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CROTAL BELLS *by Rod Blunt*

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Historical Introduction

Bells are one of a very small number of artefacts that have been in virtually continuous production for over 4000 years. The earliest known examples were made in China before 2000 BC, and they were familiar everyday objects to the ancient Indians, Egyptians, Greeks and Romans. They have served a number of purposes, from ritual, magical and religious, to musical, signalling and warning. Apart from their functional role, bells have served as decorative devices throughout the ages, and continue to be popular as harness embellishments to the present day. Their longevity is reflected by the fact that the Guinness Book of Records lists the Whitechapel Bell Foundry as Britain's oldest manufacturing company, having been established in 1570, or possibly even earlier, and still producing bells today.

The earliest bells were cup-shaped and were struck externally with a separate striker, but it was not long before the attached internal clapper was invented, and the two types have co-existed ever since. The crotal bell was developed somewhat later. It differs from the preceding types in that its clapper is loose and contained within an enclosed chamber with perforations to allow transmission of the sound.

Although crotal bells were possibly first used in antiquity, surviving examples that can reliably be dated before the medieval period are rare. The earliest dateable examples identified while carrying out research for the present article are some of the 9th century AD, recovered from female graves in Gotland, Sweden. They were found on chains suspended from chatelaine-type brooches, and appear to be of similar construction to English crotal bells dateable to the 13th century.

It is worth mentioning that, depending on context, sleigh bells, jingle bells, pellet bells, hawk bells and rumbler bells are all terms used to describe bells of the crotal type. Technically they are regarded as rattles, rather than true bells.

Button makers
Coinweights
Crotal bells
Edwardian farthings
Edwardian halfpennies
Edwardian Pennies
Galley halfpence
Gunter's chain
Harness pendants
Long Cross Pennies
Nuremberg jetons
Papal bullae
Pocket sundials
Roman seal boxes
Seal matrices
Thimbles
Tumbrels

The Chronology and Dating of English Crotal Bells

General

The earliest crotal bells found in England date to the beginning of the 13th century. They are of tin and were cast as open bells with an integral suspension loop and four ‘petals’ forming the lower body. The pellet, also of cast tin, was placed inside the open-ended bell, and the four petals were pushed inwards to meet at the centre and enclose it.

Fig.1
Tin crotal bell
13th century

Fig.2
Copper-alloy crotal bell
13th–14th century

Bells of this type were produced only until about the end of the 13th century. (Cf. MoL, Dress Accessories, 1668-1671; Mitchiner, Medieval & Secular Badges, 356.)

Cast copper-alloy bells based on the same principle are probably contemporaneous, or very nearly so. Their integral suspension loops are frequently at the end of an extended shank, and a number of them have been found attached to harness mounts - perhaps their principal use. Bells of this type probably date from about the mid-13th to the mid 14th century. (Cf. Read, Metal Artefacts of Antiquity, 465-467.)

A variation of the previous bell is the teardrop type. Here, the bell is cast in a flat, fan-shaped form, with a loop at the apex, and four petal-shaped projections at the base. The casting is then rolled to form an elongated cone with a seam, and the four base projections are folded in to retain the pellet, as on the preceding types. Similar teardrop-shaped bells have been found on elaborate harness decorations with pendants that are dateable to the 14th century. (Cf. Read, Metal Artefacts of Antiquity, 464.)

Fig.3
‘Teardrop’ crotal bell
Circa 14th century

Fig.4
Sheet-metal crotal bell
13th-15th century

Alongside the early cast crotals, copper and copper-alloy bells of sheet metal were produced. The body of these is made in two halves, formed by hammering the sheet into shaped moulds, and joined together, after inserting the iron ‘pea’, with a lead/tin solder. On the very earliest of this type, the loop was made of circular-section wire, which was inserted through a small hole in the top of the bell and its ends splayed in the manner of a modern split-pin. Slightly later, a narrow strip of sheeting was used instead of wire, and was either fitted in the same way, or formed into a ring and soldered to the top of the bell as on the example illustrated. Bells of this type have been recovered from secure contexts that span the date range circa mid-13th to mid-15th century. They are also found in a wide range of sizes, at least from 13mm to 34mm diameter, suggesting a variety of different uses. (Cf. MoL, Dress Accessories, 1644-1667; B Read, History Beneath Our Feet. p.55, No.2; Mitchiner, Medieval & Secular Badges, 350.)

Around the end of the 13th century, a new type of white-metal (pewter and tin) crotal bell, cast in one piece, appears. The form is approximately spherical, but, as cast, the bottom half of the bell chamber is splayed. This enables the pellet to be placed inside the bell, and the splayed half to be squeezed together to retain it. It also makes support of the core within the mould relatively easy. The earliest bells of this type have several moulded parallel ribs around the circumference, both vertically and horizontally. Later ones are often plain, but some have moulded decoration of various forms. The rounded ends of the sound bow are often very close to, or interrupt, the girth rib. Bells of this type are usually quite small (typically 13mm to 17mm diameter), and many were used as dress accessories and hawking bells. The wearing of bells became fashionable in the 14th century and remained so well into the 15th century. Examples dating from the later end of this period have been found suspended from necklaces and possibly

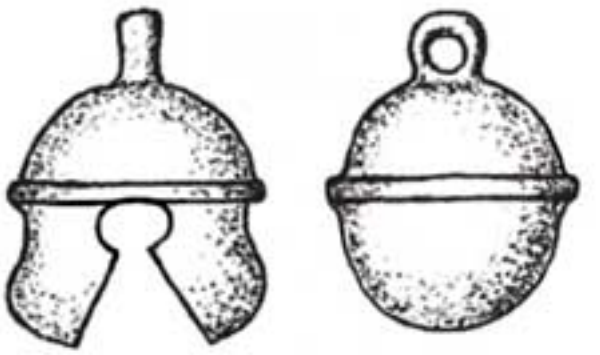

Fig.5
Cast one-piece white-metal crotal bell
Late 13th-15th century

bracelets. Prior to becoming fashionable, the wearing of bells as a dress accessory was limited to jesters, acrobats, pilgrims and priests. (Cf. MoL, Dress Accessories, early: 1672-1683, late: 1689; Mitchiner, Medieval & Secular Badges, early: 351-355, late: 782-786.)

A development that occurs during the late 14th century is the casting of bells in two halves, which were then soldered at the horizontal joint line after inserting the pellet.

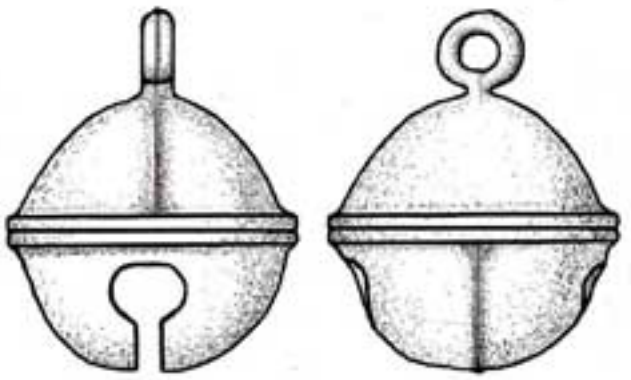

Fig.6
Two-piece cast crotal bell
Circa 15th century

Bells of this type were produced in both white metal (tin and pewter) and copper alloy. They are known with domed (as illustrated) and conical upper bodies, and some have moulded decoration, while others are plain. They are distinguishable from the later one-piece crotals by the mould joint lines, which run in a vertical direction, as shown, on both the upper and lower halves, and also by the absence of holes in the upper part of the body. The separate girth ribs on the two halves are also a good indication of the type. A single-point attachment of the suspension loop to the bell, via a short shank, is also a common feature. The type is not a common find, and was probably short-lived, being superseded by the one-piece cast type, probably in the late 15th or early 16th century. (Cf. MoL, Dress Accessories, 1684-1688; Mitchiner, Medieval & Secular Badges, 396.)

The one-piece cast crotal bell represents a triumph of ingenuity, the manufacturing principle of which has not changed in 400 years. Details of the process, as now implemented, are fully described below, but essentially the pellet is contained within the sand core during the moulding process, thus eliminating the need either to solder a joint, or to bend the body into shape.

Bells made in this way are readily identifiable by the two ‘sound holes’ in the upper half of the body. These are, in fact, primarily to facilitate positioning of the core, rather than for transmission of the sound. The two-part moulds for bells of this type are split at the girth rib on the bell, and consequently there are no vertical mould-joint lines evident on them. The girth rib serves the useful purpose of accommodating any minor misalignment between the two halves of the mould, as well as strengthening the bell and

retaining the traditional appearance of those with a soldered joint. From the 16th century, the one-piece cast crotal rendered most other types of construction obsolete. One exception was the sheet-metal type, which, has been produced ever since for hawking bells, pet bells and other uses where a small size and lightness are key considerations. (Since the 18th century, sheet-metal bells have been produced by a die-forming process, rather than the metal being hammered into a mould.)

Fig.7
Early one-piece cast crotal bell
16th-17th century

As the method of manufacturing the one-piece bell has changed little since the Tudor period, the determination of their chronology is dependent on differences of detail, rather than basic manufacturing concept. Close dating is often difficult, unless the bells can be associated with a maker whose period of operation is known from documentary sources. This is rarely the case prior to the late 17th century, when some makers began to put their initials on the bells. The following details are helpful in determining an approximate date.

Suspension Loops

The suspension loop on the earliest one-piece crotal bells was cast as an integral solid lug and drilled afterwards as a separate operation. The fillet radii between the lug and the top of the bell are often quite generous, and there is every indication that the pattern was made in one piece.

Fig.8
Drilled suspension loops on one-piece cast crotal bells of circa 16th to mid-17th century date

The sprue will have extended from the top of the lug, and will have been cropped as part of the fettling process. The accompanying illustrations show some early suspension loops of this type, and an outline drawing of the top of a typical pattern used to produce the mould. Bells with suspension loops of this type are likely to date from the 16th to the mid 17th century.

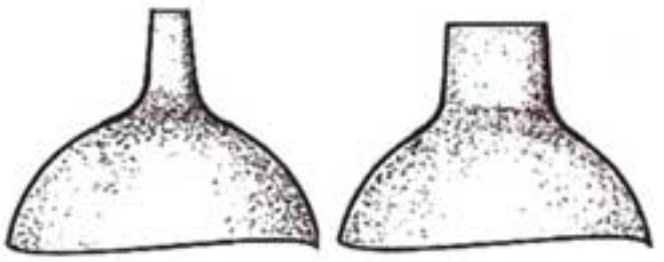

Fig.9
The top of an early pattern.
This type was withdrawn complete from the underside of the mould.

Fig.10
As-cast loop on 17th to 18th century crotal bell

During the 17th century, an innovation in the production process eliminated the need to carry out a drilling operation. Instead, by making the pattern with a detachable 'sprue-piece', it was possible to create a suspension lug with a cored hole. The sand in the upper moulding box was packed around the pattern (see drawing), which was then withdrawn, as normal, from the underside.

The detachable sprue- piece, however, was withdrawn from the top of the mould, leaving a core of sand to create the aperture. Bells with lugs produced in this way are identifiable by their uninterrupted spherical profile forming the base of the aperture, which can no longer be round.

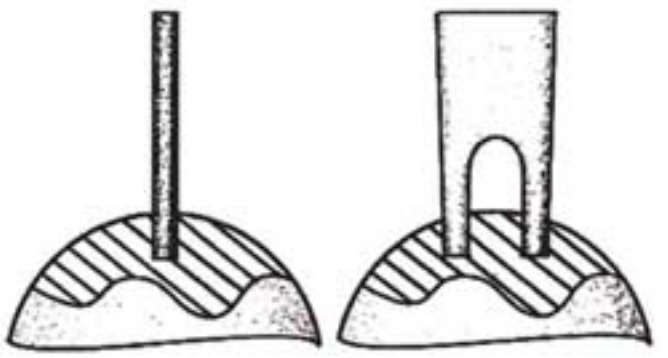

Fig 11
The top of a later pattern with detachable 'sprue-piece'. This was withdrawn separately from the top of the mould, thus leaving a core to produce the aperture in the suspension lug.

Fig.12
As-cast loop on 18th to 19th century crotal bell

There is also little or no fillet radius where the lug joins the bell, as this would have prevented withdrawal of the sprue-piece without damaging the mould. There were not any further fundamental changes in the process of casting crotal bells of this type, but the suspension loops tended to become proportionally larger during the 18th century, and they often have a more angular appearance. They remained this way until the traditional design was largely superseded by a new style of horse bell in the mid-19th century.

Note: It is sometimes said that the suspension loops of later crotal bells, of the type described immediately above, were separately cast. This is certainly possible, but I have found no evidence to support it on those that I have examined. It is also

difficult to imagine why a manufacturer would complicate the process by producing additional moulds and adding a brazing or soldering operation. It is true, however, that some modern crotal bells are made this way in order to fit ornamental handles. It is also likely that there will be bells that have had replacement loops soldered/brazed to them to effect a repair following breakage.

I also considered the possibility of the loops being separately cast, and embedded in the mould, such that they would fuse to the body of the bell. Again, I found no evidence to support such a process, and it would present difficulties in casting, as the loop is located at the top of the mould in the position where it is desirable for the molten metal to enter.

Decoration

Post-medieval crotal bells may be either plain or decorated, and decoration may be applied to both the upper and lower hemispheres, or to the lower hemisphere only. Where both hemispheres are decorated, the respective designs may be of similar or differing types.

A number of different decorative devices are used, but varieties of the so-called sunburst design (sunflower would seem more appropriate) are by far the most common. This takes the form of a number of elongated ovoid petals radiating from the centre of the hemisphere. The design is found on bells throughout the post-medieval period.

Fig.13
16th-17th century bell with sunburst decoration on both hemispheres

Fig.14
16th-17th century bell with fish-scale pattern on the lower and sunburst on the upper hemisphere

The second most likely form of on both hemispheres decoration to be found is the fish-scale pattern. This was used during the early part of the post-medieval period, but is rarely, if ever, found on bells made after the 17th century. It is often used to decorate the lower hemisphere of the bell, in combination with a sunburst design on the upper hemisphere.

There are various other forms of decoration, including crowns (Civil War period?), leaves, and human and animal faces, but the vast majority of bells are either plain or have sunburst or fish-scale decoration, or a

combination of these types.

As indicated, the sunburst design occurs in various varieties, and some interesting geometric patterns are to be found. It should also be noted that the founder's mark or initials often occupy the very centre of the decorated area on the lower hemisphere. These are discussed in detail below.

Fig.15
16th–17th century bell with a variety of the sunburst decoration in which each of the petals contains a figure '9' symbol, and there are arrowheads pointing to the centre on each side of the sound bow

Fig.16
Late 18th crotal bell decorated only on the lower hemisphere

Bells that are decorated only on the lower hemisphere tend to be of later date, usually late 18th to mid 19th century. Those with no decoration also usually date to this later period. There are, however, exceptions to this general rule, and plain bells of early post-medieval date are also known. All the indicators discussed should be taken into consideration when dating a bell. It should also be noted that the decoration can often have a very worn appearance, and is sometimes barely discernible. It seems unlikely that such wear occurred in use, and it is probably mostly due to the use of worn-out patterns.

Metals

In the absence of analytical information, any comment on the composition of the metal from which cast crotal bells were made is inevitably speculative. The difference in appearance, however, between many earlier post-medieval bells, and the majority of later ones is such that it warrants comment, as it plays a part in their dating.

Many of the earlier bells were cast in alloys that have a distinctly white or grey appearance, and they are often casually described either as being of pewter or

having a tinned surface. On closer examination, however, neither of these descriptions would appear to be correct. Pewter is a lead/tin alloy, but the corrosion products, where they occur on these 'white-metal' bells, are green, thus indicating the presence of copper. If the bells had a tinned surface, it would be evident when examining fracture surfaces, but this is not the case. The metal is white and consistent across the section. The most likely interpretation is that it is a high-tin copper alloy, possibly with a small addition of lead to facilitate casting. For the present purposes, the point to note is that bells cast in this white metal are unlikely to post-date the 17th century. Apart from their colour, bells of this type tend to have a thicker cross-section than their later counterparts, and are correspondingly heavier in relation to their size.

Later bells are more readily recognisable as being of copper alloy, and are invariably found with a characteristic green-brown patination.

Makers' Marks

Many crotal bells carry a maker's mark, invariably located at the centre of the lower hemisphere, and often within a cartouche or dedicated area of the design. The mark may be a symbol, typically a bell-founder's hammer or the initials of the maker, or in some cases both. Makers' initials, in particular, have proved to be helpful in dating post-medieval crotal bells and establishing their chronology. Foundries that cast crotal bells also produced other types, and, for the more important ones, this included church bells.

Fig.17
16th-17th century crotal bell with bell-founder's hammer mark in shield

Fig.18
17th century crotal bell with the initials HW (William Seller's Foreman ?) on one side and a founder's hammer on the other.

The latter were often marked with the name of the founder and the date of manufacture, and as many of the bells have remained in service over the centuries, these details are available and have been recorded for the benefit of researchers. Using this information in conjunction with that from documentary and other primary sources, it is sometimes possible to relate makers to crotal bells that bear their initials. However, it is necessary to sound a note of caution, as simply matching a pair of initials to the name of a founder can easily result in misattribution if there is no corroborative evidence.

It is estimated that about 170 bell

foundries have operated in Britain since the middle of the 13th century, varying in size from cottage industry operations to major businesses. The number in operation at any one time rose steadily from approximately five in 1250 to a maximum of nearly sixty around 1700, and then progressively declined to just two at the beginning of the 21st century. Not all bell foundries will have made crotal bells, of course, but the scope for errors of attribution will be apparent from the statistics.

Where initials occur, they may be on one side of the sound bow, or divided by it. Where they are on either side of the bow, they may be orientated at 0 degrees or 180 degrees to each other (as the RW example illustrated). In some cases they are neat and may originate from the pattern. In others they are crude, and appear to have been engraved on the bell itself.

Fig.19
18th century crotal bell with the initials WG (William Gwynn ?) on one side and a founder's hammer on the other.

Fig.20
18th century crotal bell with the initials RW (Robert Wells Foundry)

Table 1 below is an alphabetical list of initials that have been confirmed either by direct examination of crotal bells or photographs of them. It also shows the names of founders attributed to them and the related foundries and approximate dates of operation. Many other initials are mentioned in the works consulted, and a number are attributed to founders, but where it has not been possible to trace an example of the bell, they have been omitted. The list is therefore inevitably incomplete, and will be extended as more information becomes available.

Table 2 provides further information about the foundries, the bell-founders and the relationships between them. It is arranged alphabetically by foundry location. The comments in the table reinforce the point made above concerning the scope for errors of attribution.

Table 1: Initials/Names on Crotal Bells

Mark	***Name***	***Approximate dates when casting bells***	***Foundry Location***

AG	*Andrew Gurney*	*Late 17th century*	*Hull*
AS	*Uncertain*	*16th–17th century*	*Uncertain*
CL	*Possibly symbols, rather than letters*	*16th–17th century*	*Uncertain*
DS	*Uncertain*	*Uncertain*	*Uncertain*
ER	*Edward Read*	*1751-1753*	*Aldbourne*
ES	*Edward Seller I* *Edward Seller II*	*1685-1724* *1723-1760*	*York* *York*
EW	*Edne Witts*	*1760-1777*	*Aldbourne*
GT Wigan	*Gerald Tarleton*	*1740-1755*	*Wigan*
HP	*Henry Pleasant*	*1694-1707*	*Sudbury*
HW	*William Seller's unnamed foreman.*	*1683-1687*	*York*
IB	*James Bridgman*	*1828-1851*	*Aldbourne*
Iohn Doole	*John Doole*	*18th–19th century*	*Uncertain (See under Misc.)*
IH	*John Higden*	*1619-1652*	*Reading*
IL Wigan	*John Latham*	*1760-1783*	*Wigan*
IR	*John Read* *John Rudhall*	*1751-1753* *1808-1835*	*Aldbourne* *Gloucester*
IS	*John Stares* *John Seller*	*1743-1746* *1733-1760*	*Aldbourne* *York*
Joseph Wallis	*Joseph Wallis*	*Uncertain*	*Uncertain (See under Misc.)*
RC	*Robert Corr I* *Robert Corr II*	*1690-1715* *1720-1724*	*Aldbourne* *Aldbourne*
RE	*Richard Eldridge*	*Early 17th century*	*Wokingham & Horsham*
RW	*Robert Well I* *Robert Wells II*	*1755-1781* *1775-1798*	*Aldbourne* *Aldbourne*
TS	*Thomas Swain*	*1771-1781*	*London*
WD	*William Dunn*	*1800-1852*	*London -Bloomsbury*
WG	*William Gwynn*	*1770-1813*	*Aldbourne*
WK	*Uncertain*	*18th–19th century*	*Uncertain (See under Reading.)*
WS	*William Seller*	*1675-1687*	*York*
WW	*Uncertain*	*Uncertain*	*Uncertain*

Table 2: Foundry and Founder Details

Foundry	**Details**	**Founders and approximate dates when casting bells**
Aldbourne *Corr*	*The origins of this foundry can probably be traced back to 1642, when William Corr, a*	*John Corr I 1670<1714* *Oliver Corr I 1675<1716*

1670-1742	*gunsmith living in Aldbourne, is first mentioned. William himself was probably not involved in casting bells, but two of his sons, John I and Oliver I, certainly were. The earliest reference to their bell-founding activities is in 1698, but it is likely that by then they had been in the business for some time. John I's son, William, followed his father's trade, but was the last of his line to do so. Oliver II, eldest son of Oliver I, died at the age of 30, and it is uncertain whether he was involved with the foundry. Oliver I's second son, Robert I, operated in partnership with his wife, Joan, until his death in 1715 at the relatively early age of 44 years. Joan continued her involvement in the business, along with William, and was joined in turn by her sons, Robert II and Oliver III. However, William only lived for a further four years, and the untimely deaths of both Robert II, at 23 years, and Oliver III, at 22 years, must have placed an enormous strain on her. She persevered with her only surviving son, John II, until her own death in 1732. John II then ran the business until 1741, in which year he ceased founding. Two church bells signed 'R Cor 1742' were possibly made by John II's nephew, Robert III, but some believe that the last two figures of the date have been inadvertently transposed. If confirmed, however, these would be the last known products of the Corr Foundry.* *The only initialled crotal bells currently attributed to this foundry are those marked 'RC', but these are believed to have been cast by William and John II, as well as Robert I.*	*William Corr 1680<1719* *Oliver Corr II (1685<1697)* *Robert Corr I 1690-1715* *Joan Corr 1712-1732* *Robert Corr II 1720-1724* *Oliver Corr III 1722-1727* *John Corr II 1730-1741* *Robert Corr III (1740-1742)*
Aldbourne *Stares & Read* *1743-1753*	*The reason for connecting John Stares and Edward Read is that in 1743 both men are linked with an Aldbourne property known as 'Court House', which Stares bought from a member of the Corr family. They may, however, have operated independently, or Read might have succeeded Stares. Crotal bells marked 'IS' and 'ER' are attributed to them.* *Bells marked 'IR' are attributed by Moir to John Read of Aldbourne, and they do seem to be of 'Aldbourne style'. However, Butler has found no documentary evidence of a John Read, and attributes the bells to John Rudhall of Gloucester.*	*John Stares 1743-1746* *Edward Read 1751-1753* *(John Read 1751-1753)*
Aldbourne *Wells* *1755–1825*	*The Wells Foundry was established in 1755 by Robert I (b.1725), the only son of William Wells, a local blacksmith. Robert I ran the foundry until his death in 1781, at which time, he was working jointly with his son, Robert II (b.1756). Robert II was joined by his younger brother, James (b.1771), around 1790, and when he retired in 1798, he left James in charge. For some time, the business did very well under James, but*	*Robert Wells I 1755-1781* *Robert Wells II 1775-1798* *James Wells 1790-1825*

	circumstances changed, and in 1825 it went bankrupt and was sold to Thomas Mears II of the Whitechapel Foundry. *Wells crotal bells are virtually identical to those produced by the Seller Foundry at York. It seems likely, therefore, as Butler suggests, that when Edward Seller II ceased trading and sold his equipment in 1761 and 1763, Robert Wells I acquired his patterns.* *The only initialled crotal bells currently attributed to this foundry are those marked 'RW', and these were probably produced even during the period when James was in sole charge.*	
Aldbourne *Witts 1760–1777*	*Edne Witts was born about 1737. His family had lived in Aldbourne since the middle of the 17th century, and had introduced fustian weaving to the village. His ancestor, Edward de Wit, issued his own trade tokens in 1666 with a weaver's shuttle on the reverse. Edne was also a fustian weaver, as well as a bell-founder. From two church bells, he is known to have been founding in 1760 and 1774, but probably ceased some time before his death in 1808. Crotals marked 'EW' are attributed to him.*	*Edne Witts 1760-1777*
Aldbourne *Gwynn 1770-1813*	*Although details of only one member of this family are listed, the initials 'WG' occur on crotal bells that seem to span a considerable period of time and differ widely in quality. It is possible that earlier members of the family were involved in bell founding, or that the initials on the earlier and cruder bells are those of an unrelated maker. The William Gwynn listed was born in 1749 and died in 1813.*	*William Gwynn 1770-1813*
Aldbourne *Bridgman 1828-1851*	*James Bridgman was born in Aldbourne about 1782, and originally worked for the Wells Foundry. When Wells went bankrupt in 1825, he was offered employment at the Whitechapel Foundry, and worked there for three years. In 1828, however, he decided to return to Aldbourne and establish his own business, as both bell-founder and bell-hanger. The business operated until 1851, when he had a serious accident while hanging some bells. He died in 1858. Crotal bells marked 'IB' are attributed to him.*	*James Bridgman 1828-1851*
Chertsey *Eldridge 1622-1710*	*The Chertsey foundry was established in 1622, when the Eldridge family moved from Wokingham. Brian I (d.1640) was the son of Richard, and the father of Brian II (d.1661) and William (b.1634, d.1716). The later bell-founder, Thomas Swain of London, was a descendant of William Eldridge.*	*Brian Eldridge I 1622-1636* *Brian Eldridge II 1649-1658* *William Eldridge 1660-1710*

Gloucester *Rudhall* *1684-1835*	*Gloucester has a long history of bell- making, which dates back to at least the 13th century, when 'John of Gloster' is recorded as a bell-founder. However, it came into prominence under the Rudhall family, which had bell-foundries there for 150 years. It was Abraham I, a local carpenter, who established the family's first foundry in 1684, and successive generations ran the business until it was taken over by the Whitechapel Foundry in 1830.* *Butler attributes the initials 'IR', found on crotal bells, to John Rudhall, but Moir attributes them to John Read of Aldbourne.*	*Abraham Rudhall I 1684<1736* *Abraham Rudhall II 1704-1735* *Abel Rudhall <1760* *Thomas Rudhall <1783* *Charles Rudhall <1815* *John Rudhall 1808-1835*
Hull *Gurney* *Late 17th C*	*Little information has been traced, but Butler suggests that crotal bells with the initials 'AG' might be attributable to Andrew Gurney of Hull. He states, "The only church bell founder with these initials in the north of England was Andrew Gurney of Hull, whose bells bear dates of 1676 and 1678."*	*Andrew Gurney Late 17th C*
London *Swain* *1771-1781*	*A bell-founder named Thomas Swain, descended from William Eldridge of Chertsey, was working in London during the second half of the 18th century. His name appears on some church bells cast between 1771 and 1781. Crotal bells bearing the initials 'TS' are tentatively attributed to him.*	*Thomas Swain 1771-1781*
London - Bloomsbury *Dunn* *1800-1852*	*William Dunn was born c.1775, admitted to the Worshipful Company of Founders in 1796, and ceased founding c.1852. Butler attributes Crotal bells bearing the initials 'WD' him.*	*William Dunn 1800-1852*
London - Whitechapel *1570*	*The Whitechapel Foundry was established in 1570, and is still in producing bells. In fact, it is possible that a direct link goes back even further, to 1420, when Robert Chamberlain was casting in Aldgate. The earliest known bell was cast by master founder, Robert Mot, in 1575. The foundry has occupied its present premises since 1738, and has produced bells of all sizes, including church bells, which have been exported around the world. At the time of Thomas Mears II, the Whitechapel foundry became the most famous foundry in England. The Wells Foundry of Aldbourne (1825) and the Rudhall Foundry at Gloucester (1830) were both purchased and integrated into the Whitechapel organisation.* *When Thomas Mears II died in 1844, his two sons, Charles and George ran the business as 'C & G Mears'. Charles died in 1855, but the firm continued to trade under that name until George took on Robert Stainbank as a partner in 1864. It then traded as 'Mears & Stainbank', but George Mears was bought out by his partner the*	*Robert Mot 1570<1608* *Joseph Carter 1606-1610* *William Carter 1610-1619* *Thomas Bartlett 1619-1632* *John Clifton 1632-1640* *Anthony Bartlett 1640<1676* *James Bartlett 1676–1700* *Richard Phelps 1700-1738* *Thomas Lester 1738<1769* *Thomas Pack 1752<1781* *William Chapman 1769<1784* *William Mears 1781-1789* *Thomas Mears I 1790-1810* *Thomas Mears II 1805>1844* *Charles Mears 1844>1855* *George Mears 1844-1865* *Robert Stainbank 1864>1883*

	following year and took early retirement.	
Reading *Knight* *1518-1709*	*It is said that the Knight family first became involved in bell-founding at Reading in 1518, but the earliest member traced here is William, operating from the 1560s. William's descendants ran the foundry until Samuel transferred operations, firstly to Arundel in 1709, and thence to Holborn in 1730. He died in 1739. Two other early bell-founders of the town, John Sanders and Joseph Carter are also listed, the second of whom moved to Whitechapel Foundry in 1606.* *Crotal bells exist with the initials 'WK', and some writers have associated these with William Knight. They are, however, of later date.* *Bailey attributes crotal bells with the initials, 'IH', to John Higden. Butler notes, however, that there are many church-bell founders with these initials.*	*John Sanders 1539-1559* *William Knight 1567-1586* *Joseph Carter 1579-1606* *Henry Knight I 1586-1622* *John Higden 1619-1652* *Ellis Knight I 1626-1651* *Henry Knight II 1640-1684* *Francis Knight 1651* *Ellis Knight II 1661-1684* *Samuel Knight 1684-1709*
Sudbury *1694-1759*	*Henry Pleasant cast a great number of bells for Essex and Suffolk churches, and is noted for his rhyming couplets on them. Thomas Gardiner moved to Norwich in 1745, but returned to Sudbury in 1754.* *Bailey attributes crotal bells marked 'HP' to Henry Pleasant.*	*Henry Pleasant 1694-1707* *John Thornton 1708-1725* *Thomas Gardiner 1720-1759*
Wigan *18th century*	*Little is known, but the founders listed were working in the town during the 18th century. Crotal bells marked 'GT Wigan' and 'IL Wigan' are attributed to Gerald Tarleton and John Latham, respectively.*	*Ralph Ashton 1703-1720* *Luke Ashton 1724-1750* *Gerald Tarleton 1740-1755* *John Latham 1760-1783*
Wokingham *1350–* *Landen*	*The history of a foundry at Wokingham dates back to circa 1350, and for most of the 15th century, the Landen family was responsible for casting a large proportion of southern England's church bells.*	*Roger Landen mid 15th century* *John Mitchel 1445-1480*
Wokingham *1564–1622* *Eldridge*	*Thomas Eldridge probably served his apprenticeship at the Reading foundry. He established the family business in Wokingham when he took over the foundry at Smyths Place in 1564. When he died in 1597, his son, Richard, who is also recorded working at 'The Belle House', Horsham in 1592, succeeded him. It is likely that Richard's own son, Brian I, worked with his father at this foundry, as he cast a church bell in 1620. The foundry was moved to Chertsey in 1622, where Brian I's career continued.*	*Thomas Eldridge 1564<1597* *Richard Eldridge 1592-1623* *Brian Eldridge I 1620-1622*
York *Seller* *1662-1760*	*The first record is of 1662, when William Seller is mentioned as having a foundry in Jubbergate. William was succeeded by his son, Edward I,*	*William Seller 1675-1687* *HW 1683-1687* *Edward Seller I 1678-1724*

	who, on his death in 1724, left the foundry to his sons, Richard and Edward II. Richard only survived his father by a few months, and Edward II ran the foundry alone until his own son, John, joined him in 1733. The two men worked together until the late 1750s, when Edward II retired and it was decided to close the foundry. *When the assets of the foundry were sold in 1761 and 1763, it is likely that Robert Wells of Aldbourne purchased the crotal bell patterns, as the products of the two foundries are virtually identical.* *Bells marked 'ES' are attributed to Edward Seller I or II, or possibly both.* *Butler suggests that Crotal bells marked 'WS' might be attributable to William Seller. If this is accepted, those marked 'HW' could be those of his foreman, as William's church bells are marked with both sets of initials. Unfortunately the foreman's name is unknown.*	*Richard Seller 1713-1724* *Edward Seller II 1723<1760* *John Seller 1733<1760*
West Country *Purdue* *1570-1710*	*The Purdue family's first foundry was in Closworth, Somerset, but they later ran many others, and it is clearer to list them together, rather than being split geographically, as the entries above. The locations and related family members are shown below. It will be noted that some family members are associated with more than one foundry.* *Closworth: William I, George &Thomas* *Taunton: George* *Banbury: Richard* *Glastonbury: Richard* *Bristol: Roger I & Roger II* *Stofford: Richard* *Salisbury: William II* *George, Richard and Roger I were sons of William I. William II, Roger II and Thomas were his grandsons.*	*William Purdue I 1572-1618* *George Purdue, 1599-1633* *Roger Purdue I, 1601-1640* *Richard Purdue, 1600-1640* *William Purdue II, 1637-1669* *Roger Purdue II, 1649-1688* *Thomas Purdue, 1647-1707*
Misc.	*A 68mm dia crotal bell with this name is illustrated in Benet's Artefacts.* *Mentioned by Butler*	*John Doole 18th–19th century* *Joseph Wallis*

Manufacture of the One-Piece Crotal Bell

The following paragraphs are based on an article published in Rescuing the Past (Countryman Books, 1970), in which the process used by the Whitechapel Foundry to mould and cast one-piece crotal bells is described in detail. Since first being employed, around the end of the 15th century, the process and the equipment used will have been subject to many improvements, but in principle the method has

remained the same. As indicated elsewhere in this article, a development occurred sometime during the 17th century, which required that the pattern had a detachable ‘sprue-piece’. The use of an ‘oddside cup’, to ensure exact positioning of the pattern, is also likely to be a later refinement, as is the use of metal, rather than wooden moulding boxes. It should also be borne in mind that although a single bell is considered below, in practice a significant number of bells were moulded in each box, and cast at the same time.

The bells were cast in two-part moulds with the joint line at the girth rib of the bell. The patterns from which the moulds were made were probably of metal, as the decoration would need to be quite finely engraved.

The first stage of the process involves the use of an oddside cup, as mentioned above. This ensures that the mould joint line is positioned exactly at the centre-line of the bell. The cup is placed inside an open-ended moulding box, set on a moulding board as shown. Sand is packed around it, rammed tightly and levelled at the top.

Fig.21
Oddside Cup

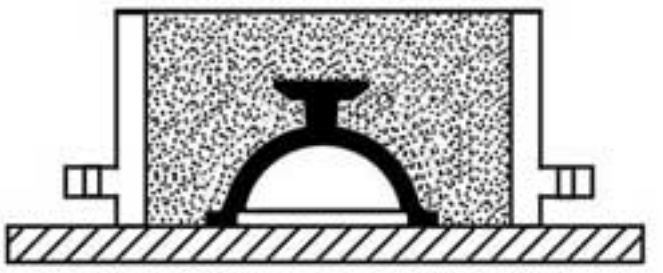

Fig.22
Stage 1 - The oddside cup is set in a moulding box.

The moulding box with the oddside cup is then turned over, and the pattern for the bell is placed in the cup. A second moulding box is placed on top of the first one and guide pins are fitted to ensure that there is no lateral movement between the two boxes when they are dissembled and reassembled. Moulding sand is then added to the upper box, rammed tightly around the pattern and levelled at the top of the box.

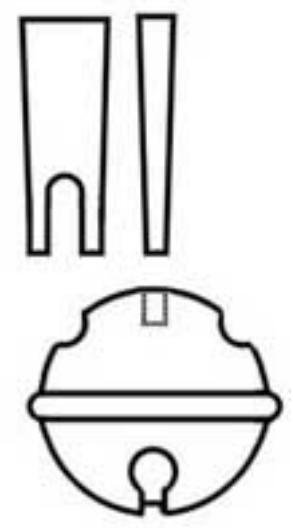

Fig.23
Pattern with detachable sprue-piece

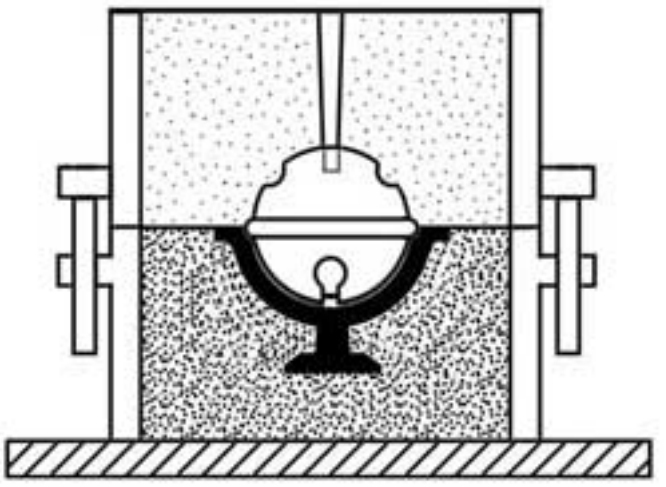

Fig.24
Stage 2 - The pattern is placed in the oddside cup and the top half of the bell is moulded.

At the next stage the moulding box with

the oddside cup is removed. It can be used repeatedly for other moulds, as it is not destroyed in the process. The second moulding box with the pattern in place is then turned over, and an empty box placed on top of it. This, in turn, is filled with moulding sand, rammed and levelled flush with the box.

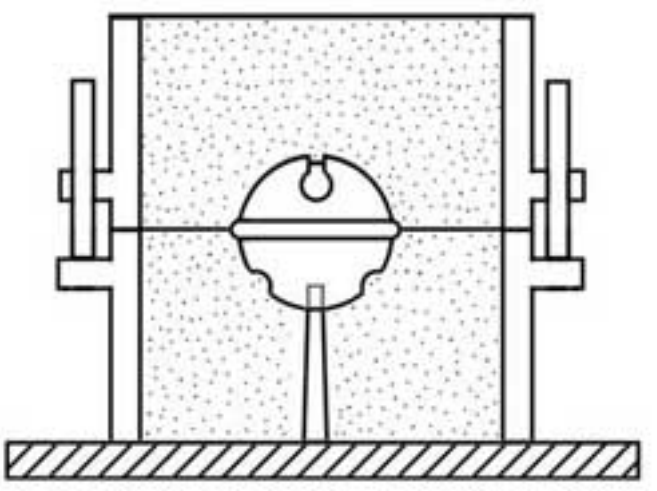

Fig 25
Stage 3 - The oddside box is removed and the bottom half of the bell is moulded.

The completed mould is turned over and the two boxes are separated. The pattern is removed, the sprue-piece being withdrawn from the top of the mould, and the body of the bell from the underside. A spherical sand core produced in a core-box and with an embedded iron pellet, is then placed in the lower half of the mould. It is supported on the ridge of sand that forms the sound bow of the finished bell. The upper half of the mould is then carefully lowered on to the lower half. The two small sand projections that will form the holes in the bell's upper hemisphere ensure that the core is located centrally, so that the thickness of the bellchamber wall is uniform. A pouring cup is positioned on top of the completed mould, which is then placed on a bed of sand reading for casting.

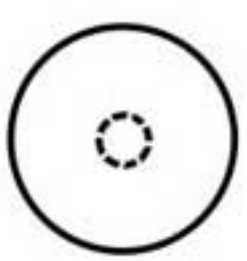

Fig.26
Core of sand with embedded iron pellet

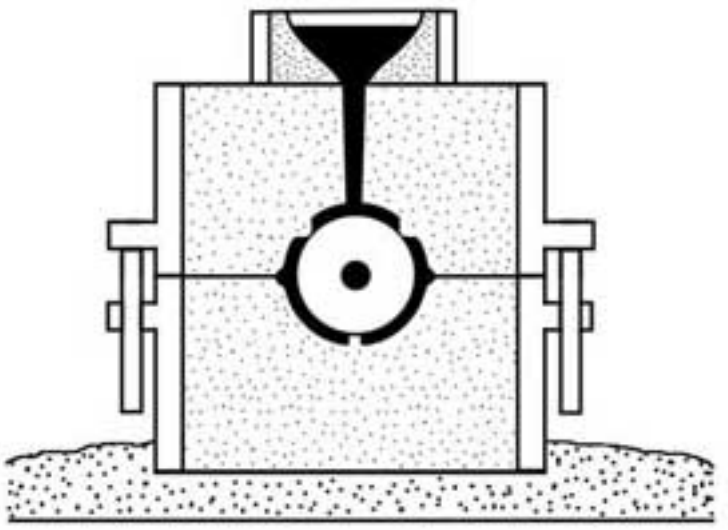

Fig.27
Stage 4 - The pattern is removed, the core (with embedded pellet) is placed in the mould, and the bell is cast.

Molten metal is poured into the mould, which is then allowed to cool. It is then

opened, the bell removed and excess metal trimmed from the sprue-piece. The core is removed as loose sand through the upper holes and sound bow, leaving the iron pellet trapped within the bellchamber. Finally, the bell is fettled and wire-brushed to complete the process.

Bibliography

Printed Sources

Bailey, Gordon, *Datafile* (The Searcher, June 1989)
Bailey, Gordon, *Detector Finds* (Greenlight Publishing, 1992)
Butler, William, *Musical Handbells* (Phillimore & Co Ltd, 2000)
Cripps, Anne (Ed), *Rescuing the Past* (Countryman Books, 1970)
Egan, Geoff, and Pritchard, Francis, *Dress Accessories c.1150-c.1450* (MoL 1991)
Griffiths, Nick, *Medieval Harness Pendants* (Finds Research Group Datasheet 5)
Mitchiner, Michael, *Medieval Pilgrim & Secular Badges* (Hawkins Publications, 1986)
Moir, W, *The Aldbourne Foundry and Cast Rumbler Bells* (Antique Metalware Society Journal, Vol 4, June 1996)
Read, Brian, *History Beneath Our Feet* (Merlin Books, 1988)
Read, Brian, *Metal Artefacts of Antiquity* (Portcullis Publishing, 2001)

Internet Websites

British History Online: http://www.british-history.ac.uk/
Church Bells in Gloucestershire: http://www.ringing.demon.co.uk/towers/glos.htm
Great Bells: http://www.btinternet.com/~keltek/Great_bells_of_GB.xls

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