he was ably assisted by James Skerman, a Hertford man and a ringer who took over on Briant's retirement. Under Skerman's son, William, and his successors, the business continued until the 1930s.

Hatfield bells were a major commission which took up much of 1786, so that wedding plans had to wait until the work was complete. The bells were dedicated on 5th June. Two days la ter on 7th June, Briant, aged thirty-eight, married Mary (Molly) Hanley at St. Andrew's Hertford. The bride was twenty-six, having been born in Hertford in 1760. The timing was rather close as their first child, Mary, was christened on 1st. September. This child seems to

have both healthy and intelligent, out living both parents and being a great help and comfort to her father in his old age.

A second daughter, Catherine, named after her dead grandmother, only lived for four months. Molly herself died aged thirty-three, on 22 November 1793. It seems to have been a happy and stable marriage, although short. Nine years later , at the age of fifty-four, Briant married again. His bride was Ann Fyson, aged twenty-four, christened at Exning on 28 October 1777. She may well have been the daughter of one Briant's old neighbours or old school fellows.

This marriage was tragically short. A son was born at some unknown date between February and June 1803, but no date of baptism has been found This child died in infancy, being buried on 5 March 1804. Two months later a daughter, another Catherine, was born, physically or mentally handicapped. Less than a year later, Ann herself died, being buried at St. Andrew's Hertford, on 3rd March 1805, aged twenty-seven. Mary kept house for her father and the pathetic baby was probably fostered. Years later , in his Will, Briant appointed two guardians, both Hertford tradesmen, to supervise her. Finally, Catherine made her home with Mary. The old rumour that both Briant's daughters died in extreme poverty in Hertford Workhouse is without foundation.

Mary Briant married Solomon George Shaw on 24th May 1810 at St. Andrew's Hertford Shaw was described as 'Stationer, Bookseller and Binder' a t Market Place, St. Albans. He was also a printer with branches in Hertford, Ware and Hitchin, and did Actuarial work as well as being an amateur historian who wrote a History of St. Albans. His link with the Briant family may have arisen because of the publication by Briant of a list of his bells in 1805 which Shaw almost certainly printed. The well-known list of clocks which Briant issued in about 1825 would also have been printed by Shaw. The manuscript additions to that list are not in Briant's own hand, but appear to have been written by his daughter. Either or both of the Shaws seem to have given clerical assistance to Briant as he became increasingly troubled by his sight in his old age.

As Briant's reputation grew as a good founder and an honest man, so did the area over which his bells are found. 'Clusters' of bells can be found in various counties, although Herts. does not conform to this pattern, the distribution being fairly constant over the north and east of the county. His early expansion was into North Oxfordshire in the late 1780s and early 1790s, with mid Bucks being mainly early 1800s. His connection with the Salisbury estate led to links with other members of the aristocracy , including the Hon. Mary Leigh of Stoneleigh, a noted benefactress in the West Midlands , for whom he supplied bells.

Another source of business came through his contacts with local bellhangers who were often, fellow bellringers, such as John Cabourn of Sutterton, which led in the case of Lincolnshire known bells being cast, on a subcontract basis, between 1793 and 1805. Other hangers for whom he subcontracted were John Waters of King's Sutton and John Over of Rugby. Benjamin Cort of Leicester, an iron-master, seems to have acted as an agent for Briant, probably on the recommendation of Edward Arnold When Briant retired in 1825, he recommended Thomas Mears of Whitechapel as a trustworthy successor. This was normal sound business practice.

In transport matters, Briant was very far-sighted. Hertford is on the Lea navigation and water transport was expanding. It was also probably cheaper and more reliable than roads. Churchwardens' accounts from Padbury, N. Bucks., are specific on wharfage charges at Box moor (Hemel Hempstead) and Buckingham. and most of the N. Bucks bells must have travelled that way. Likewise, his bells for Shropshire are known to have been sent via the Severn. Bells for Barnstaple went by sea. Had he lived longer, he would have been a rail enthusiast.

Being a ringer, one of the firs t things he did when he moved to Hertford was to join the local ringing society, the Hertford College Youths, who quickly elected him Steward. Some indication his ability is shown by the fact that he rang the tenor to 5280 Oxford Treble Major at St. Andrew's, Hertford in the first true peal on the bells. That peal-board survives. He also was elected to the Society of College youths of London and rang the tenor behind to a peal of Triples at St. Mary's, Battersea. These are the only peals in which he is certainly known to have rung, although there were possibly others. That he was interested in the theoretical side of ringing is proved by his name being among the subscribers to the 1788 Clavis Campanologia, along with all the other major bellfounders of the day.

He supplied a set of handbells to the Hertford College youths in 1821, although there is no evidence that he actually cast them himself. They may have been produced to his order by his old friend, Henry Symondson of London. They were almost certainly lost in the fire which destroyed old All Saints', Hertford in 1891. Another little-known sideline was casting small servants' bells for big houses. One of his daughter Catherine's appointed guardians was James Nunn, ironmonger of Hertford, one of whose specialities was supplying and possibly casting these domestic bells and who may have learned the technique from Briant. The two men appear to have been close friends.

By honesty and sheer hard work, his own and that of what must have been a sizeable workforce, he established a near-monopoly in Herts., almost totally excluding his friend and rival, Thomas Mears of Whitechapel between 1790 and 1825. Much of his time had to be spent travelling the country to meet churchwardens, inspect installations and give advice. Being a modest man, in the days when carriage-owning was a status symbol, he did not set up his own carriage, on the grounds that he did not want one. A horse would suffice for local journeys, but for further afield, he must have travelled post, or on the Stage, which however slow, gave him the opportunity to meet people, which he enjoyed.

His childhood links with Suffolk were undoubtedly the main factor in the contract to cast or recast the present treble at Gazeley, near Newmarket in 1808. Ten donors are listed in a three-line inscription which aspires to a rough rhyme. It could only have been concocted by a company well supplied with ale in a taproom in front of a roaring fire. The gales of laughter are not far below the surface! This is the only bell where Briant acknowledges his Suffolk origins JOHN BRIANT DE IXN1NG FECIT. Some of the names probably belonged to old schoolmates. One listed is Fyson; a relative of his luckless second wife Ann, no doubt.

Another way to rustle up business was to write to parish authorities, in effect touting for their custom. A classic example was at Burwell, Cambs.,where he had been 'inform'd' (in his own words) that possible bell work was being considered. Burwell is two miles from Exning, across the county boundary, so the tip must have either come from an Exning cousin or an old schoolmate. In fact, nothing was done at Burwell, but the letter survives in Cambridge Record Office.

There is no central collection of Briant's papers, although much correspondence survives in various record offices up and down the country, consisting of letters, bills, receipts, etc. Normal business letters, in fact. It shows that he was right-handed and that much was quickly written, but bold and legible. This legibility remained almost to the end of his life.

There have been many unkind things written about his later years; that he was so poor that he had to be given shelter in an almshouse; that he died in extreme poverty largely because of his generosity to hard-up parishes etc. The truth is quite different. Nobody ever considered that physical infirmity may have been the deciding factor in his retirement in 1825. A careful examination of his later bells suggests that the main problem was failing eyesight. This is

clearly confirmed by the Lincoln Correspondence, where he admits to having an 'Amanuensis' – someone to write his letters. A further clue is where 'Mr Shaw sends his thanks' for hospitality in Lincoln. Solomon Shaw had obviously accompanied his father-in-law on that visit, possibly to keep an eye on him.

In 1825 Briant sold out the bellfounding side of his business to Thomas Mears of Whitechapel. How much money he received is not known, as the Whitechapel records were lost by fire in 1837. There was more than enough to buy the lease of a very small plot of land at Datchworth, Herts., probably to provide a steady income for his handicapped daughter Catherine. There were minor legal problems which had to be resolved and the old man won a rebate. He showed a very sharp business sense throughout. He was no fool.

At some unknown date, about 1827, he moved into a four-roomed 'flat' in the Marlborough Almshouses in Hatfield Road, St Albans. It was possible to buy one's way into sheltered accommodation at that time and Shaw, a St Albans shopkeeper, was well-placed to hear of a vacancy. Briant did not, however, vegetate; some of his time was spent in Hertford where he and James Skerman were working on the new clock to be installed at King's College, Cambridge and the Lincoln letters state that he actually supervised its installation in 1828, his last major work.

The Lincoln Correspondence, dating from the last years of his long life is the finest example of his written style. It was a strange situation -an old man of nearly eighty, several years retired, being consulted by the Lincoln Cathedral authorities as to the best solution to the problem of their cracked Great Tom. His sound reasoning, his technical knowledge are still clearly apparent.

It says much for his reputation that, when the Dean and Chapter of Lincoln became seriously concerned about their bells, they should approach a man of his age for advice. The correspondence which has been reproduced in full above quoted in extenso by North and Stahlschmidt in Church Bells of Hertfordshire 1886 and also by Andrews in his life of Briant and it gives an insight into Briant's character and his amazingly lucid replies, as well as his use of English.

The cathedral authorities did not follow his advice; they tried to cut out a piece to stop the crack spreading, with the result that Thomas Mears had to recast it in 1835, proving Briant to have been correct all along. Briant had even designed a special set of pulleys for lifting the bell, a result of his excellent mechanical training in his youth. It was a strange situation; an old man living in an almshouse, needing a secretary to write his letters, yet still spry enough to supervise the installation of the King's College clock. This suggests that eyesight, rather than immobility, was the real problem. For delicate adjustments to the clock, good hearing and sensitive fingers were more important than sight. There could be no doubt whatsoever about his mental capacity. The letters are slightly discursive, but his meaning is abundantly plain. Moreover, his poor Amanuensis, either Solomon or Mary, got the blame for the mistakes!

Briant's last year appears to have been spent quietly in St Albans as little more is heard of him, except that the churchwardens of Shillington, Beds placed an order with him for the recasting of their Sanctus bell. The order was completed by Thomas Mears, the bill being submitted by Mary Shaw, Briant's executrix. There was also some correspondence over the Datchworth lease in October 1828, but nothing else. He was comfortably off, lacked no material comforts and Mary was near enough to keep an eye on her father.

Towards the end of February 1829, his health gave cause for serious concern. On the 26th, he dictated his will, in the presence of two surgeons and a woman who may have been a nurse at

the almshouse. Had he been suffering from the effects of old age, a physician would have been called in, but the presence of two surgeons suggests that there had been a sudden crisis such as a bad fall, requiring a surgeon who then called in a second opinion.

His will is simple and lucid and may have been drawn up by a lawyer, or by Solomon Shaw who had some legal knowledge. Even at the end, he was still concerned about his handicapped daughter, Catherine.

> I hereby constitute and appoint my daughter Mary Shaw my Executrix to discharge my just debts and I bequeath the whole of my property of whatever nature it may consist as follows Namely two thirds to my said daughter Mary Shaw and the remaining one third to my daughter Catherine Briant and I hereby appoint George Jackson Upholsterer and James Nunn Ironmonger both of Hertford the guardians of my daughter Catherine
>
> Briant and desire my Executrix to pay to each of them Twenty pounds as follows : Namely Ten Pounds each at the end of the first year after my decease and the other Ten pounds each at the termination of the second year if they shall have executed their Guardianship satisfactorily to my daughter Mary Shaw
>
> In witness thereof I have unto fixed my hand and seal
>
> his
> John >< Briant
> mark
>
> Dated at Saint Albans on the Twenty sixth day of ffebruary 1829 and signed in the presence of
>
> Richard Webster Surgeon
> George Robertson Baillie Surgeon
> her
> Martha >< Denten
> mark

Probate was granted to Mary Shaw the Daughter of the said deceased the sole Executrix on 10 March 1829. The estate was valued at 'under three hundred pounds".

John Briant died on Friday 27th February, in his eighty-first year, deeply mourned not only by all who knew him but by most of Hertford as well. He was buried on 10th March, in the grave of his first wife, Molly and her mother in All Saints' churchyard The Hertford College Youths rang half-muffled and his old friend Henry Symondson placed one gross of iron screws in his coffin, as Briant had requested.

The original stone still stands, but has long been illegible. A new stone laid horizontally at the foot of the original was dedicated on 13th May 2000. A bronze plaque was dedicated on the centenary of his death at a memorial service and is in the church, facing the font .

Source : This an abbreviated version of the biography by Joyce Dodds contained in *Hertfordshire Bellfounders* (2003) pp 163-206

James HARRISON I (*circa* 1704 – 1766)

James Harrison I is mainly known for bell hanging and for the manufacture of bellframes. He gained a considerable reputation for the quality of his bellframes and this is confirmed by the commission given him in 1733 to construct a new frame and rehang the twelve bells of York Minster. Unfortunately the bells were in fact not a good ring and they were scrapped in 1760 and a new ten was installed in a new frame by the London bell founders. However, his reputation as a bellhanger was assured and he installed many frames in Yorkshire and Lincolnshire. Much of his early bellhanging was of bells cast by Daniel Hedderly. He also worked in conjunction with Edward Sellers I and II of York and the London bell founders.

Unfortunately few of his bellframes now survive but from the evidence of those remaining he was an excellent craftsman. In about 1762 James Harrison I extended his business to include bell founding at Barrow-on-Humber. This may well have been due to the retirement of Daniel Hedderly, with whom Harrison had worked closely. Hedderly cast his last bell in 1759 when aged 80. James Harrison's son, Henry II who was at that time working with him. may also have influenced the decision to enter into bell founding.

In about 1762 James Harrison I set up a second bell foundry at Preston and this operated until his death in 1766.

For a much more complete biography of James Harrison I see Ketteringham, J. R. *Lincolnshire Bells and Bellfounders* (2000).

James HARRISON II (1767 – 1835)

James Harrison II was born in 1767 and, on 2 June 1791 he married Jane Marshall in Hull. They had one child who was also named James (III). James II moved the foundry to Barton and he achieved a considerable reputation not least as an eccentric. Although the greater part of his time was taken up with the casting and tuning of bells, as will be discussed below, he was also concerned with problems in clock making.

He spent much time on his calculations before casting a bell and if he was not entirely satisfied with the result he would immediately recast the bell. It is said that his calculations were made in a bed which he had within his foundry where he would remain for several days. His bells were cast in a cellar in the middle of the night so that no sound would affect the setting of the metal! Perhaps the fact that a bell for Normanby le Wold was cast on 21 December 1827, the shortest day of the year, was another example of his eccentricity!

Harrison had a particular theory that bells had in them much more metal than was necessary and that their tone would be improved if less metal was used. The result was that his bells were very wide and thin and most of them are now considered far inferior to conventional bells.

Harrison lost no opportunity of publicising his theories as will be seen from the very long letters written by him in 1816, 1818 and in 1828 which are reproduced above.

In 1826 James Harrison II published a treatise on bells, which was revised and republished in 1831. The main part of the very long title reads as follows : 'An Introduction to a Treatise on the Proportions of the Constituent Parts of Bells…'

Although James Harrison II was clearly an innovator he was no businessman and on 19 June 1834 he was imprisoned in Hull for debt amounting to £5, and discharged on 25 July 1834. He died in Hull and was buried on 26 November 1834. The *Hull Packet* dated 28 November 1834 recorded Harrison's death as follows :

> ‘On Saturday evening in the 67th year of his age, at the house of his sister, in this town, Mr James Harrison, the well known bellfounder and turret clock maker, of Barton’.

It seems that the bellfoundry site at Barton was sold in October 1837.

For a much more complete biography of James Harrison II see Ketteringham, J. R. *Lincolnshire Bells and Bellfounders* (2000).

William Ludlum (1717 - 1788)

William Ludlum was born in Leicester in 1717. He was a mathematician having graduated BA in 1738, MA 1742 and BD in 1749 and he was elected a fellow of St John's College, Cambridge in 1744. Ludlum became Vicar of Norton by Galby in 1749 and was one of "three gentlemen skilled in Mechanics" appointed to report to the Board of Longitude in 1765 on the merits of John Harrison's chronometer. John Harrison was, of course, the brother of James Harrison I the bellfounder. In 1768 Ludlum accepted the living of Cuckfield, Suffolk but seems to have actually spent the rest of his life in Leicester and died there in 1788. He published several papers including "A short Account of Church Organs" in 1772; "Determination of the Latitude of Leicester " 1775 and various theological works.

William Dobson (*circa* 1779-1842)

Thomas Osborn was foreman for Joseph Eayre at the bellfoundry in St Neots and when Eayre died in 1772 his successor, Edward Arnold, appears to have taken Osborn into partnership. In about 1779 Osborn started casting bells on his own account at his home town, Downham Market in Norfolk.

At some time in the 1790s Osborn's grandson William Dobson joined him in the foundry. His name first appears on the ring of five bells cast for Crimplesham, Norfolk, in 1798. Dobson's name does not appear again on bells until 1803. From then until 1806 the joint names of Osborn and Dobson occur on bells cast at the Downham foundry. In 1806 Dobson succeeded his grandfather in the foundry, an advertisement to that. effect appearing in the *Bury and Norwich Post* of Wednesday 18th June 1806. Osborn died on 6th December 1806.

Another advertisement by Dobson appeared in the *Bury and Norwich Post* in July 1807. This lists "peals" of bells cast at the Downham foundry since 1779. Dobson states that the last 15 “peals” were cast under his own immediate direction. The earliest of these rings of bells was a ring of six cast for Walsoken, Norfolk in 1795 opened on 27 January 1796. However at that time Dobson was about 16 or so – he died on 11 July 1842 “in the 63rd year of his age. Thus while this claim is possible it seems rather more likely that Dobson was exaggerating for the purpose of drumming up business.

In 1808 Dobson cast a 29 cwt ring of eight bells for St John’s Peterborough. His greatest ring however was the 41 cwt ring of twelve bells for St Nicholas Liverpool in 1812/13 to replace the bells broken in the fall of the steeple on Sunday 11 February 1810 just before morning service. Dobson’s bells were opened on 4 June 1814 and on that occasion a silver cup valued at 20 guineas was presented by the churchwardens for the best performance while Dobson gave a set of handbells for the second best performance.

The tenor bell at Liverpool was not Dobson’s largest bell. The *Norfolk Chronicle and Norwich Gazette* for Saturday 15 November 1817 contains a report of the casting of five clock bells for the General Post Office in Dublin the largest of which weighed 43 cwt. Clearly Dobson had a good reputation which was probably due to the good tonal qualities of his bells which was well above average for the period. There is evidence that thought was

given to bell design in a manuscript dated 20 December 1800. This is now among the records of the Whitechapel bell Foundry.

Rings of bells cast by Dobson were supplied to most English counties and even as far afield as the West Indies. He clearly had a good reputation and he was well aware of the value of publicity. In 1819 he cast seven bells to add to the old tenor at Birstall, Yorkshire and the advertisement for the opening on 18 August in the *Leeds Mercury* included an up-dated list of rings of bells cast at the Downham foundry.

In 1832 Dobson sold the Downham foundry to the London founder Thomas Mears and he worked in a solicitor's office in London. He eventually became a brother of Charterhouse where he died in 1842.

Adapted from an article by Dr J. C. Eisel which was published in the *Ringing World* dated 31 January 1986.