An Account of Church Bells
with some notices of Wiltshire Bells and Bell-founders

BY

Rev. W. C. Lukis, M.A., F.S.A.

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AN ACCOUNT

OF

CHURCH BELLS.
AN ACCOUNT
OF
CHURCH BELLS;
WITH SOME NOTICES OF
WILTSHIRE BELLS AND BELL-FOUNDERS.
CONTAINING
A COPIOUS LIST OF FOUNDERS, A COMPARATIVE SCALE OF TENOR
BELLS, AND INSCRIPTIONS FROM NEARLY FIVE HUNDRED
PARISHES IN VARIOUS PARTS OF THE KINGDOM.

BY
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AND NATURAL HISTORY SOCIETY.

"The tower yet stands, and has its bells renown'd
For size magnificent and solemn sound;
Each has its motto."—Crabbe's Borough.

J. H. PARKER, LONDON AND OXFORD.
1857.
PREFACE.

The following account of Church Bells and Bell-founders was originally read at a General Meeting of the Wiltshire Archæological and Natural History Society, held in Salisbury in the year 1854, and appeared in the Society's Magazine. Since that time the writer has collected much additional information which he believes will be of interest and service to those who are engaged in the same study; and justifies him in publishing the paper in the present form. He has added many founders and foundries to his original list; and many more might be obtained from the Northern and Eastern Counties, whose bells are comparatively unknown to him. From this list a tolerable acquaintance may be made with the history of bells and their founders from the middle of the sixteenth century downwards; but much has yet to be learned respecting bells of an earlier date,—where, and by whom, they were cast. A careful examination of their shapes, inscriptions, forms of letters, ornaments, stops, and other devices, especially shields, which sometimes occur, will help to elucidate their history. Very few parish records of the fifteenth century remain to assist the investigation, and therefore the perseverance and ingenuity of campanologists must be exercised. As the following account has been drawn up almost exclusively
from bell-inscriptions, it will be readily admitted that
the same method applied to mediaeval bells will produce
a like and a better and more interesting result. Some
Plates (X. and XI.) are given, shewing shields and stops
on bells of that period.

The history of ancient Church Bells is connected with
a very important portion of English history; and it may
be worth while to inquire in what way the feelings and
prejudices of the people were manifested, if at all, with
regard to them at that eventful period.* The writer would
throw out a suggestion or two for campanologists to work
out in collecting bell-inscriptions. What is the general
colorature of the inscriptions on bells which have escaped
the spoliation of the sixteenth and seventeenth centuries,
in certain districts? e.g. Is there any assignable reason
for the following fact?—Out of one hundred and sixty-
eight mediaeval bells found in various parts of England,
no fewer than forty-five are in honour of the Blessed
Virgin; and it is remarkable that of this number twenty-
four are in Wiltshire out of fifty-seven bells of the period.
It is also curious that at Chilmark in Wiltshire, out of a
peal of four, two are "Ave Maria" bells. This is not
a singular instance of two bells in the same tower
bearing the same inscription, for at Westwood in the
same county two bells, cast by the same founder (whose
initials are h i) have "Sancte Tome ora pro nobis."
It would almost appear as if some mediaeval bell-
founders, like many of their successors in the craft,

* Are we to consider that cupidity rather than righteous zeal influenced
spoliators? for it is certain that, with very few exceptions, the heaviest bells
were taken away; and very few entire mediaeval peals have remained intact.
placed what inscriptions they chose on their bells, without reference to those already existing in the towers which they were supplying. It may be too that the founders of those times had their favourite epigraphs, as J. Wallis of Salisbury and others had at a subsequent period. These suggestions are offered to direct others in their campanological investigations.

It is certain that bells were sometimes cast in monasteries, and sometimes by clerics. A very ancient bell at Sealton in Yorkshire, (taken there in 1146, by order of Abbot Roger, from Byland Abbey,) was cast by John Archbishop of Graff, whose name appears on it as its founder. Sir William Corvehill (who died in 1546), "Priest of the service of our Lady" at Wenlock, Shropshire, was "a good bell-founder and maker of frames." But we want to know some particulars about them: we want to know their mode of casting and tuning bells; and unfortunately there is at present very little to help us. There is a painted window in York Minster which throws a little light on these matters. It contains several subjects connected with the art of bell-founding: one represents the act of casting; another either the tuning or the cleaning of a bell just cast, &c.

The subject of itinerant bell-founders, which has been briefly alluded to in these pages, deserves the especial attention of campanologists.

Some French inscriptions have been added by way of comparison.
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* This is erroneously marked XIV. on the Plate.
PLATE I.

[See Mercenius de Harmonicis, lib. iv.]

N.B.—The Sound-bow is the line of the thickest part, where the Clapper must strike.
ON CHURCH BELLS.

I do not propose to enter into the antiquity and history of Bells in general. This has been done already by several most able writers of our day; I refer particularly to the Reverends Alfred Gatty and H. T. Ellacombe. My object is to speak of Church Bells exclusively, as we find them, making some passing allusions to some of the uses to which they were applied in former times, as well as to those to which they are applied now.

Accordingly into the origin of church bells, whether they were adopted into the Christian church from heathen temples, or whether they are the legitimate offspring of the church herself, I will not now inquire.

And in the pursuit of this very interesting and fruitful subject I propose to consider the following divisions:—

1. Belfries; their condition, and the causes of their frequent dilapidation.
2. Bell-founders and foundries.
3. The composition of bell-metal.
4. Method of casting and tuning bells.
5. Bell hanging.
6. Expenses of bells in early and present times.
7. Ancient bells.
8. Epigraphs or legends.
10. Spoliation of bells in 16th century, and subsequently.
11. Comparative scale of tenor bells.

I have adopted this order, because, in investigating the subject of campanology, the belfry first presents itself to your eyes. You
ascend it, and the bells themselves then come under your consideration. But you will know very little about them, unless you have first become acquainted with their founders, and the several changes which were introduced by them in the form of the bells.

1. Belfries. Some persons apply this term to signify the whole tower; others limit its application to the part in which the bells are suspended; and others again to the room or space in which the ringers stand, which is either on the floor of the church, or in one of the stages of the tower. This is a matter of very little consequence; and I do not intend to speak of this part of the church further than just to remark by the way, that, as it was clearly erected for the purpose of carrying bells, it is a matter for our grave consideration how it comes to pass that so many of our village churches should have their towers in so dilapidated a condition. I have seen several in the course of my Wiltshire rambles which are in so dangerous a state that the bells are forbidden to be rung. There can be no doubt that this arises from two causes. In the first place, bells for which the towers were originally constructed were not subjected to the same revolutions and tossings as now. They were swung to and fro, it is true, as I shall explain presently, but very gently compared with the present wild somersaults of change-ringing, an art of comparatively recent date. Consequently, in constructing the towers, the architects of those days had not to take into their calculation the great vibration of the walls produced by the violent motion of the bells. In 1810 the spire of St. Nicholas's church, Liverpool, fell, as the people were assembling for service, and killed twenty-three persons. This catastrophe was partly caused by the vibration of the bells. Any one who has stood in the belfry of the lofty and beautiful tower of Magdalen College, Oxford, when a peal is ringing on its ten sweet-toned bells, knows the way in which a tower is made to sway. To a person of weak nerves it is perfectly alarming, and it is easy to understand how this kind of vibration must loosen the masonry and eventually endanger the building. The following is an extract from the ancient churchwardens' accounts of St. Thomas's, Salisbury. "At a vestry held 6 April 1640. Item, by reason of the danger with the tower is in by
ringing of the bells, since they were high hung, and in other respects, it is agreed that the bells shall bee hung lower at the same pitch they formerly were hung att, and the churchwardens are desired to do it accordingly."

In the second place, and this I take to be the principal cause of the evil, churchwardens have been sadly negligent. With a little oil and new ropes allowed now and then, they have imagined that their duty to the bells and to the parish has been faithfully done; whereas mischief of a three-fold nature has been growing and increasing,—mischief to the building, to the bells, and to the parishioners;—the one ending in its dilapidation and ruin; the second, in their utter destruction; and the third, to the prejudice of their pockets. In a tower in Wiltshire I found three out of six bells broken, as I firmly believe, from this cause; and several peals of bells are rendered nearly useless in consequence of the shaky state of the towers. As an instance of the way in which some, I may say many, churchwardens speak and act, I will mention, that I was warned by a parish clerk to be very careful where I stepped in the bell-loft, "for," said he, "the tower be main crazy." On asking the churchwarden for the key of the church, and mentioning the clerk's humane warning, he said, "Sir, I have known the tower these forty years, and he never was no better than he is now. He's quite safe. I'll tell'ee what, sir; one day the bishop come, and he said, 'Measter churchwarden, you've a very pretty church, and he's in very good order.' Another day, another gentleman come, I think they call'un a rural dean, and he said, 'Measter churchwarden, you've a pretty church, and he's sadly out of repair.'" When I returned the key I did not see the churchwarden, or I should have told him that in my humble opinion both the rural dean and the parish clerk were right; for I had seen very many churches and many belfries, but few in a worse condition.

And to illustrate the way in which these good easy parish officers will sometimes suffer the house of God to fall into decay, while I fear they expend what they rob Him of upon their own bodily comforts, I will tell you, that, in ascending a Wiltshire tower with careful step, I sank through the rotten floor of one of its stages,
and was preserved from a broken limb, if not an untimely end, by the joists, which happened to be less decayed.

Bells require very constant attention to keep them in proper ringing order. When you consider their enormous weight, the different parts of their gear, the iron and the wood of which it is composed, bolted and screwed together; the framework on which they hang, and which in revolving they violently shake and vibrate; and then reflect that the iron and the wood are both exposed to continual changes of atmosphere; and that, under one condition of atmosphere, when one of these materials expands, the other contracts, and that then the bells cannot oscillate so easily, you will form some idea of the care and attention they require to keep them in ringing order. Well, suppose screws to get loose, and to remain so during many successive generations of churchwardens, the iron straps to become corroded, thin, weak, and then to snap; the gudgeons to wear away unequally by the friction, and thereby to throw the bells out of the horizontal, you can imagine what the consequences must be. The bells revolve heavily, the frame-work shakes and creaks, and the ringers, who have no voice in the vestry, and no power over parish moneys, do what they can to remedy some of the evil, and the very thing they do only increases the mischief. They put wedges between the frame-work and the walls of the tower to stop the creaking; but the result of this is to set the walls shaking, and finally to destroy them. Or, if this does not immediately happen, the clappers of the bells get out of order, and, striking the sound-bow suddenly in a fresh place, cause them to crack instantly.

While upon the subject of Wiltshire bell-lofts, I cannot refrain from expressing another regret. I have been frequently much pained by observing the shameful state of filth and neglect of many of them. Generally speaking, the dark winding stone staircases (when they have any) leading to them are dirty, worn, and difficult to tread, and you have to cork-screw your way up with very careful step; and when you have secured your footing, and are beginning to congratulate yourself on having passed every obstacle, you suddenly come upon a huge heap of sticks, straw, feathers,
bits of cloth, and other rubbish, the patient and laborious work of indefatigable jackdaws. When the towers have no stone staircase, the bells have to be reached by a succession of crazy ladders, planted on equally crazy floors. How very shameful that any part of God's house should be so neglected! Why should towers be so desecrated? Are they not as much a portion of the church as any other part? Why should they be left to the sole occupation of unclean birds, and profane and irreverent ringers? Why, the very jackdaws, starlings, and owls used to stare at me, and linger among the bells before they took flight, wondering perhaps what kind of evil bird I was, and with what possible object I had intruded unbidden into the territory to which generations of parishioners had given them a prescriptive right.

We may, I think, attribute this state of things to two causes, first, to a want of interest in the art of bell-ringing; and secondly, to the difficulty which is experienced by the clergy in managing the generally most unruly set of men in the parish—the ringers. If gentlemen in a parish really loved to hear their bells,—

Those chimes that tell a thousand tales,
Sweet tales of olden times;
And ring a thousand memories,*

they would not long endure the abominations that so frequently exist. And if clergymen would only take the ringers in hand in the right way,—aye, and take a bell in hand with them if possible,—they would soon bring them into order, and convert them into respectable parishioners. I know of more than one instance where, in consequence of the sinful and disgraceful practices of the ringers the bells have been silenced by the clergyman, one only being allowed to be tolled for service. And one reason which has been given for the destruction of the magnificent peal of the Cathedral of Salisbury was the disgraceful scenes which used to occur in the belfry. It reminds me of Mr. Weller's story in the Pickwick Papers, of the man who cut his child's head off to cure it of squinting. It is one way of stopping an evil, but not one to be recommended or

* Coxe's Christian Ballads.
imitated. Surely there is another and a wiser remedy for such abuses. However, there has been a salutary reform effected of late years among another branch of church musicians, and we may hope to witness a reform in this respect also before long.

2. We come now to the second division of the subject—Bellfounders and foundries.

When you examine a church bell, you will generally observe that, besides a legend or some quaint epigraph upon it, there are also the initials or the name of the founder, and sometimes the town is added where the foundry was situated. The number of bell-founders' names on Wiltshire bells amounts to thirty-seven, besides a dozen instances where initials only are given. This appears a large number, but you must recollect that they range over a period of three hundred years at least. I have a list of upwards of 150 founders, which I have collected chiefly from inscriptions on bells, and of forty-seven foundries. I do not say that these thirty-seven or rather forty-nine founders had their foundries in Wiltshire, nevertheless this county has produced some of the most eminent men of this craft: I allude to Wallis, Danton, and the Purdues of Salisbury, in the 16th and 17th centuries; to the Corrs and Wellses of Aldbourne, in the 17th, 18th, and 19th centuries; and in the 18th century to Richard Phelps, of Whitechapel, London, a native of Avebury, who cast the great clock bell of St. Paul's cathedral, weighing nearly four tons. It will be, I believe, a new thing to the people of Salisbury to hear that a very large bell-foundry existed there for a considerable period. I have ascertained that it continued to supply Wiltshire and other counties with bells for a period ranging from A.D. 1480* to 1731, and yet it is a very remarkable circumstance that no tradition of its existence has been perpetuated in the city. I have searched, in vain, through published histories of Salisbury, and have

* It would appear that bell-founding was carried on in Sarum prior to the year 1499; for in the parish accounts of St. Mary's Devizes we find the following entry:

1499. It th [p]d for riding to Salisbury when the belman send for us . . . xvj. And from the accounts of the Clerk of the Works preserved in the Muniment Room of Salisbury Cathedral it is clear that in 1480 there was a bell-foundry here:

1480. Et in denaris solut. Thome Grey et John Brento pro carriag. nov. campan. de domo executor. usque le belfray . . . . . . . . . iijs. ivd.
been equally unsuccessful in my inquiries there among those gentlemen who have made its antiquities and history their study. Not one vestige remains of the foundry, nor a single record of its site has yet come under my notice. I have, however, been informed that the street called Culver street was also called Bell-founders' Street,* and it is just possible that it stood there.

That the foundry must have been large and its business extensive is evident from the very large proportion of bells in Wiltshire that came from it; and also from the fact that the heaviest bells in the country were cast there. It could not have been an insignificant foundry that produced such bells as the tenor of St. Edmund's church in Sarum, and the tenor of Great Bedwyn. The earliest founder in Wilts with whom I am acquainted was J. Wallis, of Salisbury, and his first bells are to be found at Little Bedwyn, Bishopstone, Figheldean, Netheravon, Chute, St. Martin's Salisbury, &c. There appears to have been an extraordinary demand for his bells; and he seems to have been a man of few words, but of great deeds. A man is known by his works, and a man's character and tone of mind may be known in some measure by his words. If we estimate him by his works he was a great man; and if we take his laconic epigraphs as an index of his heart, his was a trustful, thankful, religious character. "In the Lord do I trust;" "Give thanks to God;" "God be our guide;" "Give alms;" "In God is all my hope and trust;" "Praise God;" "Hope well;" "Serve God;" these are some of his short expressive epigraphs. Associates and assistants are greatly influenced by a master mind. Men's thoughts and characters are moulded on the pattern continually presented to them. Danton, who appears to have been originally associated with Wallis, but in what capacity does not appear, in carrying on the foundry, after the retirement or death of Wallis, seems to have imbibed his joyful, thankful spirit. "O

* In the Report of the Commissioners of Charities we find: "Salisbury—Thomas Bee's charity—By Deed Poll dated 29 Nov. 1624, Bartholomew Tooke and Wm. Marshall, in pursuance of the Will of Thomas Bee, conveyed one Messuage or Tenement, three Gardens, and two Orchards with the appurts. in Culver Street at* Bell-founders Street in New Sarum, upon the Trusts of his Will, &c."
be joyful in the Lord;"  "Praise God;"  "Love God;"  "O praise the Lord;" &c.

The bells which came from the hands of the Purdues may be classed among the finest and most beautiful that were founded at Salisbury. This city once possessed a magnificent peal, surpassed by few in the kingdom. Not to mention the unpardonable destruction of the belfry, an irreparable loss to the county and the lover of Christian art, Sarum has lost one of the finest peals that ever existed in England; and the fine-toned cathedral clock bell, which formed the sixth of that monster peal of eight, hourly, by day and by night, tolls the knell of the departed members of that once united and harmonious family. This peal must have equalled that of St. Saviour's, Southwark, the tenor of which weighs 52 cwt. The cathedral bell, cast in 1661; the tenor of St. Edmund's church, which is a larger bell, cast in 1656; the fifth of Great Bedwyn, which for liveliness and clearness of tone is not to be surpassed by any, cast in the same year, were all the handiwork of William Purdue. It is remarkable that the Purdues, following Wallis and Danton, did not, as a rule, place inscriptions of a religious character on their bells. The usual form of their inscriptions contains the churchwardens' names, and occasionally that of the clergyman. Out of seventy-four of their bells in Wilts, only four bear anything approaching to religious sentiment, viz. at Broadhinton; St. Mary Devizes, on two bells; and at Nunton. It may fairly be presumed that the historical period in which they lived was unfavourable for the public expression of honest and sincere religious feelings. There was at that time so much that was hollow and boastful in religion that men of piety and truth shrunk from publicity.

With the deaths of the Purdues end the really great works of this foundry. They had successors, but the giants of the art were no more, and with Clement, William and John Tosier closes the history of the Salisbury foundry, about the year 1731. Their bells are to be found in the immediate neighbourhood, at Nunton, Homington, Winterborne Dauntsey, Shrewton, Orcheston St. Mary, &c., but they are all of small dimensions. Clement Tosier, however, made one or two great efforts, for I have just discovered that in the year
1680* he, in conjunction with Elizabeth Fillowry (Flory or Flower) widow of R. Fillowry,† cast the seventh and eighth bells of the great Salisbury peal; and that he also cast the fine tenor at Downton. The Tosiers followed the Purdues in the character of their inscriptions.

* Copy of a document in the muniment room, Salisbury Cathedral. "Articles of Agreement had, made, and concluded by and betwene the Reverend Deane and Chapter of the Cathedral Church of Sarum, and Clement Tosier, of the City of New Sarum, in the County of Wilts, Bell-founder, and Elizabeth Fillowry, of the said City of New Sarum, Widdow.

"It is articled and agreed by and betwene the partyes aforesaid as followeth, viz.—

"1. That the said Clement Tosier and Elizabeth Fillowry shall, at their owne proper cost and charges, new cast the seveth and eight Bells belonging to the said Cathedral Church, and fit and tune them to their places; And shall finde and provide such quantity of mettle as shall be necessary for that purpose; Which mettle (to be made) shall bee compos'd of eight parts of the best Copper and two parts of the choyest Tinn; All which the said Clement Tosier and Elizabeth Fillowry doe promise to performe within the space of eight weekes after the date of these p'sents.

"2. That the said Clement Tosier and Elizabeth Fillowry shall warrant and make good the said Bells, being soo cast as aforesaid, for the space of one yeare and a day next after they are hung up in theire places; And if it shall happen either of the said Bells shall prove defective within the space of one yeare and a day aforesaid, that then the said Clement Tosier and Elizabeth Fillowry shall make good and recast the sd. Bells at his owne cost and charges untill they shall continue sound and perfect for the space of one whole yeare and a day next after their hanging up.

"3. That in consideration of the sd. worke to be performed the said Deane and Chapter doe covenant and agree to pay the said Clement Tosier and Elizabeth Fillowry after the rate of Twenty Shillings by the Hundred for the soo casting and perfecting the said Bells, and to allow and pay them after the rate of five pounds, three shillings, and six pence for every hundred weight that the sayd Bells shall weigh more than they did before the said Tosier cast them.

"4. That the said Deane and Chapter shall pay for the aforesaid mettle soo severely as the said Clement Tosier and Elizabeth Fillowry shall bring it in place, and for their labour and charge when they shall be at in casting the said Bells soo severely as the said Bells are finished and hung up.

"In wittnes whereof the partyes aforemencioned to these p'sents interchangeably have sett their hands, the 16th day of August, 1680.

Signed in the p'sence of } The marke of Clement Tosier.
Tho. Naish, Geo. Frome, Jun. } The marke of Elizabeth Fillowry."

† It is just possible that this was Elizabeth Orchard, who married Richard Floorrey the younger, at Great Bedwyn, on June 11th, 1660. Richard Floorrey was buried at Great Bedwyn, Sept. 14th, 1679, and Elizabeth Floorrey was buried at the same place, Oct. 16, 1680. These dates will agree with the Salisbury document.
The Corrs of Aldbourne were founders of church bells as early as 1696, and, although this foundry must have supplied a vast number of bells in their days as well as in the days of their successors, the Wellses, I cannot discover that any very great work issued from their hands, compared with that of their brethren of the craft at Salisbury. The seventh and eighth bells at Calne, and seven out of the fine peal of eight at St. Thomas's, Salisbury, are some of the largest works of the Wellses.* Their epigraphs are of a totally different character from those of the Salisbury founders, and appear to be rather the composition of the clergy or of the donors, e.g. at Aldbourne we find on the treble bell,

"The gift of Joseph Pizzie and Wm. Gwynn.
Music and ringing we like so well,
And for that reason we gave this bell."

"Me resonare jubent pietas mors atque voluptas."

"On earth bells do ring,
In heaven angels sing—Hallelujah."

"My cheerful note aloft shall raise
To sound my Benefactor's praise."

"The heart resolves, the hand obeys
To sound our mighty Maker's praise."

There was a bell-foundry also at Devizes, belonging to James Burrough, in the 18th century, but little business appears to have been done by it. The fifth bell at Collingbourne Ducis, and the fourth at Calne, with the first and second at St. John's, Devizes, came from this foundry.

* Extract from "The Marlborough Journal" newspaper, of "Saturday, June 6th, 1772; vol. 2. No. 63." Among the advertisements is—

"At the BELL-FOUNDRY at Aldbourne, Wilts, CHURCH-BELLS are cast in a most elegant and as musical a manner as in any Part of the Kingdom, the Founder having made the Theory of Sounds as well as the nature of Metal his Chief Study; Also hangs the same, finding all materials in a complete and concise manner; And also Hand-Bells prepared and strictly in Tune in any key. Horse-bells, Clock and Room Bells, the neatest of their several kinds.

"Likewise Mill Brasses cast and sold at the lowest Prices.

"All orders will be punctually observed by ROB. WELLS, Founder.

"He gives Ready Money and the best Prices for Bell Metal."
And here, I think, ends the list of Wiltshire founders and foundries.

A great many Gloucester bells are to be met with in Wiltshire, and they abound also in the western counties. That foundry is of great antiquity, and it was there that the art was brought to great perfection. In the time of King Edward II., circa 1310, it is known that bells were founded there by John of Gloucester. From his days to the present time, i.e. for more than five hundred years, the foundry has been in active operation, and especially so from the close of the 17th century, when we are introduced to the well-known name of Rudhall. The family of the Rudhalls must have been of that class of Englishmen who were once more common than now, called good "Church and State people." Nearly all their bells bear such epigraphs as the following: "Prosperity to the Church and Queen;" "May the Church of England ever flourish;" "God prosper the Church of England;" "Free from rebellion God save the King;" "Peace and good neighbourhood;" "God send peace." Some of their bells are of considerable size, but the largest I have met with are the tenor of Westbury, in Wiltshire, which is 58 inches diameter, and is the largest bell in the county, weighing about 35 cwt.; and the tenor at Bath Abbey, which is 59½ inches diameter, weighs about 2 tons, and bears this inscription:

"All you of Bath that hear me sound,
Thank Lady Hopton's hundred pound."

It would take up too much space, if I were to say a few words only upon all the founders of Wiltshire bells and their foundries. I will merely add that Henry Knight, Ellis Knight, and Samuel Knight, of Reading, were bell-founders of some eminence in the seventeenth century; and that four of the Great Bedwyn peal, and the fifth of Collingbourne Kingston, besides several to be met with in Oxford, are their work. There can be little doubt that many bells were cast, in the localities where they are found, by itinerant bell-founders, e.g. the bell (1657) of St. Lawrence Chapel, Warminster, was cast in a field close by. It was supposed to contain a great deal of silver, and to insure the same metal being used, the bell was cast on the
spot. Some additional silver was thrown in, it is said, by the inhabitants who were interested in the process of fusing and recasting the bell. The second bell (1681) of the present peal at Coggeshall in Essex, is said to have been cast in a barn there. Similar instances might be multiplied. I believe that works of this kind were frequently executed by skilful men belonging to Foundries at a distance, which will account for their initials appearing together with the names of their masters.

I also give here a chronological list of bell-founders, to which many others might be added:

**GLOUCESTER.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>John of Gloucester</td>
<td>circa 1310</td>
</tr>
<tr>
<td>Sandre of Gloucester</td>
<td>c. 1400</td>
</tr>
<tr>
<td>William Henshawe*</td>
<td>c. 1480</td>
</tr>
<tr>
<td>Abraham Rudhall, Sen.†</td>
<td>1684</td>
</tr>
<tr>
<td>Abraham Rudhall, Jun.</td>
<td>1718—1727</td>
</tr>
<tr>
<td>Abel Rudhall</td>
<td>1737—1754</td>
</tr>
<tr>
<td>Thomas Rudhall</td>
<td>1764—1780</td>
</tr>
<tr>
<td>Charles Rudhall</td>
<td>1784—1828</td>
</tr>
</tbody>
</table>

**SALISBURY.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Wallis</td>
<td>1581—1636</td>
</tr>
<tr>
<td>John Danton</td>
<td>1624—1640</td>
</tr>
<tr>
<td>William Purdue</td>
<td>1613—1662</td>
</tr>
<tr>
<td>Roger Purdue</td>
<td>1663</td>
</tr>
<tr>
<td>Thomas Purdue</td>
<td>1654</td>
</tr>
<tr>
<td>Nathaniel Bolter</td>
<td></td>
</tr>
<tr>
<td>Jonathan Bolter</td>
<td></td>
</tr>
</tbody>
</table>

* There is a Brass to the memory of W. Henshawe and his two wives in St. Michael's church, Gloucester. The figures of the wives alone remain, and the following legend.—

"Pray for the Soull of Willm. Henshawe Belfounder and late Maire of this Towne and Alys and Agnes his wythes, the which Willm. deceased the day of. In the yer of our Lord God a thousand cccc. and the said Alys deceased the second day of February the yere of our Lord m⁰ xvi. for whose soules of yo' charite say a pater noster and a Ave."

† He died January, 1736, aged 78.
<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Lett</td>
<td>1627–1685</td>
</tr>
<tr>
<td>T. Flower</td>
<td>1654</td>
</tr>
<tr>
<td>R. Flowry, or Flower</td>
<td>1675</td>
</tr>
<tr>
<td>Clement Tosier</td>
<td>1680–1717</td>
</tr>
<tr>
<td>William Tosier</td>
<td>1721–1731</td>
</tr>
<tr>
<td>John Tosier</td>
<td>1724</td>
</tr>
</tbody>
</table>

**ALDBOURNE, WILTS.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oliver Corr</td>
<td>1698</td>
</tr>
<tr>
<td>William Corr</td>
<td>1696–1713</td>
</tr>
<tr>
<td>Robert Corr</td>
<td>1750</td>
</tr>
<tr>
<td>John Corr</td>
<td>1751</td>
</tr>
<tr>
<td>Edward Read</td>
<td>1764–1793</td>
</tr>
<tr>
<td>Robert Wells</td>
<td>1800–1825</td>
</tr>
<tr>
<td>James Wells</td>
<td></td>
</tr>
</tbody>
</table>

**DEVIZES, WILTS.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>James Burrough</td>
<td>1738–1754</td>
</tr>
</tbody>
</table>

**READING.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Henry Knight</td>
<td>1587–1623</td>
</tr>
<tr>
<td>Ellis Knight</td>
<td>1623</td>
</tr>
<tr>
<td>Henry Knight</td>
<td>1670</td>
</tr>
<tr>
<td>Samuel Knight</td>
<td>1693</td>
</tr>
</tbody>
</table>

**LEICESTER.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert Newcombe</td>
<td>1598–1612</td>
</tr>
<tr>
<td>Mr. Eayres</td>
<td>1700</td>
</tr>
<tr>
<td>Mr. Clay</td>
<td>1793</td>
</tr>
<tr>
<td>Edward Arnold</td>
<td></td>
</tr>
</tbody>
</table>

**WOODSTOCK.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richard Keene</td>
<td>1626–1681</td>
</tr>
<tr>
<td>James Keene</td>
<td></td>
</tr>
</tbody>
</table>

**LONDON.**

<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Underhill</td>
<td>1615</td>
</tr>
<tr>
<td>John Hodson</td>
<td>1653</td>
</tr>
<tr>
<td>Christopher Hodson</td>
<td>1680</td>
</tr>
<tr>
<td>James Bartlett</td>
<td>1692</td>
</tr>
<tr>
<td>William Wightman</td>
<td>1686</td>
</tr>
</tbody>
</table>
Philip Wightman 1699
James Bagley 1712
Richard Phelps (Whitechapel) 1716—1723
Thomas Lester 1742
Lester and Pack 1758
Pack and Chapman 1770—1778
Robert Patrick (Whitechapel) 1784
Mr. Janeway (Chelsea) 1750—1800
Messrs. Mears (and at Gloucester) 1791—1857
Messrs. Warner and Sons 1857
Mr. Bowen 1857
Barrett and Osborne 1857

**CHACOMBE, NORTHANTS.**

Henry Bagley 1664—1679
Matthew Bagley 1679
Henry Bagley 1722
Mathew Bagley 1753—1779

**KETTERING, NORTHANTS.**

Thos. Eyre 1755

**DONCASTER.**

William Cuerdon ob. 1678

**BAWTRY, NEAR DONCASTER.**

Daniel Heddersley 1720

**WOOTTON, NEAR BEDFORD.**

Mr. Russell 1719—1743

**HERTFORD.**

John Bryant 1787—1820

**BARROW, LINCOLNSHIRE.**

John Harrison 1749
Henry Harrison 1776

**STAMFORD, LINCOLNSHIRE.**

Tobie Norris 1632—1641
Thos. Norris
BELL-FOUNDERS.

WATH, YORKSHIRE.
Mr. Hilton . . . . . . . 1791

YORK.
S. Sellor . . . . . . . 1713

ST. NEOT'S, HUNTINGDONSHIRE.
Mr. Arnold . . . . . . .

BICESTER, OXON.
Edward Hemins . . . . . 1729—1737

GUERNSEY.
Nicholas Blondell . . . . . 1759

CHEPSTOW.
William Evans . . . . . . 1732

DOWNHAM, NORFOLK.
T. Osborn . . . . . . . 1780—1802
Wm. Dobson . . . . . . 1808—1826

OXFORD.
Mr. Watts . . . . . . .
W. Taylor . . . . . . . 1835—1854

EDINBURGH CASTLE.
Robert Borthwick . . . . . 1528

LOUGHBOROUGH.
J. Taylor . . . . . . . 1857

BRISTOL.
. . . Westcote . . . . . . 1823
Mr. Cary . . . . . . . 1854

BRIDGEWATER, SOMERSET.
John Stone . . . . . . . 1790
T. Kingston . . . . . . . 1826

CHEWSTOKE, SOMERSET.
Thomas Bilbie (and at Collumpton, Devon) . . . . . . 1740—1766
Abraham Bilbie . . . . . . 1769
<table>
<thead>
<tr>
<th>Name</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>William Bilbie</td>
<td>1780—1783</td>
</tr>
<tr>
<td>T. Bilbie</td>
<td>1805</td>
</tr>
<tr>
<td>William Cockey</td>
<td>1715—1747</td>
</tr>
<tr>
<td>T. Billbice</td>
<td>1805</td>
</tr>
<tr>
<td>Kirling</td>
<td>1521</td>
</tr>
<tr>
<td>Richard Corrington</td>
<td>1606</td>
</tr>
<tr>
<td>John Martin (of St. Martin’s)</td>
<td>1661—1700</td>
</tr>
<tr>
<td>Anthony Bond</td>
<td>1615—1629</td>
</tr>
<tr>
<td>Stephen Tonin</td>
<td>1576</td>
</tr>
<tr>
<td>Thomas Gardiner</td>
<td>1733</td>
</tr>
<tr>
<td>John Draper</td>
<td>1601—1646</td>
</tr>
<tr>
<td>James Edbury</td>
<td></td>
</tr>
<tr>
<td>Robert Gurney</td>
<td>1663—1672</td>
</tr>
<tr>
<td>George Lees</td>
<td></td>
</tr>
<tr>
<td>Edmund Wright</td>
<td>1600</td>
</tr>
<tr>
<td>Thomas Hodges</td>
<td>1854</td>
</tr>
<tr>
<td>James Sheridan</td>
<td>1854</td>
</tr>
<tr>
<td>T. Murphy</td>
<td></td>
</tr>
<tr>
<td>Thomas Bilbice (and at Chewstoke)</td>
<td>1740—1766</td>
</tr>
<tr>
<td>Pannell</td>
<td></td>
</tr>
<tr>
<td>Location</td>
<td>Founder</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Exeter</td>
<td>Charles Pannell and Co.</td>
</tr>
<tr>
<td>Bromsgrove, Worcestershire</td>
<td>Richard Saunders</td>
</tr>
<tr>
<td>Edgbaston, Birmingham</td>
<td>Joseph Smith</td>
</tr>
<tr>
<td>Durham</td>
<td>Thomas Bertlett*</td>
</tr>
<tr>
<td></td>
<td>John Bartlett</td>
</tr>
<tr>
<td>Wenlock, Shropshire</td>
<td>William Corvehill, Priest†</td>
</tr>
<tr>
<td></td>
<td>The Lowth bells were cast here in</td>
</tr>
<tr>
<td></td>
<td>1510</td>
</tr>
<tr>
<td></td>
<td>Thomas Hedderley</td>
</tr>
</tbody>
</table>

In the 15th century there were celebrated bell-founders in Bristol (1457); and foundries once existed at East Dereham in Norfolk, Chesterfield, Colchester, and Bracebridge near Lincoln.

*Founders whose localities I have not been able to determine.*

- John Adam, (found at Lochmaben) 14th century
- John Barbur, (found in Wilts) 15th century
- Richard de Wambis, (found in Northants)
- Thomas de Lenne 14th or 15th century
- Joh. Godynge de Lenne ditto

* In Sir Cuthbert Sharpe's Extracts from Parish Registers, 1841, p. 54, there is the following extract from the Burial Register of St. Mary-le-Bow, Durham: “Thomas Bertlett (a bell-founder). This man did cast the Abbey bells the summer before he dyed: buried Feb. 3, 1632.”

† In Bowen's MS. Collections for Shropshire, among Gough Topog. books in Bod. Lib. Oxford, is the following extract from the register of Thos. Botelar, Vicar of Wenlock, temp. Hen. VIII., Ed. VI., Mary, and Elizabeth. “1546. May 26, buried out of tenements in Mardfold-street, next S. Owen’s Well, Sir William Corvehill, priest of the Service of our Lady in this church, &c. He was well skilled in geometry, not by speculation, but by experience: could make organs, clocks, and chimes; in kerving in masonry, and silk weaving and painting, and could make all instruments of music, and was a very patient and gud man, borne in this borowe, and sometyme monk in the monastery; he had two brethren, döpne John, monk in said monastery, and Sir Andrew...
ON CHURCH BELLS.

Thomas (fecit) Derby . . . 14th or 15th century.
Wilelmus Revel . . . . . ditto
Wilelmus Schep . . . . . ditto
John Cole . . . . . . . . 1574
Robert Motte . . . . . . . 1578
. . . Bellingham, (Doncaster Church Accounts) 1579
Valentyne Trevor* . . . . . 1592
Richard Bowler, (found at Cambridge) . . 1602
Bartholomew Atton, (found in Northants) 1602—1624
Robert Atton, (ditto) 1610
Joseph Hatch . . . . . . . 1605
William Hatch, (found at Rochester) . . 1654
John Warrin, (found at Cambridge) . . 1607
Thomas Pennington, (found at Trent, Somerset) 1626
Miles Graye, (Suffolk, Norfolk, and
Cambridge) . . . . . . . 1624—1681
Christopher Graye, (ditto) 1669—1683
Thomas Nobbes, (found at Cambridge
and Hunts) . . . . . . . 1632—1641
John Wilnar, (found at Rochester) . . 1635
Charles Newman, (Norwich and elsewhere) 1684
. . . Oldfield . . . . . . . 17th century
Thomas Newman, (Norwich and elsewhere) 1722
John Thornton, (found in Essex) . . . 1711
Henry Pleasant . . . . . . 1702
Henry Penn, (found at Peterborough) . . 1704
Willm. Knight, (found in Dorset) . . . 1735
Robert Catlin, (found in Sussex and Berks) . 1740
Wm. Roth, (found in Devon) . . . . 1748
Henry Paris, (found at St. Patrick’s Cathedral,
Dublin)

Corvehill, a secular priest, who died at Croydon in Surry; on whose souls God have mercy. All this country had a great loss of Sir William, for he was a good bell-founder and maker of frames." Willis’s Current Notes, 1856, p. 39.

* He cast the bells of St. Margaret’s, Westminster, but not to the satisfaction of the vestry, who record in their accounts that they were "very falsely and deceitfully made by Valentyne Trevor." (Notes and Queries, vol. i.)
Michael Darbie, (found in Oxford) . . . 1654
John Brend, (found in Eastern Counties) 1646—1658
Elias Brend, (ditto) c. 1669
William Hansley, (ditto) 1623
John Driver, (ditto) c. 1617
Edward Tooke, (ditto) c. 1670
Brian Eldridge, (found in Sussex) . . . 1625
William Eldridge, (ditto and in Hants) 1674—1699
J. Stephens, (found in Suffolk) . . . 1721
Francis Foster, (found in Wilts and Hants) 1655
. . . Chandler (found in Herts) . . . 1685

Besides these founders, whose localities are unknown by me, I have met with the following initials: J.P. (1667) in Devonshire; G.R. (1675) at Coventry; and R.S. (1667) at Cambridge; and of mediaeval founders these initials, tl. hi. ig. v. cr. vb. hm. pw. on Wiltshire Bells, and to. on those of St. Botolph's, Cambridge.

3. The composition of bell-metal. In the Liberate Roll 26 Henry III., sec. 12, is an entry of 1050 lb. of copper and 500 lb. of tin, and the metal of an old bell, to be melted up with it to make three new bells for the church of the castle of Dover. In the Circle of Mechanical Arts, published by Mr. Martin, a civil engineer, in 1813 (p. 354), it is stated that in bell-metal there is about one-fifth of tin. And in the Penny Cyclopædia, tit. Bronze, it is stated that Dr. Thompson found English bell-metal to consist of

<table>
<thead>
<tr>
<th>Metal</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>80</td>
</tr>
<tr>
<td>Tin</td>
<td>10.1</td>
</tr>
<tr>
<td>Zinc</td>
<td>5.6</td>
</tr>
<tr>
<td>Lead</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

But this must have been a very bad sample. Good bell-metal should consist of copper and tin, in the proportions of one of tin to three of copper. Mr. E. B. Denison states (and he is no mean authority in this matter) that "four parts of tin to thirteen of copper produces a very hard, elastic, and strong bell-metal." It is
quite an error to suppose that silver enters largely into the composition of some bells. When the bells of Great Bedwyn church were taken down lately for the purpose of re-stocking them, it was observed that the canons had become white in parts where there had been some friction, and I could not convince the workmen that it was tin and not silver which they saw. They knew better; and only wished they could have the bells to extract the precious metal which they contained. It has been stated by those who know much more about this matter than I do, that "silver, if introduced in any large quantity, would injure the sound, being in its nature more like lead, as compared with copper, and therefore incapable of producing the hard, brittle, dense, and vibratory amalgam called bell-metal."*

It is very certain that ancient bells have a better and more mellow tone than the generality of modern ones. The tenor bell of Ogbourne St. Andrew, which was cast in the 15th century, and weighs about 15 cwt., cannot be surpassed for richness and dignity of tone; yet the proportion of its sound-bow is only $\frac{1}{15}$th of the diameter. I have remarked that bells of the 15th century, for the most part, range in their proportions from $\frac{1}{4}$th to $\frac{1}{5}$th and nearly to $\frac{1}{6}$th; and that few are thicker in the sound-bow than this. Perhaps they have more metal in the waist than more modern bells, to account for their better tone. Their superiority is also owing no doubt to several causes;—first, to a larger weight of metal than is commonly given now to a bell of the same note; secondly, to a better admixture of the metals; and thirdly, probably to the method then adopted of fusing the metals, viz., by a wood fire, which, not being so hot as that of coal, does not sublimate the tin.† In bell-casting, the art is to know when to put in the tin, and to tap or pour the boiling metal into the mould.

4. Method of casting and of tuning bells. The art of bell-founding and tuning was brought to great perfection by Abraham Rudhille, of Gloucester, whose foundry has passed into the hands of the Messrs. Mears. When the size and proportions of the bell to be

* See the excellent little work "The Bell, &c." by A. Gatty, p. 30.
CASTING AND TUNING.

21

cast have been determined, four things have to be prepared—first, the crook; second, the inner mould or core; third, the outer mould or cope; and fourth, the crown.

The crook is a kind of compass formed of wood, and is used for making the moulds. One leg of this instrument is curved to the shape of the inner side of the intended bell, and the other takes the shape of the outer side; and they are made to revolve round a pivot fixed to a beam above, and the lower end driven firmly into the ground. The inner mould or core is built up of brickwork round this pivot, having a hollow space in the centre for a fire; and the face of the brickwork is then covered with a composition of clay and other materials, and moulded by one of the legs of the crook into the shape of the inside of the bell. It is then baked by means of a fire in the hollow, and when hard is greased and coated with another composition which is made to take the exact shape of the outside of the bell, by a few revolutions of the other leg of the crook. This is also hardened by the fire, and upon it are placed the inscriptions and ornaments in relief.* Over this, when it has been washed with a composition of grease and tan, the outer mould or cope is formed; and finally, the crown or head of the bell, for the formation of the canons, is then fitted to the top of it. The whole having been burnt, the cope is removed, and the inner composition between it and the core, representing the bell, is destroyed; so that when the cope is again put over the core, there is a space between the two of the shape and thickness of the bell, and into this space the metal is allowed to run.

When a bell is to be cast, the core is placed in a pit close to the furnace, the cope and crown are carefully fixed over the core, and the whole is rammed round tightly with dry sand, leaving nothing exposed but the holes in the cap or crown, one for an air hole, and the other for the fused metal to run into. As soon as the metal is cool, the bell is dug out, and, if one of a peal, carried into the finishing department for the purpose of being tuned. Formerly

* Mistakes in spelling frequently occur in bell epigraphs, owing to carelessness (sometimes to ignorance) in making the impressions of the letters on the moulds. Letters, in some instances, are inverted, and in others omitted or transposed.
this was done by chipping the inside of the bell, or by cutting away the edge of the lip. But Mr. Rudhall, of Gloucester, invented a simple machine for accomplishing this object. It is nothing more than a vertical lathe, driven by steam power. The bell to be tuned is fixed very firmly in an inverted position, and a powerful cutter, working on a pivot placed within it, diminishes its thickness if too sharp, or, by cutting away the edge of the lip, reduces its diameter, if too flat. It must have been a very difficult operation for Mr. Lawson Huddleston, by the process of chipping, to modulate the sound of every bell in the peal till they answered exactly the intervals of the monochord, and more particularly in those cases where the bells had been cast at different periods, by different founders, and with different metal. But it appears that this gentleman, who had a passion for bells, used to pass days and weeks in belfries in this laborious work; and thus tuned the peals of Colerne, Shaftesbury, Knoyle, and St. Cuthbert's, Wells.

It is now asserted that these two processes for tuning ought not to be required at all, and that if bell-founders would take the trouble to work by rule, they would not only save themselves the additional labour of tuning, but turn out of hand a more perfect instrument. There can be no doubt that many bells have been entirely spoilt by having been tuned; and often has a well-proportioned and really good bell been thus mutilated to bring it into tune with a wretched new one which has been added to the peal. If the quality of the sound depends upon the free vibration of the metal, it follows of course that where the internal surface of a bell has been chipped and deeply furrowed all round, its tone must be greatly deteriorated. There are few "virgin peals" to be found, i.e. peals cast at one time, one or more of whose bells have not required tuning—a proof that bell-founders must have worked pretty much by guess. Mr. Denison has proved that it is possible, with a given weight of metal, to cast a bell of any given note, and therefore one should imagine that no difficulty lies in the way of "virgin peals" from henceforth.

5. Bell-hanging. When a bell is ready, the next operation is

* The key-note of a bell depends in a great measure on its diameter at the mouth, and on the thickness of the sound-bow. It depends also of course on the quality of the metal.
PLATE II.

1. Upright spokes.
2. Transom or Long Rail.
3. Arms or spokes.
4. Shrouding.
5. Sole of Wheel. See Plate III.
6. Fillet. See Plate III.
7. Head-stock.
8. Ground-truck.
10. Catch.
11. Timbers of Cage.
1. Brasses.
2. Gudgeons.
4. Shrouding.
5. Coupling-plates.
   — Sole of wheel (in the elevation).
6. Fillet.
7. Stock.

ELEVATION OF BELL AND STOCK.

PLAN OF HEAD-STOCK,
(Looking down on the Bell.)
to hang it in the church tower; and here, in England, one or two great changes have been introduced in the mode of doing this. It is perhaps one of the most difficult of all the operations connected with bell-fixing, and requires the greatest care and skill of the person employed. I must here begin by saying that a great deal of the mischief to which I have alluded in speaking of belfries arises from the unscientific manner in which bells are too often hung now. It is too frequently the practice for parishioners or churchwardens, when the bells require repair, to send for the village carpenter, who knows about as much of bell-hanging as he does of geology, in the comfortable but vain notion of saving parish money. Bell-hanging is an art of itself, quite distinct from that of bell-founding, and, like it, must be executed on well-ascertained principles. It is of the utmost consequence that the stock, or piece of wood to which the crown of the bell is fixed, should bear a due proportion to the size of the bell, and the length of the staple from which the clapper hangs. If this is not attended to, the clapper will not strike the bell properly. This is determined on sound principles of dynamics. But what can a village carpenter, who never fixed church bells before, know of that science? And what must be the result of his unskilful efforts?

Before the introduction of change-ringing it was not of so much consequence how the stock was made, because bells were then only chimed. But as soon as they begun to be swung rapidly to and fro on their gudgeons, and rung in time, it became necessary to reduce the proportions of the various parts of their gear to fixed rules and principles, which can only be known by those whose business it is to make them their study.

A change also took place in the form of the bells, in order that they might be rung more easily. The early bells with which we are acquainted have their crowns not so well adapted for the purpose of modern ringing as more recent ones; but there can be no question as to their superior elegance of form. Bells of the 17th and subsequent centuries have their crowns, particularly of heavy bells, flattened, and the canons brought closer together, in order to fit the stock better, and increase the leverage, but at the expense of their beauty.
A great variety of crowns may be observed, each founder having a design peculiar to himself. Some are of a pleasing form, and others are the reverse. There is a striking contrast between the first and fourth bell at Ogbourne St. Andrew; and again between each of these and the beautiful mediæval tenor of the same church.

One important part of bell-gear remains to be noticed, viz., the wheel. This is, in fact, the powerful lever by means of which the bell is moved; and it has undergone some changes. It is not probable that the full wheel was employed much before the year 1677. Before that period bells were moved by means of a short piece of wood fixed at right angles to the stock, or by a half-wheel, which was in use in 1527, and is still to be met with in Dorsetshire, at Dunchideock, Devon, at Westcote Barton, Oxon., where there are three, and at the church of St. Saviour in Guernsey. The bells of St. Magnus Cathedral, Orkney, "are not, and probably never have been rung by the common processes of wheel or crank, but by a rope applied so as by a nearly lateral traction to make the tongue strike the side. One end of a short rope is fastened to the tongue and the other to the wall; a second rope is fastened to the middle of the first, and the lower end of it pulled by the ringer, which of course pulls the tongue to one side."* The half-wheel was all that was required for chiming, but it could not answer the purposes of change-ringing, in which it is necessary that the bell should be set, i.e. turned up, and rested against the slider or catch, each way.† Several changes also have taken place in the mode of attaching the clapper, which I will only allude to now. The great object in suspending a clapper is to give it a free action without allowing it to have any lateral motion, so that it may always strike the bell in the same place; and various methods have been invented to accomplish this. The ancient mode, with bawdrick and buskboard, was clumsy and expensive. Anyone who is desirous of learning what this method was will find a sketch and explanations by the Rev. H. T. Ellacombe in Willis's Current Notes, No. xiii. p. 5. and xiv. p. 9.

Before passing to the next head, I cannot refrain from making

* Extract from a letter by Sir H. Dryden, Bt., to the Editor of the Oreadian, Sept. 1855.
† For an explanation of this operation see "The Builder."
TREBLE BELL, OCBOURNE ST ANDREW, WILTS.
Scale 1/2 inch

4TH BELL, OCBOURNE ST ANDREW, WILTS.
Scale 1/2 inch
TENOR BELL, OGBOURNE ST ANDREW, WILTS.

Scale 1½ inches

Black Letter Inscription "Trinitatem adoremus 115th Century"
PLATE VIII.

OLD HALF-WHEEL,
Beautifully moulded, at Dunchideock, Devon. Date 15th Century.
a few remarks upon two improvements in bell-hanging which are
now engaging the attention of scientific men, and are likely to intro-
duce a new era in the history of Campanology. These two improve-
ments involve the same principle, and have been suggested by the
serious injuries which the constant blows given by the clappers
sooner or later produce. A bell gets indented in two places where
the clapper strikes, and in course of time it is found necessary to
turn it one quarter round so as to offer two fresh places to the action
of the clapper. But this is always a troublesome and expensive al-
teration, and can only be accomplished once in the life-time of a bell.
Two plans have been proposed, both of which are great improve-
ments, by which a bell may be turned at any time without requiring
to be refitted to the stock, and to have new fastenings and a false
staple. The principle of both these plans is to have a central boss
instead of canons, and to make the bell revolve on a strong central
bolt passing through the crown. But one of these plans (Mr. W. L.
Baker’s) has the merit of priority of invention, and of a more per-
fect construction and adaptation of means to an end, than the other,
which is Mr. Denison’s, and which he has been allowed to carry
out in the great Bells of Westminster. The latter plan appears,
however, to have been suggested by the former, and is a modification
of it which seems greatly to invite an application of the epithet
clumsy, not in an offensive sense, but merely as indicative of
deficiency in contrivance. Had Mr. Baker’s plan not been invented,
Mr. Denison’s, as an original one, would have been a great improve-
ment in bell machinery. Into the question of piracy which has been
mooted,* I will not enter, my object being merely to compare the
two plans, and to say which should approve itself most to an un-
prejudiced mind. I cannot but think that Mr. Baker’s plan has
everything to recommend it. It has the merit of being not only
ingenious but simple, and admirably adapted to the end proposed.
To those who are unacquainted with the strength of materials it

* First, in a Lecture by the Rev. R. S. Baker, before the Northants Architectural and
Archæological Society in October 1856; and afterwards in a pamphlet by Mr. W. L.
might appear a dangerous experiment to trust so great a weight to a single bolt; but it is easy to prove, and it has been clearly demonstrated* that any bell may be hung in this manner with perfect security. I should say that it was even more safe than the old way of suspending a bell by its canons. It has not unfrequently happened that, in consequence of imperfect casting, the canons have been torn off the crown, and the bell has fallen during ringing. I have met with a sufficient number of instances to make one anxious on this point, and to make it very desirable that a sounder substitute for canons should be applied. In all these instances the bells were lying as they had fallen; but I have met with many bells which must also have shared the same fate, for the canons were gone, and the bells had been re-hung with iron bolts passing through their crowns. It is impossible to test the canons previously; they may appear sound outwardly, and be faulty within; whereas a wrought iron bolt can be carefully made and tested. There is also less danger of the crown of a bell being torn out by the bolt, than of the canons breaking, which is a contingency equally unlikely with Mr. Baker’s, as with Mr. Denison’s, or the old plan. The accompanying plate will show Mr. Baker’s plan; and I will explain it in his own words: “In this patent improvement there are three principal features:—first, a circular boss is cast on the crown of the bell, through which a single bolt of sufficient strength is passed, and attaches the bell to the stock. Secondly, metal is used instead of wood for the stock and other parts. Thirdly, the bell is attached in such a manner to the stock (whether by a single central bolt or by casting an axis on the top of the crown, or by any similar contrivance,) that the bell may be turned round its vertical axis, and present in succession a fresh part of the bell to the blows of the clapper. To facilitate the turning of heavy bells, a screw or pinion and toothed wheel are connected to the boss. Fig. 1 is a side view; fig. 2. is an elevation partly in section, and fig. 3 shows the wheel and pinion arrangement. A is a main central bolt; B the crown of the bell; Q a boss on the crown B; G an iron stock; HH are nuts to screw the bell to the stock; I is a square part of

* See Mr. R. C. Nichols’s paper, read at the Meeting of the Royal Institute of British Architects, Feb. 1856, in the Mechanics’ Magazine, No. 1714.
the main bolt; OO are the gudgeons; P is a toothed wheel; R an endless screw; S a square part of the screw's spindle to receive a spanner; W is a catch for the stay, and V is the stay." (Mech. Mag. No. 1706.) You see then that the bell can not only be turned at pleasure with the greatest facility, but that this can be effected by one man with the aid of a common spanner, and at no expense.

Now compare this with Mr. Denison's plan, which is shown in the accompanying figure, and you will see that there is the same central bolt and the same boss, slightly modified, in the place of canons. In both plans the central bolt carries the clapper, and, as the bolt does not move when the bell is turned, the clapper always maintains the same position. Mr. Denison's bell is cast with a thick neck, having a flanch round the top, instead of canons; and is attached to the stock by hooks which take hold of the flanch. When the bell requires turning, the nuts of these bolts are loosened, the bell is slewed round by a number of men, and the hooks are made fast again. During this operation the bell is sustained by the central bolt alone. I cannot see wherein consists the superiority of this plan over Mr. Baker's, that it should have been preferred. The two prominent defects of Mr. Denison's plan are precisely those points of Mr. Baker's which, I conceive, should have been adopted in the Westminster Bell, viz.: first, an iron stock, and secondly, an apparatus for turning. The former has been omitted for no assigned reason; the latter, because of the expense; which expense, by the way, Mr. Baker stated would be no more than one per cent of the cost of the bell and its gear. The former omission would, in the case of a bell subjected to motion, probably result in
shaking itself loose, for as the flanch is to be fitted into a wooden stock, if it get play, the stress of the hooks would be likely to fracture it, supposing, as Mr. Denison insists, that the central bolt "has nothing to do with carrying the weight of the bell." In the case of the Westminster Bell, the objection to a wooden stock is not so great, but an iron one would be more durable, and avoid all the heavy expense at a future day of taking the bell down to be stocked afresh. The latter omission renders the turning a matter of considerable difficulty where no ready means for doing so are at hand. On these grounds, it must seem a matter of surprise, to any one who carefully examines the subject, that Mr. Denison, as a scientific man, possessing acute mechanical genius, should have contented himself with an imperfect plan, when a perfect one, or one at least which combines all these advantages, was before him; and this too in a great public work which naturally invites public criticism. We, who pay the piper in all public undertakings, expect to have the best thing that can be supplied for our money, and may be allowed the Englishman's privilege where we have it not; and I think that few will assert that plan to be the best which is, after all, an imperfect expedient for accomplishing an end, offers no greater security, and must be more expensive ultimately.

Mr. Baker proposes, likewise, to hang the bells on an iron frame. There is an obvious advantage in this, as it would be more rigid, occupy less space in the tower, and be fire-proof.

6. Expenses of bells, &c. There are many entries to be found in parish account books which throw considerable light upon the history of bells and bell-founders; and, among other things, the value of bell-metal, old and new, with the cost of casting bells per cwt., is accurately given. In 1457 bell-metal was charged £5 0s. 8d.; and the price of casting was 20s. 1d. From the churchwardens' accounts of St. Margaret's, Westminster, we find that in the year 1592, bell metal was worth £2 16s. the cwt. From that of Steeple Ashton, Wilts, we learn, that in 1616, it was worth £5 12s. In the year 1630, the accounts of St. Thomas's church, Sarum, tell us that it maintained the same value, and that the cost of casting was 14s. the cwt. In 1663, we find from the
same accounts, that the value had risen to £6 6s.; and that old bell-metal fetched £4 5s. In 1680, the Dean and Chapter of Salisbury agreed to pay Clement Tosier after the rate of 20s. per cwt. for casting two bells, and to allow and pay him after the rate of £5 3s. 6d. per cwt. of extra metal. In 1716, the vestry of St. Thomas's church agreed with Mr. Abraham Rudhall, of Gloucester, that he should have £7 for casting the second bell, and 1s. per lb. for any additional metal. In 1769, the parish of St. Mary, Marlborough, agreed to give Mr. Robert Wells, of Aldbourne, £6 10s. per cwt. for a new third bell, and were to receive £4 13s. per cwt. for the old metal. And now the price varies from £6 10s. to £6 15s.; but if frames, carriage, hanging, journey, &c., are included, the cost is about £7 per cwt.; and old metal realizes about £4 4s. The price has I believe risen above this lately.

7. Ancient bells. In the Archdeaconry of Wilts there are one hundred and eight churches, of which I have examined the bells of eighty-eight, with an aggregate of four hundred and six bells, and of this number only twenty-three are clearly of a date prior to 1500, ten are of the sixteenth century, and one hundred and sixty-four belong to the seventeenth century. Out of six hundred and ninety-eight bells in Wiltshire, of which I have account, sixty-three belong to a period prior to 1500, twenty-three to the sixteenth, two hundred and seventy-three to the seventeenth, two hundred and thirty-nine to the eighteenth, and forty-six to the nineteenth century; and twenty-six have no date or inscription. And this rarity of bells of the fifteenth century is not confined to Wiltshire only; although the proportion of bells of that date in other counties may be greater. Ex g. in Framland Hundred, county of Leicester, which contains thirty-eight churches, and one hundred and twenty-seven bells, there are as many as twenty three of a mediæval period.* The cause of this rarity throughout England I will explain presently.

In the earliest bells, only the name of the Saint is given, without any further inscription; and we find simply, "Sancta Anna," as at Cholderton, "Sancte George" at Pewsey, and "Gabriel" at Maddington. I think there can be no doubt that the second bell at

* Ecclesiologist, vol. iv.