

A Review of the Information Gained from Dendrochronologically Dated Chests in England

MARTIN BRIDGE AND DANIEL MILES

Wooden chests form the basis of many studies, including the evolution of construction, decoration, ironwork, and lock mechanisms, but this paper discusses the wood itself, and the insights gained into the movement of wood as a resource in historical times resulting from dendrochronological dating. On the Continent more than 50 wooden chests, mostly of oak or pine, have been dated in the Luneburg monasteries alone. These are discussed by both Albrecht and von Stülpnagel, both giving well illustrated examples of dated chests with which examples in England could be compared stylistically as a first step in dating.¹ In England, relatively few chests have been dated, and no systematic study has been undertaken, resulting in the findings either being well scattered in the literature, or only published as a date with little additional information. If the dating has been commissioned by an individual, it is possible that the dates are not disseminated at all. This paper may not therefore be an exhaustive survey of all that is known from dated chests in England, but it will hopefully serve as a starting point for further study.

This paper confines itself to chests, although it does not propose to put forward a definition of the term. Essentially chests are considered to be portable items, compared with other objects like cupboards. Paradoxically however, most of the items discussed here have probably sat in much the same place for centuries.

The 34 chests whose dates have been determined are in churches, cathedrals and abbeys, the Public Record Office, museums, and private collections. Few dates have been published for domestic chests, the numbers of which must be considerable, unless one considers the date for the chest from Boughton Monchelsea Place, Kent, which is thought to have possibly come from the medieval church which sits within the estate.² The original function of the Lydham chests (numbers 33 and 34 in the catalogue) is unknown. Until recently, the excellent books available covering a number of chests³ have generally given stylistic dating only, except where dates are carved on the chest itself, or documentary evidence firmly dates the object under scrutiny. The very informative book by Geddes on ironwork includes the discussion of several chests dated stylistically on their metalwork.⁴ The exception to this is Sherlock's recent book *Suffolk Church Chests*, which details the dendrochronological dates obtained for chests at Little Waldingfield, Mendlesham and Poslingford.⁵ The English Heritage Research

¹ Albrecht (1997), pp. 214–25; von Stülpnagel (2000), pp. 60–63.

² This chest was dated by Ian Tyers and is reported in the catalogue for a sale of Oak, Country Furniture, Folk Art and Works of Art, Christie's, London, 3 November 1999, pp. 74 and 76.

³ For example, Roe (1902); Cox and Harvey (1907)

⁴ Geddes (1999).

⁵ Sherlock (2008).



1 Lid of a Westminster Abbey chest showing surface prepared and marked by early dendrochronological investigators. *The authors*

Report Series also recently detailed work on a number of chests dated at Westminster Abbey, but this cannot be considered to be widely read.⁶ Neither can the other main source of dates, Fletcher and Tapper's 'Medieval artefacts' paper of 1984, in which Table 5 is the source of many of the dates given here, but which lacks information on the chests themselves or what the ring series have been dated against.⁷

One of the biggest problems in the dendrochronological dating of chests is of getting the tree-ring sequences themselves. In the past, exposed end-grain on boards has been cleaned and measured with a hand-held graticule, photographed, with the images being analysed subsequently, or had impressions made with a modelling clay that can be hardened. These methods limit the number of elements that can be investigated, and may cause some minor aesthetic damage in some cases (Figure 1). It has, nevertheless, produced some very valuable dating and provenancing information. Many boards or planks are too abraded or damaged, or simply do not have exposed end-grain, making this methodology unacceptable in many cases.

⁶ Miles and Bridge (2008).

⁷ Fletcher and Tapper (1984).



2 (left) Micro-boring the Mendlesham I pine chest. *The authors*

3 (above) Hole left after microboring, this is subsequently plugged and stained. *The authors*

Recent advances have allowed another method to be used – micro-boring (Figure 2). This uses a small 8mm outside diameter hollow drill bit which extracts a 5 mm diameter core. The drill bit is cooled and cleared of dust with the aid of compressed air which is channelled through the inside of the cutting tube and clears the waste from around the outside of the bit. The drill bit is accurately aligned by the use of a series of guides fitted to a jig which is clamped to the face of the board or plank. In this manner the drill can be used to bore through a number of boards as thin as 15 mm thick and as wide as one metre or more. Thus a number of boards can be drilled in succession with the need to make only a single hole (Figure 3), which is afterwards plugged and stained.

The extracted cores are mounted on grooved timber mounts and prepared by being sanded on a linisher using 60 to 1200 grit abrasive paper, and cleaned with compressed air to allow the ring boundaries to be clearly distinguished. Various laboratories use slightly different hardware and software measuring set-ups, but the ring-widths are generally recorded to the nearest 0.01mm. The derived series are then compared with dated reference sequences both statistically and using plots of the ring-width series which can be compared on a light table. Various statistical methods have been used in the cross-matching of ring-width series, but the one most commonly used in Europe is the Student's t-test. This calculates a correlation coefficient for every possible overlap and modifies it according to how many rings are overlapping, producing a value related

to the probability of the match being significant. Usually series of over 50 rings match in the same position against a large number of independent dated series with *t*-values greater than 3.5.⁸ In practice, one would expect to find values of at least 5 or 6 against a number of dated series, all at the same position, with the plots being acceptable to the trained eye.

Now that the database is so extensive, the geographical spread of the results gives some indication of the origin of growth of the wood. In this way it is possible to determine imported timbers. Material from modern Poland, and states to the north and east, generally dates quite readily as it tends to have long ring sequences, and the reference material is well replicated. Sometimes more unusual sources might be harder to determine. For example, the Courtrai panel was re-analysed by Ian Tyers and he suggested the origin of the timber to be Scandinavia.⁹ There is then the problem of interpreting the dates for the ring sequences in relation to any construction date of the object. Unlike a standing building, where structural timbers often retain their bark edge, allowing precise felling dates to be given accurate to the season of the year, chests rarely retain any bark edge, and sapwood rings are seldom present. Only one of the 34 listed here had bark edge recorded on one of the leg members. The best we can hope for is the heartwood/sapwood transition on a few members, from which a felling date range can be given. This assumes that the heartwood/sapwood transition has been correctly identified. Ideally, several independent samples from the same piece should share similar heartwood/sapwood transition dates. More often than not however, no sapwood or heartwood/sapwood boundary will be evident on the series of ring sequences, and here only a *terminus post quem* or 'felled after' date can be given. This is determined by taking the minimum of the appropriate sapwood estimate and adding it to the timber with the latest last measured ring date. This then gives the earliest possible date at which the piece could have been constructed. Sapwood estimates vary across Europe, and become refined through further research, and determining the origin of the timber through dendroprovenancing is essential for calculating the appropriate felling date range.

The first dendrochronological investigation of chests in England was on chests in Westminster Abbey carried out by Dr John Harvey and A. W. G. Lowther. In 1948 Harvey sanded the edges of boards of a number of chests including the Greater Treaty Chest in the Pyx Chamber, and the Long and Big chests in the Muniment room, and made graticule measurements to 0.1 mm accuracy. These he passed on to Lowther who analysed them using a series of mathematical tests as well as visual comparisons. The results of this work were published in 1957,¹⁰ expanding on and revising some initial conclusions published in 1951.¹¹ Lowther also worked on the Winchester College chest.

Between 1970 and 1984 Dr Fletcher reviewed Lowther's material and took measurements from additional boards from the Westminster Abbey chests, including the

⁸ Baillie and Pilcher (1973) This work became the basis for statistical cross-matching in Europe, although variations have been produced since, e.g. by a German dendrochronologist, Hollstein, who adapted the statistics.

⁹ Personal communication.

¹⁰ Schove and Lowther (1957).

¹¹ Lowther (1951).

Greater Treaty Chest and the Long and Big chests, as well as the Lesser Treaty Chest, Cope chest, and from the Deep chest in the Muniment Room. Detailed results were published in 1976 on the Greater Treaty Chest, and on the other items in 1984.¹² An incomplete series of punch cards for all of the items were found in the Fletcher archive held by the Oxford Dendrochronology Laboratory and were transcribed to machine-readable format for re-analysis at the time of the more recent study.¹³ Much of Fletcher's early work relied on comparisons of the data obtained with dated reference material using the *W* statistic, or *Gleichlaufigkeit*. This is a non-parametric statistic, simply counting the number of coincidental increases, decreases or lack of change between one ring width and the next. It has been largely replaced throughout Europe by the use of Student's *t*, first described for use in dendrochronology by Baillie and Pilcher (1973) and also used in slightly different forms by others. In the course of the Westminster study some of the Fletcher's dates have been re-evaluated and most have been found to be broadly correct, although it has not been possible to confirm one or two of his early dates. It must be remembered that this early work was done in the pioneering era of dendrochronology and that since then both confidence levels and available reference chronologies have improved. Nevertheless it is important to remember that some of the early published dates by Fletcher and Tapper have yet to be confirmed.

CATALOGUE OF DENDROCHRONOLOGICALLY DATED CHESTS IN CHRONOLOGICAL ORDER

1. *Wells Cathedral Cope Chest* (Miles, Worthington and Bridge 2003)

The cope chest is one of seven surviving medieval examples in England. It is segmental in plan with a hinged lid. The front and sides were ornamented with blind arcading, the arches and stepped bases of which remain. A reference to lining the chest with linen in 1409 led to a supposition that it was early fifteenth century; it was later assigned to the fourteenth century, and Cecil Hewett dated it to the thirteenth century.¹⁴ Recently its Romanesque detailing has been recognised, particularly the stepped bases, suggesting a twelfth-century date. Although measurements from the V-edged rear panels failed to date, a felling date range of 1111–43, for a moulded bottom side rail, makes it the oldest item of scientifically-dated wooden furniture in the British Isles, although this date is somewhat earlier than anticipated from the detailing. Ideally additional samples with sapwood are needed to confirm this early date range.

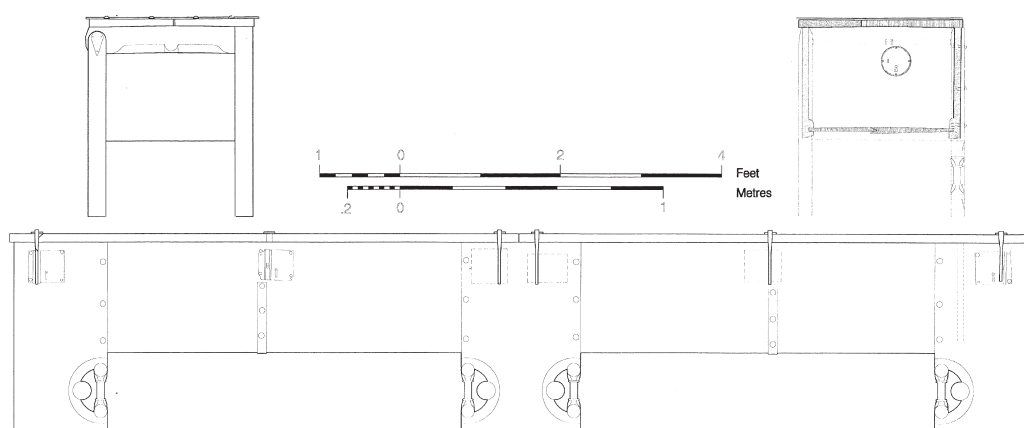
2. *Long Chest (Chest 1), Muniment Room, Westminster Abbey* (Miles and Bridge 2008)

This exceptional chest (Figure 4) is almost 13 ft (400 cm) long, 2 ft (61 cm) wide, and 2 ft 5 ins (74 cm) high. It is situated at the north end of the Muniment Room, overlooking the Choir. Although all the three chests in the Muniment room at present hold documents, they were most likely to have been originally constructed to hold royal

¹² Fletcher (1976); Fletcher and Tapper (1984).

¹³ Miles and Bridge (2008).

¹⁴ Hewett (1988), pp. 105–23.



4 (above) Scale drawing of the Long Chest, 1167-99, oak, Muniment Room, Westminster Abbey, London. *Dan Miles*

5 (right) Detail of decoration, Long Chest, 1167-99, oak, Muniment Room, Westminster Abbey, London. *The authors*



treasure. There are three large stiles front and back: the ends measure 14 ins (35 cm) wide and the middle one 18 ins (45 cm). The front stiles have D-shaped indents closed by small columns with Romanesque cushion capitals (Figure 5). A chest in Little Canfield, Essex is much smaller, but of very similar decoration. The front boards were tapered with the widest part at the bottom, but were then hollowed out internally to give parallel faces to the inner face of the plank. They are tenoned into the stiles and set back slightly from the face of the stiles and pegged with a number of pegs with large decorative iron studs nailed over. The end boards were similarly hollowed out internally and were housed in the stiles. The bottom of the chest is made up of two V-jointed tapered boards, the groove having a $\frac{1}{4}$ in. (0.5 cm) round gullet.

The lid is in two halves, each with an outer rail with decorated chamfer and central bar and ogee run-out end stops. This is cut so that it forms a pivot, or carpenter's hinge, over the rear stiles. Each lid is made up of two boards, which are held together by three straps with staples at each end, having a hasp on the front and a chain to the back, giving added security. There is little ironwork apart from the hinge bands and chains with the exception of a strap on the underside turning up over halfway up the front

face. A relatively modern wrought-iron hasp, dating from the eighteenth or nineteenth century, now secures each lid. The lid boards are fixed to the side rails by square pegs covered with large decorative wrought nails. Other features include an early fabric lining and a till on the right-hand side of the right compartment with a round lock plate.

Of the eight timbers sampled, seven were successfully dated. Micro-bore samples through the front and rear panels had clear evidence of partial sapwood on the underside, giving heartwood/sapwood boundary dates of 1154 and 1160 respectively. Also, the rear left-hand lid board and the front right stile both had heartwood/sapwood boundary dates of 1161, and as they were from the same parent tree as another unidentified stile measured by Fletcher, an average heartwood/sapwood boundary date of 1161 could be ascribed to this timber too. Therefore an average heartwood/sapwood boundary date of 1158 could be calculated, from which a felling date range of 1167–99 can be ascribed to the group. The other dated boards and planks had last measured heartwood rings ranging from 1146 to 1161, and are consistent with the period of felling.

This places this chest firmly in the latter part of the twelfth century, and as such is one of the earliest chests to be scientifically dated in Britain. It is the oldest chest in the Abbey, and pre-dates the Henry III rebuilding by about half a century, and therefore is a relic of the old Norman Abbey. The successful dating of stiles, front and back boards, and lid boards has shown that the chest is still complete in its components with no replacements noted. This, together with the quality of the decoration, makes it a piece of national importance. This chest has previously been studied by Harvey, Lowther, and Fletcher over a period of 30 years, and various dates have been published. On the basis of the information to hand, it would appear that Lowther, using the measurements taken by Harvey, was able to successfully date one of the lid boards as early as the 1950s.¹⁵ Fletcher further prepared the boards and measured more of them; in his latest summary he stated that five lids and stiles were dated, and that the latest measured rings ranged from 1146–61.¹⁶ In his unpublished summary from 1977, Fletcher proposed a date range of 1190 to 1200 as a likely date of construction. This is consistent with the empirical felling date range of 1167–99 given by the present analysis.

3. *Large Oak Chest, Lapidarium, Westminster Abbey* (Miles and Bridge 2008)

This large chest with double lid is in the Lapidarium museum over the Chapel of St John the Baptist. It measures 6 ft 9 ins (206 cm) long, 2 ft 5 ½ ins (75 cm) high, and 3 ft 11 ins (119 cm) wide. The plank stiles are almost 18 ins (45 cm) wide, and vary considerably in character, with the wood of the rear stiles being exceptionally slow-grown, whilst that of the front stiles is exceptionally fast-grown. Some of the planks used to construct the sides are also very fast-grown, whilst the lid boards are of average quality. The planks used to construct the sides are 1 ½ ins (3.8 cm) thick at the base, and are then reduced to a consistent thickness of ¾ in. (1.8 cm) above the floor of the chest.

¹⁵ Schove and Lowther (1957).

¹⁶ Fletcher and Tapper (1984).

The planks used to form the front and back are tongued and pegged into the stiles, with a haunch used for the top board. The butting edges of the boards are edge-dowelled together. The lids are presently hinged together in the centre, but originally were designed to open outwards from the centre. The back leaf is hinged by the ledger, forming a pivot in the stile, and the front leaf was also originally hinged this way. The back lid is not fixed down. The hinge pins were covered with pear-shaped cover plates of which only one now survives. The lid is presently connected together with three strap hinges, and a well-wrought and decorated hasp now locks the front down. There remains part of an early locking device which consisted of a lock, set well in from the edge which had long bolts that locked into the central bearer and into the front stiles. The top is made up of three boards for the back lid, and two for the front lid. The meeting of the two lids is not parallel to the front or back of the chest. The end panels are noticeably out of parallel and are housed into the stiles and pegged through. There are traces of original decoration on the chest — the sides were red, whilst the top appears to have been coloured green. The chest has been in many different locations in the Abbey including the Muniment Room, the Triforium above the Chapel of St Benedict, and the Chapel of St Edmund before being moved to its present location. The chest has been variously dated stylistically as thirteenth-century, with the modifications to the lid as dating from around 1500.¹⁷ Most of the timber used to construct this chest was medium to very fast-grown, up to 10mm per annual growth ring, so only five samples were taken, using the micro-borer. Two samples from the lid boards were dated, one with a heartwood/sapwood boundary at 1228. As this sample was of English provenance, a felling date range of 1237–69 was obtained. The second dated sample from the lid, also English, had a last measured ring of 1220, giving a *terminus post quem* date of 1229. These timbers were of average mean ring width from trees not more than 100 to 150 years old when felled.

Conversely, the two rear stiles were very slow grown, with 239 and 308 rings respectively. The left stile had a last measured ring which appeared to be at the heartwood/sapwood boundary, whilst the right hand stile had a last measured ring, without any hint of sapwood, 22 year later. The two stiles were found to have originated from the same parent tree, however. Although a variation of 10 or even 20 years in the heartwood/sapwood boundary date within one tree is not unusual, the early occurrence of sapwood in the left stile may represent a sapwood inclusion. Given that only one of the dated boards retained any evidence of sapwood, the 1237–69 felling date range for one sample is therefore representative for the chest as a whole.

4. *Large Chest (Chest 2), Muniment Room, Westminster Abbey* (Miles and Bridge 2008)

Set immediately to the south of the Long Chest, at the north end of the Muniment Room, this chest is the largest in the Abbey. It measures 13 ft 6 ins (411 cm) long, 3 ft 8½ ins (113 cm) wide, and 2 ft 9 ins (84 cm). The front and back of the chest have three stiles each about 12¾ ins (32 cm) wide, which have simple quarter-round hollow chamfers with circular terminations. The lid is in two halves, longitudinally as well as

¹⁷ Personal communication from Tony Platt.

transversely, and is hinged by six long double-knuckled hinges, the middle two connecting with a hasp. An interesting feature which is not entirely understood is a secret locking mechanism which was activated by a pair of movable decorative studs on each lid which engaged with a bar that slid along the inside of the front panel and somehow connected with the central hasp. The evidence for this still remains in the form of an open cut-out slot a little bit below the top of the front board. Each lid had two subsidiary lock plates fixed on the front, the hasps to which are now missing, but the remains of the straps on the tops still remain. There are also two hasp and staples, probably dating from the eighteenth or nineteenth century.

The boards are tapered with the exception of the thin, $\frac{3}{4}$ in. (1.8 cm) thick bottom boards which are secured by a thickened foot of the bottom side plank, much like the Long Chest. The boards are all glued together, those forming the front panels are so finely joined that it is almost impossible to see the joint in places. A number of tapering iron straps, casually placed, reinforce the joints on the front, sides, and back of the chest. The top is made up of four boards per half, two per lid section, and is slightly concave, with the underside of the lid being flush. The ends of the lids are supported by a small ledge or rail with a simple chamfer with a stepped, run-out stop. Stylistically this chest was dated slightly later than the Long Chest, due to its simpler decoration. Fletcher published a date of after 1225 for this chest from measurements taken from the lid boards, derived from last heartwood ring dates of between 1200 and 1203.¹⁸

Of the eight timbers sampled, all were successfully dated. The five boards which were included in the chronology were clearly of German origin, but, as none of these boards included a clear heartwood/sapwood boundary, only *termini post quem* dates can be offered, ranging from 1198 to after 1212, based on an empirical sapwood range of 8–38 years.

Fortunately, the right rear lid board had an area of timber previously prepared which extended up to the year 1200, with a further 30 rings counted beyond the area of previously-sanded end grain to a clear heartwood/sapwood boundary at the back of the board. This single board therefore produced a felling date range of 1239–71. This is based on the felling date range of 9–41 years for English timbers, as the chronologies with which it is dated with suggests an English rather than a German provenance. Two other timbers of English provenance were dated. Although neither of these retained any evidence for sapwood, they nevertheless originated from the same parent tree, and gave a *terminus post quem* date of 1221. Therefore, the Large Chest was found to have been constructed of some timbers imported from the region around Germany which included some of the front boards, lid boards, and stiles, whilst some other lid boards were found to have an English origin. The felling date range of 1239–71 for one of these English lid boards is consistent with the *termini post quem* dates from the other English and German boards.

It therefore appears that the two groups of boards are contemporary and that the chest is in its original configuration. Fletcher's estimate for construction after 1225 does not conflict with the 1239–71 range produced by the 2008 analysis.

¹⁸ Fletcher and Tapper (1984).

5. *Courtrai Chest* (originally New College Oxford, currently on display in the Ashmolean Museum)

This should not really be considered as a chest — rather a carved panel from a chest incorporated into a much later (probably 17th-century) construction that was not dated. There appears to have been some controversy as to whether the carving of scenes of the ‘Battle of the Spurs’ or Battle of Courtrai (1302) was original early fourteenth-century work or a nineteenth-century copy. The Fellows of New College contemplated selling the chest in 1977 at which time it became the object of a number of studies. The carved front panel consists of two boards, tapered in cross-section, butted together. It is related to the St Mary Magdalen chest described below.

Fletcher established a tree ring series of 274 rings for the upper plank ending in 1243, and one of 234 rings ending in 1216 for the lower plank.¹⁹ He said it was from an oak grown somewhere in a region stretching from SE England to Hesse in Germany. He argued that allowing for sapwood and some seasoning, the wood would have been used sometime after 1275, and was therefore most likely used very soon after the battle it depicts. Unfortunately it has not been possible to find his original measurements and check the dating. Tyer’s re-analysis suggests the wood was sourced from Scandinavia and gives a similar date range. Radiocarbon dating was undertaken in 1985 determined that the outer rings were most likely formed around 1280, but could be as late as 1420.²⁰

6. *Icklingham Chest* (Fletcher and Tapper 1984)

This is described by Sherlock as an oak chest with very slightly convex lid, covered throughout with splendid wrought-iron scroll work.²¹ On the front is a central flap-lock that opens by means of a spring still in working order under the floor of the chest. It is 70 ins (168 cm) long by 21 ins (50 cm) broad and 17 ins (40 cm) high. It has seven hinges. There is a left-hand till with no lid and a second shelf, accessed by sliding the side of the till up through a groove which was probably cut later. Geddes notes the similarity of ironwork with that on a chest at St Botolph’s, Church Brampton (Northants), suggesting the chests were made by the same blacksmith or workshop.²² It has been discussed in several works.²³ Fletcher and Tapper suggest the boards come from a tree over 400 years old, and it seems likely this is of Baltic origin. Although Fletcher reported a date of after 1255 (unconfirmed), Eames repeats the stylistic date of *circa* 1400 postulated by Macquoid and Edwards.²⁴

7. *Lesser Treaty Chest, Pyx Chamber, Westminster Abbey* (Miles and Bridge 2008)

This chest (Figure 6), together with the Greater Treaty Chest (Figure 7) which sits next to it, had housed treaties and other documents relating to foreign policy. Both chests have white painted inscriptions inside their lids naming foreign states, and Rigold

¹⁹ Fletcher and Tapper (1984).

²⁰ Hall (1987).

²¹ Sherlock (2008).

²² Geddes (1999).

²³ Sherlock (2008).

²⁴ Eames (1977); Macquoid and Edwards (1927).



6 Lesser Treaty Chest, 1271–87, oak, Pyx Chamber, Westminster Abbey, London. *The authors*



7 Greater Treaty Chest, 1379–95, oak, Pyx Chamber, Westminster Abbey, London. *The authors*



8 Detail of the hinge, Lesser Treaty Chest, 1271–87, oak, Pyx Chamber, Westminster Abbey, London. *The authors*

assigned the hand to the early sixteenth century.²⁵ This chest is often referred to as the ‘regalia’ chest today, but there is no specific basis for this, and it is not known whether regalia were kept in this or the Greater Treaty Chest, before the sixteenth century.²⁶

It measures 3 ft 3 ins (99 cm) high, 3 ft 1 in. (94 cm) wide, and 6 ft 7 ins (200 cm) long, and is a plank and stile chest, in which the front and rear is composed of 14 ½ ins (3.7 cm) wide plank stiles between which a series of three boards are tongued in flush to the outside. The ends are a series of three boards which are let into the back sides of the stiles, and set back from the edge. The lid is composed of three boards, the top being level but the outer boards being tapered. Like the lid, all of the boards are tapered, and are flush on the outside. However, the bottom boards are of consistently ½ in. (1.2 cm) thick. The boards are also not cut parallel, but are often tapered along their length. The top boards are secured on the ends by a rail with a wide chamfer with a run-out stop with bar, as well as a centre bar. The rail is let into an open slot in the rear stiles and secured with an iron pin to form a wooden hinge. The top is reinforced with three straps which are chained to the rear of the chest and terminate in hasps at the front. Other simple iron bands are used to strengthen the chest; the only decoration is a compact, flat, fleur-de-lis with squared seating at the top of the middle strap just beneath the centre lock plate. Other features include a central divider and a till inside on the left-hand side. The hinge is illustrated in Figure 8.

²⁵ Rigold (1976), p. 35.

²⁶ Rodwell, personal communication.

Of the seven boards sampled from this chest, only two could be dated. Both the timbers were stiles, the rear left one retaining a clear heartwood/sapwood boundary, dated to 1263. The front right stile matched the rear stile very well, and probably originated from the same tree. The two samples were combined to form a site master, which matched best with chronologies from the Baltic region. None of the three boards comprising the lid could be dated, nor could one of Fletcher's from an unknown location, despite having between 80 and 210 rings. Fletcher postulated a felling date range of 1285–1300 for this chest, which is slightly later than the 1271–87 range produced in 2008.²⁷ However, this is probably due to his samples not having a heartwood/sapwood boundary, and his conservative estimate for the time required for seasoning.

8. *Deep Chest (Chest 3), Muniment Room, Westminster Abbey*
(Miles and Bridge 2008)

This chest is located in the north end of the Muniment Room, at right angles to the south-west side of the Large Chest. It measures just over 3 ft (92 cm) tall, 2 ft 8 ins (81 cm) wide, and 5 ft 11 ins (180 cm) long. It has stiles just over 12 ins wide (31 cm) clamping three boards front and back, the top and bottoms of which are very tapered, from a maximum of 1½ ins (3.8 cm) to the thickness of the middle one at ½ in. (1.2 cm). The side panels are housed in the stiles and are skew-pegged with ¾ in. (0.9 cm) almost square pegs. The top boards are secured on the ends by a rail with a wide chamfer with a run-out stop with bar, as well as a centre bar. The rail is let into an open slot in the rear stiles and secured with an iron pin to form a wooden hinge. Inside there is a till on the left-hand side. The only ironwork on this chest consists of two hasps and lock plates, plus a centre hasp and staple probably dating from the eighteenth or nineteenth century. Adjacent to the centre hasp is a lock plate without hasp which is probably medieval in date. Both Lowther and Fletcher worked on dating this chest. Lowther dated one of the lid boards to 1054–1261,²⁸ and Fletcher dated a number of other boards and stiles with last heartwood rings ranging from 1238 to 1265, suggesting a felling date range to after 1290.²⁹ In 2008 seven boards were sampled, with dates obtained for five of them. These were found to be of German origin. However, the sourcing of the boards appears to be somewhat diverse, given the lack of exceptional cross-matching between them, which would normally be expected with long sequences of imported material. Fortunately, four of the five dated boards retained evidence of sapwood, allowing for an average heartwood/sapwood boundary of 1266 to be determined. Two of these boards had 5 and 30 rings counted, but not measured, to the heartwood/sapwood transition. By applying the 8–38 sapwood range for German timber to the average heartwood/sapwood transition date of 1266, a felling date range of 1274–90 is produced for this chest. Given that both stiles and lid boards were dated, this chest appears to be a complete and integral unit.

Fletcher showed in his unpublished 1977 summary that all four stiles originated from the same tree, with the latest sequence ending at 1265, and that a lid board sequence finished in 1241. In the 1984 summary the last measured rings range from 1238 to

²⁷ Fletcher and Tapper (1984).

²⁸ Schove and Lowther (1957).

²⁹ Fletcher and Tapper (1984).

1265.³⁰ Without any further details of the individual dates derived by Fletcher for the various boards dated, one cannot be certain of how closely his dates correlated, but given the fact that the both his summaries give a date of 1265 for the stiles, exactly the same as that obtained from samples from the present investigations, it is suggested that his dates were most likely correct. Fletcher postulated a date range of 1285–95 for this collection of boards, and after 1290, which is somewhat later than the 1274–90 range produced in 2008.

9. *Chest at National Archives, London* (Fletcher and Tapper 1984)

The only information given is that this is a chest with a quadripartite lid and that its ironwork is significant. Last measured ring date is given as 1249, with date of use given as after 1275.

10. *Poslingford Chest* (Bridge 2008a)

The chest is of clamped construction, its front panel held by four pegs and a long tenon between stiles 13 ins (32 cm) wide, which extend to keep the chest about 3 ins (7 cm) off the floor, and which may once have been longer. The lid is boldly carved with a broad pattern of chevrons in semicircles around its edges. The ends of the chest, made of two planks dowelled together, are braced with horizontal rails. Similar dowels were used elsewhere, these have been exposed, suggesting that the board was made thinner at some stage. The lid was formerly hinged by iron pivots at each end but now has two strap hinges. There is one central lock plate which is not original. Three iron bands once ran across the front from each end and had five floral terminals, as can now be seen in the stain left by the missing ironwork. There is a fragment of more ironwork down the middle of the front. Inside, there is a left hand till. Its lid, hinged with wooden pivots, has been renewed. It has a secret compartment below, accessed by sliding the lower half of the floor of the till, giving a total depth of 10 ins (25 cm). The original planks of the floor are braced with two wooden bars fixed to the bottom of the front and back panels. It is 57 ins (143 cm) long by 24 ½ ins (62 cm) broad and 22 ½ ins (57 cm) high. Four samples were taken from the stiles and the top side boards of this chest. The samples from the front and rear left-hand stiles were found to have been derived from the same tree. All samples matched, and were combined into a 205-year long site master chronology that was dated to the period 1067–1271. The most likely felling date range for the trees used was calculated as 1275–91, and allowing for some seasoning and transport, the most likely date of construction of the chest is the third quarter of the thirteenth century. The timber was found to originate from the Baltic region, possibly from modern Poland.

11. *Cope Chest, Pyx Chamber, Westminster Abbey* (Miles and Bridge 2008)

Medieval cope chests are exceptionally rare in Britain, with only seven known.³¹ The Westminster cope chest (Figure 9) is in the shape of a 94° quadrant with a 6 ft 6 ins (198 cm) radius and 2 ft 2 ins (66 cm) high, but was originally constructed as a near third

³⁰ Ibid.

³¹ Hewett (1988).



9 Cope Chest, 1375–1400, oak, Westminster Abbey, London. *The authors*

of a circle, at 115° . The left-hand side had subsequently been truncated, with the top and bottom rails shortened. The front arc is in two panels with a centre post, and the top rail is scarfed with a mortice-and-tenoned joint. The two curved panels are from single boards about $\frac{1}{2}$ in. (1.2 cm) thick held within grooves. The front frame is simply chamfered with no stops. The bottom frame consists of a stretcher running from the rear post to the centre post, into which are tenoned struts from the two front corner posts. The bottom is floored with boards edge-dowelled radiating out from the rear corner post. The lid consists of a series of 1 in. (2.5 cm) boards running parallel to the front corner posts, and as they are set at about 90° to the back edge rather than 115° , they probably relate to the present truncated shape of the chest. The lid boards are held together by four softwood cleats on the underside, and a series of three iron straps fixed to the top surface. Apart from the straps, there is little ironwork except four large strap hinges to the lid and a more modern hasp and staple. The chest has been variously dated stylistically to the fourteenth century or the fifteenth century.³² Geddes dated it to between the early fifteenth century on account of the use of tangential boarding, or later in the century by the skilled panelling.³³ At least one lid board had been measured *in situ* by Fletcher, but no dates had ever been reported for it. Fletcher apparently assigned it to the ‘end of the fourteenth century’.³⁴ Of the twelve timbers

³² RCHME (1924).

³³ Geddes (1999).

³⁴ Cited in Hewett (1988), p. 121.

sampled, only four boards matched together to form a group. None of these retained any hint of a heartwood/sapwood boundary, so only *termini post quem* dates could be given. As the boards were of Baltic origin, the minimum number of sapwood rings is added to the last measured ring date. The three lid boards gave *termini post quem* dates of 1356, 1361, and 1368, while a board from the bottom of the chest gave a *terminus post quem* date of 1361. Given the close clustering of dates, and previous evidence from studies of Baltic material, it is likely that a minimum number of heartwood rings was removed with the sapwood, and therefore a felling date range of between c. 1375 and 1400 is offered for this chest.

It is evident from the carpentry of the chest that the lid boards had been replaced when the cope chest was reduced in size. However, the bottom boards clearly relate to the original design of the chest. The closeness of last measured ring dates from the top and bottom boards suggest that they are of a broadly similar date, as well as from a similar source. As there is no obvious signs of reuse for the lid boards, it is postulated that the cutting down of the cope chest took place soon after it was constructed.

A number of structural members making up the base of the chest were sampled, and three retained complete sapwood. However, none of these could be dated, due primarily to there being too few rings. It had been hoped that they might have matched some other contemporary timbers within the Abbey, but nothing conclusive was found.

12. *St Mary Magdalen Chest, Oxford* (Fletcher and Tapper 1984)

This chest is of the clamp-fronted type, with sides being clamped between the stiles. It exhibits a combination of tracery carving on the front boards, with animals on rectangles on the front stiles (Type D under the Pickvance classification). It is described in some detail by Roe.³⁵ It has some shared features with the Kentish Gothic chests and some of the dated north German chests, making a 14th century date likely, although it could be a later copy. It has a high interior shelf at the rear, under which is a row of six 'pigeon holes'. It is said to have been repaired after damage during the Civil War, and shows signs of more recent work too. Fletcher and Tapper include it in their 1984 paper, but no records have been found of his measurements or what it was dated against.

13. *Prittlewell Carved Panels* (Bridge 2009)

The two oak panels (each consisting of two boards) were removed from their modern frames and each had one end cleaned to reveal the ring boundaries. The ring sequences were photographed and subsequent analysis was carried out using the photographs. The ring series from the two boards of the panel with carved dragons matched each other and were combined to form a single series which matched reference data, showing the series to represent the years 1149–1318 and to have come from the Baltic region, probably modern Poland. The series from the other panel could not be dated. No sapwood was confirmed on the panel, but it seems likely that the trees used were felled in the early- to mid-fourteenth century. Two panels currently hang on the north nave wall of St Mary's Church, Prittlewell. They come from a chest which was broken up, and a photograph of about 1868 exists in the church of a chest with the lower front panel as that carved with tracery in the Decorative style. The two carved panels were

³⁵ Roe (1902).



10 Carved heads from the Prittlewell boards, early-/mid- fourteenth century, oak, St Mary's Church, Prittlewell, Essex. *The authors*

retained and framed to be hung as decorative features. The two panels are quite different in their subject matter and style of carving — one consisting of two entwined dragons heads with elongated wings (Figure 10) is in a 'chunky', almost primitive style, with large, almost crude, triangle and diamond decoration; the other has finely carved tracery resembling complex masonry patterns.

The chest is one of a group of very similar chests described by Sherlock as the 'Chevington Group'.³⁶ The Chevington chest has a front panel 'elaborately carved with blind tracery consisting of four canopied roundels with pinnacles in between, the upper spaces filled with fanciful creatures and floral motifs'. The tracery and roundels have great similarities, and the animals on the left stile look similarly primitive. Similar chests are, or were, found in Alnwick (Northumberland), Brancepeth (Co. Durham), Derby, Hacconby and Wroot (Lincolnshire), Kirkleatham and Wath (Yorkshire), and Saltwood (Kent), with another reported in Majorca. This Chevington chest was itself the subject of an earlier dendrochronological investigation, also carried out photographically, in which a 135-year ring sequence failed to yield a date.

³⁶ Sherlock (2008) p. 25.



11 Carved chest, 1326–58, oak, choir, Magdalen College chapel, Oxford. *The authors*

14. *Carved Chest in Choir, Magdalen College, Oxford* (Miles and Worthington 2000)

The largest and most elaborately decorated is the one immediately outside the small chantry chapel at the north-east end of the Choir. It consists of a solid front board carved with a series of sunk quatrefoils (Figure 11). This had been previously attributed to the seventeenth century, but dendrochronology has shown it to date from 1326–58, predating the foundation of the College by over a century. The tree-ring dating matched best with local chronologies, giving support to the theory that it might have originated from the original hospital of St John.

15. *Ewerby Chest, Lincolnshire* (Litton and Simpson 1996)

A chest with an elaborately carved front with cambered lid, iron bands, lavish paterae and arcaded chip carving. A mid-fourteenth-century date, using wood from modern Poland, is given.

16 and 17. *Calais Chest and Bruce Ransom Chest, National Archives, London* (Fletcher and Tapper 1984)

The lids of two chests with painted shields and inscriptions placed in the Great Treasury at Westminster in November 1361 are said to have come from the same tree, dated 1360–65. These appear on the National Archives website as items E 27/8 and E 27/9 with dimensions of 38 ins (95 cm) × 10 ins (24 cm) × 9½ ins (22 cm) and 38 ins (95 cm) × 10½ ins (25 cm) × 9½ ins (22 cm) respectively. They are described as rectangular coffers of oak in a boarded construction, pinned with wooden dowels: iron strap hinges, both are damaged.

18. *Winchester College Chest, Winchester* (Fletcher and Tapper 1984)

Lid of a chest in the college muniment room, said to have a last measured ring date of 1346, dated against Fletcher's REF 1 chronology, giving a felling date after 1372, and said to be likely to date to soon after the college foundation in 1382. Reference is given to Harvey.³⁷

19. *Greater Treaty Chest, Pyx Chamber, Westminster Abbey* (Miles and Bridge 2008)

This large chest measures 3 ft 6 ins (107 cm) high, 3 ft 8 ins (112 cm) wide, and 7 ft 6 ins (229 cm) long, and is a plank and stile chest with 10 ins (25 cm) wide stiles. The front and back boards are edge-dowelled into each other as well as into the stiles, and all planks or boards except the bottom and central divider are tapered, the thickest planks being placed at the edges of the chest. The ends have boards set back and housed into the stiles over which are placed three horizontal cleats which are dovetailed into the edges of the stiles, and two vertical cleats which are halved over the centre horizontal and dovetailed into the top and bottom cleats. The chest is perfectly plain with no chamfers or mouldings. The ironwork includes five strap hinges, three of which extend to form hasps with an incised star pattern and stippled decoration. The hasps end in knobs with a radiating incised pattern. The three countersunk lock plates are later replacements.³⁸ The lid is slightly convex. There were four iron bands placed on the bottom of the chest which turned up about 11 ins (27.5 cm) from the bottom on the front face. Eames postulated that the chest was originally of hutch form and that the legs had decayed and were subsequently sawn off and the iron bands added to secure the bottom.³⁹ Given that the boards comprising the bottom extend underneath the stiles and lower side boards, it is unlikely that this was the case, and from the present evidence the chest in its present form is as originally built. Like the Lesser Treaty Chest, this has historically been used to store treaties, and the names of various foreign nations are written in chalk or paint on the underside of the lid.

Here eight out of nine boards were successfully dated in 2008. Two lid boards were combined to form the site master. Two side boards, a stile, and one of Fletcher's measurements from an unknown location (but probably a stile) were all found to have originated from the same parent tree, and were combined with another stile to form a second site master. Both site masters matched well with Baltic chronologies, but matched each other with $t = 4.9$ (see below). This uninspiring match between the two groups suggests that the timber was imported from different sources within the Baltic. One of the dated timbers, the rear left stile, retained 4 rings of sapwood, and a heartwood/sapwood boundary of 1371. Applying the 8–24 empirical sapwood range, this produced a felling date range of 1379–95. The *termini post quem* dates, ranging from after 1349 to after 1373, are consistent with this felling date range, and it is clear that all of the dated timbers form a coeval group of boards.

Lowther's dating of the front left stile was published as spanning the years 1292–1480 (it actually dates to 1180–1362), and his dating of the front lid board evidently spanned

³⁷ Harvey (1962) p. 203.

³⁸ Eames (1977) p. 149 (fig. 20); Geddes (1999) p. 345.

³⁹ Eames (1977) p. 150.



12 Little Waldingfield, third quarter fourteenth century, oak, St Lawrence's Church, Little Waldingfield, Suffolk. *The authors*

the years 1188–1363.⁴⁰ This second board had earlier been dated to 1244–1361.⁴¹ Whilst it is just possible that his dating might relate to the actual date of 1113–1341, if it had been measured from the other end of the board, thereby encountering grain drift, the variation in the number of rings is worrying. Fletcher managed to get a much better result from his analysis of this chest, however. His results on the analysis of the four lid boards and four stiles were published in detail, including the number of rings and the dates they spanned.⁴² Unfortunately, only two of his punch-card datasets were found: that for the front left stile, which spanned the years 1180–1362, compared to his published dates of 1156–1361, and the front right stile, which spanned the years 1146–1365, compared to his published dates of 1133–1360. These do not exactly coincide, but what is not known is whether the punch cards were older versions, or newer ones which had additional measured rings. Although it was not possible to conclusively confirm the dating of these sequences, they are certainly very close indeed, and the felling date range of 1390–1400 is not too far out from the 1379–95 date range produced from the 2008 analysis.

20. *Little Waldingfield, Suffolk* (Bridge 2008b)

This is a rectangular oak chest, its lid simply excavated centrally, as though panelled, having rosettes carved round the raised border. Its front is delicately carved with Perpendicular blind tracery consisting of eight double-light windows or arcades, each rising to a crocketed head under a common pointed hood (Figure 12). The apexes are

⁴⁰ Schove and Lowther (1957).

⁴¹ Lowther (1951).

⁴² Fletcher (1976).



13 Waynflete's Treasure Chest, 1375–1400, oak, Muniment Room, Magdalen College, Oxford. *The authors*

filled with two lion faces to left of centre and a bearded man's face and a wimpled woman's face to the right. Between the crooked finials are slender and plainer fleur-de-lis finials. At each end of the front are two more two-light windows also with fleur-de-lis finials. Along the base are seven circular rosettes and along the top are eight four-petalled flowers set in squares. The ends, braced with horizontal rails, are made of three planks, two of which extend to form legs that are now 6 ins (15 cm maximum) in height but were once longer. On the front is a rectangular iron lock plate carrying two flaps, one with guard-sides for the lock flap and one to protect the keyhole. Beside a second keyhole is a serpent-bolt cast in the curious form of a snake with open mouth and prominent eyes, 3 ins (7.5 cm) in length. Size $49\frac{3}{4}$ ins (126 cm) long by $21\frac{3}{4}$ ins (55 cm) broad and 25 ins (64 cm) high. Five timbers were sampled from this chest. The front upper board and left hand side middle board almost certainly came from the same tree. One timber retained heartwood, but the first sapwood ring dated some years before the end of the other series, none of which retained sapwood, though their ring series all finished within a short period, indicating that they were perhaps close to the heartwood/sapwood boundary. A chronology derived from all five samples was dated to the period 1131–1339. Given allowance for some sapwood and brief seasoning of the timber, the most likely period for the date of construction of the chest is the third quarter of the fourteenth century. The timber grew in the Baltic region, possibly in modern Poland.

21. *Waynflete's Treasure Chest, Muniment Tower, Magdalen College, Oxford* (Miles and Worthington 2000)

This chest (Figure 13) in the Muniment Room is a large iron-bound chest reputed to have been William Waynflete's 'treasure' chest. No sapwood rings were present on



14 Large Panelled Chest, 1405–21, oak, Lapidarium, Westminster Abbey, London.
The authors

either of the two trees identified in the sides of the chest, however the last measured ring dates of 1361 and 1367 suggest a construction date of sometime after 1375, but a date not much later than 1400 is most likely.

22. *Faversham Chest, Kent* (Pickvance 2007)

This clamp-fronted chest is 64 ins (163 cm) wide, 37 ins (93 cm) high and 29 ins (72 cm) deep. The stiles are about 9 ins (23 cm) wide. It has a deep-carved tracery front, the carving continuing over the stiles. There are nine bars of tracery in two tiers, the lower having plain gothic arches headed by three trefoils, above a pair of twin lights, and the upper tier with round, cusped arches containing two trefoils and a flower-head, above a pair of twin lights. The tracery is of the Decorated type found in English church windows.

23. *New College Chest, Oxford* (Fletcher and Tapper 1984)

The lid of a chest in the college Muniment room is said to have a last measured ring date of 1368, with an estimated date of use after 1390, indicating its construction soon after the foundation of the college in 1379.

24. *Large Panelled Chest, Lapidarium, Westminster Abbey, London*
(Miles and Bridge 2008)

This well-moulded chest (Figure 14) is situated adjacent to the Lapidarium museum over the Jesus Chapel. It measures 8 ft 8 ins (264 cm) long, 3 ft 5 ins (104 cm) wide, and 2 ft 7 ins (79 cm) high. The front is divided into three panels, and the sides into two. The top rail and muntins measure $2\frac{3}{4}$ ins (7 cm) thick, and the base is slightly thicker at $3\frac{1}{4}$ ins (8 cm), and the mouldings are all jointed with mason's mitres. The panels are made up of boards ranging from 6 ins (15 cm) to 14 ins (35 cm) wide, and $\frac{1}{2}$ in.

(1.2 cm) thick. The lid is divided into two unequal sections which are hinged from a 9½ ins (24 cm) backboard. The lids are made up of four boards each 1½ ins (3 cm) thick and ranging from 6 ins (15 cm) to 9 ins (22.7 cm) in width. The lids are secured by five sets of hinges, two for the left-hand lid and three for the larger right-hand lid. The hinges are T-shaped and are of good quality with pierced terminations. The surface of the chest has evidence of red colouring. The earliest location for this chest is in the Royal Commission for Historic Monuments (England) [hereafter RCHME] Inventory (1924) which shows it in the Lower Islip Chapel, although it is unlikely to have been its original location. In 1988 the chest was in the Triforium above the Chapel of St Edmund, and was moved to its present location in 2000. The dating of the chest has been put to be no earlier than 1500, and probably during the first quarter of the sixteenth century.⁴³ Six samples were taken from this chest through the use of the micro-borer. The side panels were too thin, but the lid boards were substantial enough to be cored. All samples matched together, and the site master matched best with chronologies from the Baltic region. Two of the samples had evidence of sapwood, with heartwood/sapwood boundary dates of 1395 and 1398 respectively. The second core finished at 1396, but by following the grain drift along the edge of the board, another two rings were counted to reach the heartwood/sapwood transition at 1398. These two heartwood/sapwood boundary dates were combined to give an average of 1397, from which a felling date range of 1405–21 was produced. One other board had no heartwood/sapwood transition and finished at 1402. As it is not known how many more rings were lost to the heartwood/sapwood boundary, and consequently to the bark edge, all that can be said is that the felling date range of 1405–21 is possibly slightly too early. Nevertheless, there is no evidence to suggest that the lid is not coeval with the lower part of the chest, even though the dates are a century earlier than that postulated on stylistic grounds.

25 and 26. *Mendlesham I and II, Suffolk* (Bridge 2008c)

Two pine chests with curved lids made from pale coloured hardwood (often said to be poplar, but at least one similar chest elsewhere has been microscopically identified as lime),⁴⁴ are found in the chamber above the north porch of the parish church, along with six other chests. Their size means that they could not fit through the door in an assembled state. The chest lying north-south against the north wall is 54½ ins (136 cm) long by 20½ ins (51 cm) wide and 26 ins (65 cm) high, having three transverse iron bands and a large decorated lock plate with extended corners. The second similar chest lies against the west wall and has five transverse iron bands, one lock and two hasps. There is evidence of a former left hand till. It is slightly smaller at 54½ ins (136 cm) long by 19½ ins (49 cm) wide and 25 ins (63 cm) high, and its convex lid is longer, fitting over the ends of the chest. The right hand end board retained the outer edge of the sapwood which would have been immediately below the bark on its right-hand end board. A core was taken through this board and the outer 1–2 mm was lost in this

⁴³ John Muir, unpublished report to Westminster Abbey (2003).

⁴⁴ Bowett, personal communication.

operation. A photographic record was made from this board to extend the core series towards the inner part of the tree, and also of the other end board, and the end boards of the second chest.

The core yielded a 143-year sequence, with very narrow outer rings. This sequence was sent to Sigrid Wrobel at the University of Hamburg Dendrochronology Laboratory. She edited the series to exclude the very narrow rings towards the outer end of the sequence, and identified a good match against two Polish pine chronologies. Careful analysis of the remaining sequence suggested a missing ring in the series, which when a dummy value was added at this point, gave the date of the outer ring retained on the core as 1417. Returning to the core it was possible to detect a single row of cells with thickened cell walls at the point indicated, and this was re-measured as a ring boundary. Eventually a 171-year sequence was formed for Chest 1, although the inner 21 rings were exceptionally wide. When edited out, the remaining 150-year sequence matched three independent Polish pine chronologies with the outermost year retained having been formed in 1417. Taking a maximum loss of 2mm of outer rings, the outer 20 rings have a mean ring width of 0.37 mm, this could represent 5 or 6 rings at most, and the likely felling date of this timber is therefore in the 1420s.

The photographically-derived mean sequence from the two boards of Chest 2 is 140 years long, and matches the edited sequence from Chest 1 with $t = 5.8$ (see below) with the outer ring retained having been formed in 1388. No sapwood is evident on this second chest so it is not possible to derive the felling date of the parent tree dendrochronologically.

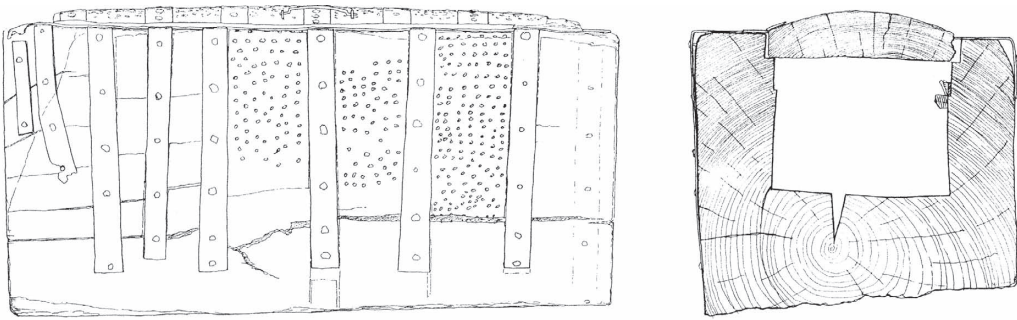
It seems likely the two very similar chests were made at about the same time, using pine felled in northern Poland.

27. *Round-headed Chest (leather covered), Muniment Tower, Magdalen College, Oxford*

This chest has a round-headed lid originally covered in leather. Some of the boards used in the construction of this chest had over 330 rings and some heartwood/sapwood boundaries, thus allowing a felling date range of 1426–42, making it quite possible that this was one of the travelling trunks belonging to the founder of the College, Bishop Waynflete. It is constructed of timber originating from the eastern Baltic region.

28. *Boughton Monchelsea Chest* (Tyers in Christie's catalogue 3 November 1999, pp. 74 and 76)

The chest is described as English or Flemish *c.* 1435–60 and to be 60 ins (153 cm) wide, 27 ins (69 cm) high and 27 ins (69 cm) deep, with a rectangular single-panelled lid with morticed iron hinges. The clamped front panel is set beneath a dovetailed rail and deeply carved with a scene of ladies hunting with hounds in a rural setting with the walls, towers and roofs of a city in the background. This is flanked by vertical stiles carved with architectural panels over figures possibly of a king and queen, the stiles extending to feet and originally carved with panels of possibly grotesque animals, the sides each with three horizontal rails, the upper and lower rails formed from the solid, and the centre rail applied. The chest is said to be closely related to other examples, e.g., one in York Minster, one in Ypres Cathedral, one in the Gruuthuse Museum, Brugges, and two panels in the V&A Museum. The right hand stile ring series ended



15 Scale drawing of a dugout Chest, 1492–1522, oak, St Mary's Church, Kempley, Gloucestershire. *Dan Miles*

in 1431, including 13 sapwood rings, making its use likely in the 1430s. Two bottom boards have a likely felling date range of 1435–60.

29. *Kempley Dugout* (Miles *et al.* 1999)

This is a large parish chest which is formed by hollowing out a large log of oak (Figure 15). Externally it measures 2 ft (60 cm) deep, 4 ft (120 cm) long, and 1 ft 8 ins (50 cm) high. It has been hollowed out to form a chamber 12 ins (30 cm) wide, 3 ft (91 cm) long, and 10 ins (25 cm) deep (Figure 12). The top has been rebated 2 ins (5 cm) to receive a curved elm lid which rises to 3 ins (7.5 cm) thick at the centre. The centre of the tree is very near the bottom of the chest, and it would have had to come from a very large tree, approximately 4 ft (120 cm) in diameter. This was the butt end of a large tree, the felling notch still remaining to the top left front corner. The tree would have started to grow in the mid-thirteenth century, and would have been the height of a man by the late 1260s. By the time it was felled between 1492–1522, it would have been about 250 years old.

The chest is bound with a number of wrought iron straps, that they were fixed onto the chest whilst the timber was still green is evidenced by the fact that a large radial split approximately 1 in. (25 mm) wide has been fixed open by the bands. The lid retains two very old locks which look as though they may be original. It is unusual that the lid of the chest should have been constructed out of such a soft wood as elm, given the security expected. Nevertheless, the locks and hinges are certainly early in form and if the lid is a replacement, it is likely that the ironmongery was re-used.

30. *Castle Bromwich Chest* (Miles and Worthington 2000)

The parish chest from this church was for some years on display at Blakesley Hall Museum, Yardley. Due to a programme of re-presentation at the museum, the chest was no longer required and as a condition of its sale, a photographic and dendrochronological record of the chest was required. The chest is of the dug-out variety, fashioned from a single log approximately 22 ins (55 cm) wide, 17 ins (43 cm) high, and with an overall length of 6 ft 10 ins (205 cm). The walls of the chest are on average 3 ins thick and somewhat unusually have bull-nosed ends. The lid is also rounded and is formed from a single plank 1½ ins thick which sits in a similar rebate, and the cavity

of the chest is 11 ins deep below the lid. Only the left-hand hinge remains to the lid. The bottom of the chest is lined with modern softwood boarding which also appears to sit in a rebate. The tree was felled between 1500 and 1530.

31 and 32. *Corpus Christi I and II, Oxford* (Fletcher and Tapper 1984)

The only detail given in the tree-ring dating results is that these two chests are likely to have been made shortly after the college became a community in 1517, and that the boards of the lids and sides of two chests were studied. Elsewhere, the largest chest is said to be 60 ins (150 cm) wide and the smaller chest 54 ins (135 cm) wide and both have oak of slow and even growth.⁴⁵

33 and 34. *Lydham Chests A and B* (Miles unpublished)

Two chests were purchased from an auction at Lydham, Shropshire, and were subjected to study by Henry Hand in 1994. Both are a variant of the clamped stile type, consisting of rectangular stiles notched out to receive a box of boards nailed together on the corners. Chest A measures almost 5 ft 6 ins (165 cm) long, 1 ft 8½ ins (51 cm) high and 1 ft 10 ins (55 cm) deep, whilst B is slightly shorter in length, being 4 ft 9 ins (143 cm) long, by 2 ft 1 in. (63 cm) high and 2 ft (60 cm) deep. Both chests have scratch mouldings on the stiles and front boards, with the stiles having large semi-circular notches cut in below the box. Slight constructional differences such as the boards on B being rebated as opposed to being simply butted as on chest A, and the scratch moulding on A having a hollow and a roll, whilst chest B has two rolls between a sharp protruding inverted 'V'. Both chests had lost their lids, having been relegated as grain bins on a farm somewhere in Radnorshire, but both chests have holes in the back board for some form of simple hinge.

Henry Hand was able to prepare exposed end grain on some of the legs and edges of boards and record the ring widths with a hand graticule. Chest B was remarkable in that one of the stiles still retained bark, and whilst the sapwood and the last 9 heartwood rings could not be measured accurately, the sapwood could at least be counted. As the last measured heartwood ring date was 1635, by adding 9 more unmeasured heartwood rings and 18 unmeasured sapwood rings to the bark edge, a felling date of 1662–63 is derived. As A and B are very similar, it is likely that they are broadly contemporary, even though the last measured ring date on Chest A is 1544. Dendroprovenancing suggests that the timber was obtained locally, in Wales or the Border Counties.

FINDINGS

The dating results so far found are summarized in Table 1. Perhaps the two most interesting points to emerge from the chests that have been dated in England are, firstly, the dates of the two 'dugout' chests, and secondly, the origins of the wood used in construction. The 'dugouts', which many might consider to be the most primitive form of chest, actually date to 1492–1522 (Kempley) and 1500–30 (Castle Bromwich),

⁴⁵ Fletcher (1981/2).

making them some of the later chests so far dated.⁴⁶ Dendrochronologists working on doors, chests and panel paintings have noted over many studies how there is a shift through time in the origins of oak boards used in England, with boards in the twelfth century and earlier, such as those at Westminster Abbey and Wells Cathedral, being of local origin. In the following century we start to find imported timber from what is now Germany, followed at the end of the thirteenth century by the majority of boards coming from further east, in what is now Poland, and possibly further afield from Belarus and the Baltic States as well. Timber has also been found to have been imported from Scandinavia (Courtrai panel) and Ireland (used as sarking boards in Salisbury Cathedral).⁴⁷ There is a return to locally grown oak being used for furniture, doors and panel paintings from the early-16th century onwards. It is perhaps too simplistic to interpret this in terms of exploitation of the primary forest alone, since trade, fashion, and price undoubtedly play a part, but it does seem that the excellent slow, evenly-grown oaks had mostly been depleted in England and Wales and the exploitation migrated eastwards. The secondary growth forest that became the local source again from the mid-sixteenth century onwards was rarely of the quality of the early wood. Although no chests have been dated to after the 1660s, other dated material has shown that timber importation was resumed from Germany again in the eighteenth century, presumably the intervening four hundred years had allowed the forests to regenerate, again producing slow-grown high-quality oak. The combination of dendrochronology and dendroprovenancing has therefore revealed much valuable information on the medieval timber trade and the depletion of the wild-wood across Europe.

The results for the two pine Mendlesham chests are of interest. These chests are often referred to as 'standard chests'¹⁵ and over a hundred have now been identified in England, the majority being on the eastern side of the country, having been imported through the east coast ports, although several have now been found in the south-west, probably imported via the River Severn. They have often been described as Danzig (Gdansk) or Flemish chests, giving a clue to their foreign origin. Most appear to have been imported as simple chests with iron-work being added locally. The early fifteenth-century date seems typical for many such chests, although they continued to be imported until at least the end of that century.⁴⁸ Simpson talks of 90 'Flemish' or Danzig (Gdansk) chests in his recent paper, but another 15 have been discovered since its publication.⁴⁹

Chests such as those in Faversham and Little Waldingfield have carving that resembles English 'Decorated' stonework and they have therefore been attributed to English manufacture.⁵⁰ That is not really in doubt, but it is of great interest to find that the boards used originally grew in Poland, and although the extensive trade in boards is known from historical sources, it is only through dendroprovenancing that this fascinating insight has been proved.

⁴⁶ The Kempley chest is discussed in Miles et al. (1999) and the Castle Bromwich chest in Miles and Worthington (2000).

⁴⁷ Miles (2002).

⁴⁸ Simpson (2008).

⁴⁹ Personal communication from Gavin Simpson.

⁵⁰ Pickvance (2007); Sherlock (2008); Bridge and Miles (2008b).

TABLE 1 Dated chests from England with origin of the wood used in construction

NAME OF CHEST	LOCATION	DENDRO- CHRONOLOGIST	INTERPRETED DATE OF CONSTRUCTION	ORIGIN OF WOOD (MODERN COUNTRIES)
1 Wells Cope Chest ⁵¹	Wells Cathedral	DM	1111-43	England
2 Long chest	Muniment Room, WA, London	DM & MB (JF)	1167-99	England
3 Hutch chest	Lapidarium, WA, London	DM & MB	1237-69	Germany
4 Large chest	Muniment Room, WA, London	DM & MB (JF)	1239-71	England and Germany
5 Courtrai Chest?	Ashmolean Museum, Oxford (on loan)	JF (IT)	c. 1243	Scandinavia
6 Icklingham chest	Icklingham church, Suffolk	JF	after 1255	unknown
7 Lesser Treaty Chest	Pyx Chamber, WA, London	DM & MB (JF)	1271-87	Germany
8 Deep chest	Muniment Room, WA, London	DM & MB (JF)	1274-90	Germany
9 Chest at PRO	PRO, London	JF	after 1275	unknown
10 Poslingford chest ⁵²	Poslingford church, Suffolk	DM & MB (JF)	1275-00	Poland
11 Cope chest	WA, London	DM & MB	1275-1300	Poland
12 St Mary Magdalen chest	St Mary Magdalen Church, Oxford	JF	Early C14th	unknown
13 Prittlewell carved panel ⁵³	Prittlewell church, Essex	MB	Early-mid C14th	Poland
14 Carved Chest in choir	Magdalen College Chapel, Oxford	DM	1326-58	Welsh borders
15 Ewerby chest ⁵⁴	Ewerby Church, Lincolnshire	RH	Mid-C14th	Poland
16 Calais Chest	PRO, London	JF	1360s	unknown
17 Bruce Ransom Chest	PRO, London	JF	1360s	unknown
18 Winchester College	WC Muniment room, Winchester	JF (JH & AL)	after 1372	unknown
19 Greater Treaty Chest	Pyx Chamber, WA, London	DM & MB (JF)	1379-95	Poland
20 Little Waldingfield	Little Waldingfield church, Suffolk	DM & MB (JF)	1375-1400	Poland
21 Waynflete's Treasure Chest	Muniment Tower, Magdalen College, Oxford	DM	After 1375	Poland
22 Faversham chest	Faversham church, Kent	IT	1389-1420	Poland
23 New College chest	Muniment Room, New College, Oxford	JF	after 1390	unknown
24 Panelled chest	Lapidarium, WA, London	DM & MB	1405-21	Poland
25 Large standard chest*	Mendlesham church, Suffolk	DM & MB (JF)	1420s	Poland

26	Smaller standard chest *	Mendlesham church, Suffolk	DM & MB (JF)	1420s	Poland
27	Round-headed chest (leather covered)	Muniment Tower, Magdalen College, Oxford	DM	1426–42	Poland
28	Boughton Monchelsea	Private collector, was in Kent	IT	1430s	Poland
29	Kempley dugout	Kempley church, Gloucestershire	DM	1492–1522	England
30	Castle Bromwich dugout	Private collection	DM	1500–30	England
31	Corpus I ⁵⁵	Corpus Christi College, Oxford	JF	after 1500	unknown
32	Corpus II	Corpus Christi College, Oxford	JF	after 1510	unknown
33	Lydham Chest A	Private collection	DM	c. 1650–75	Welsh borders
34	Lydham Chest B	Private collection	DM	1662–03	Welsh borders

? = Originally reported by Fletcher, apparently re-worked by Tyers (unpublished)

* = pine chest with poplar lid

DENDROCHRONOLOGISTS

JF John Fletcher, Research Laboratory for Archaeology and the History of Art, Oxford University
DM Dan Miles, Oxford Dendrochronology Laboratory
RH Robert Howard, Nottingham Tree-Ring Dating Laboratory
MB Martin Bridge, Institute of Archaeology, UCL, and Oxford Dendrochronology Laboratory
IT Ian Tyers, Dendrochronological Consultancy Ltd
JH John Harvey
AL Anthony Lowther

⁵¹ Miles et al. (2003).

⁵² Bridge and Miles (2008a).

⁵³ Bridge (2009).

⁵⁴ Litton and Simpson (1996).

⁵⁵ Fletcher (1981/2).

With this body of knowledge now accumulated, and technical advances in taking samples now being available, it would seem an appropriate time at which to undertake a more structured project focussing on dating representative chests of particular styles or construction types in order to produce a more exact timeframe for other studies on the development of English chests. It is hoped that this paper will highlight the importance of this subject in the development of the English joinery tradition. Opportunities should be seized whenever an historic chest is being conserved or repaired to conduct a study which includes dendrochronology. When chests are being partly dismantled to effect repairs or conservation, this reveals end grain of boards which are not usually exposed, and from which dendrochronological investigations can be carried out, often with no visual disturbance to the piece. One example of a lost opportunity is the case of the Wells cope chest, the earliest thus far identified. The date of 1111-43 was based on only one sample with apparent heartwood/sapwood boundary, as sampling was somewhat limited due to the size of the piece and access considerations. A year after the dendrochronology was carried out, the chest was completely dismantled to allow the joints to be repaired, but unfortunately further dendrochronological analysis was not carried out, and the possibility of sampling timbers with virtually complete sapwood was lost, perhaps for several generations to come. It is to be hoped that as a matter of course, a dendrochronological assessment should be carried out at the time of any intervention into any historic chest.

ACKNOWLEDGEMENTS

The authors would like to thank David Sherlock, Warwick Rodwell, Christopher Pickvance, Robert Howard, Gavin Simpson, Henry Hand and all those who have allowed work to be carried out on the chests.

BIBLIOGRAPHY

PUBLISHED SOURCES

- ALBRECHT, T., *Truhen, Kisten, Laden, vom Mittelalter bis zur Gegenwart am Beispiel der Lüneburger Heide* (Petersberg: Michael Imhof Verlag, 1997).
- BAILLIE, M. G. L. AND PILCHER, J. R., 'A simple cross-dating program for tree-ring research', *Tree-Ring Bulletin*, 33 (1973), pp. 7-14.
- BRIDGE, M. C., 'The Dendrochronological Investigation of Oak Panels from a Chest at St Mary's Church, Prittlewell, Essex', *Oxford Dendrochronology Laboratory Report* 2009/22 (unpublished, 2009).
- BRIDGE, M. C. AND MILES, D., 'The dendrochronological investigation of the chest, Church of St Mary the Virgin, Poslingford, Suffolk', *Oxford Dendrochronology Laboratory Report* 2008/3 (unpublished, 2008a).
- BRIDGE, M. C. AND MILES, D., 'The dendrochronological investigation of the oak chest, Church of St Lawrence, Little Waldingfield, Suffolk', *Oxford Dendrochronology Laboratory Report* 2008/4 (unpublished, 2008b).
- COX, J. C. AND HARVEY, A., *English Church Furniture* (London: The Antiquary's Books, 1907), 317. Check where this is in text.
- EAMES, P., 'Furniture in England, France and the Netherlands from the Twelfth to the Fifteenth Century', *Furniture History*, XIII (1977).
- FLETCHER, J. AND TAPPER, M., 'Medieval artefacts dated by dendrochronology', *Medieval Archaeology*, 28 (1984), pp. 112-32.
- FLETCHER, J. (1976), 'Oak antiques: tree-ring analysis', *Antique Collecting and Antique Finder*, (October 1976), pp. 9-13.

- FLETCHER, J., 'College timber and dendrochronology', *The Pelican* (Corpus Christi College Annual Report 1981/2), pp. 52–68.
- GEDDES, J., 'Medieval Decorative Ironwork in England', *Society of Antiquaries of London Research Report* 59, (1999).
- HALL, E. T., 'The Courtrai Chest from New College, Oxford, re-examined', *Antiquity*, 61, (1987), pp. 104–07.
- HARVEY, J. H., 'Winchester College Muniments', *Archives*, 5, (1962), p. 203.
- HEWETT, C. A., 'English medieval cope chests', *Journal of the British Archaeological Association*, 141, (1988), pp. 105–23.
- LITTON, C. AND SIMPSON, G., 'Dendrochronology in Cathedrals', in Tatton-Brown, T. and Mumby, J. (eds), *The Archaeology of Cathedrals* (Oxford: University Committee for Archaeology 1996), pp. 183–210.
- LOWTHER, A. W. G., 'The date of timbers from the spire of Chilcomb church and from the wreck in the river Hamble: some evidence from dendrochronology', *Proceedings of the Hampshire Field Club and Archaeological Society*, xvii (ii) (1951), pp. 129–33.
- MACQUOID, P. AND EDWARDS, R., *Dictionary of English Furniture*, 3 Vols (London: Country Life, 1924–1927).
- MILES, D. W. H., 'The Tree-Ring Dating of the Roof Carpentry of the Eastern Chapels, North Nave Triforium, and North Porch, Salisbury Cathedral, Wiltshire', *Centre for Archaeology Report*, 94/2002 (2002).
- MILES, D. W. H., WORTHINGTON, M. J. AND GROVES, C., 'Tree-ring Analysis of the Nave Roof, West Door, and Parish Chest from the Church of St Mary, Kempley, Gloucestershire', *Ancient Monuments Laboratory Report*, 36/99 (1999).
- MILES, D. W. H. AND WORTHINGTON, M. J., 'Tree-ring dates', *Vernacular Architecture*, 31 (2000), pp. 90–113.
- MILES, D. W. H., WORTHINGTON, M. J. AND BRIDGE, M. C., 'Tree-ring dates', *Vernacular Architecture*, 34 (2003), pp. 109–113.
- MILES, D. W. H. AND BRIDGE, M., 'Westminster Abbey, London, tree-ring dating of the chests and fittings', *Research Department Report Series*, 30/2008. (2008)
- PICKVANCE, C., 'Medieval tracery-carved clamp-fronted chests: the 'Kentish Gothic' chests of Rainham, Faversham and Canterbury in comparative perspective', *Regional Furniture*, xxi (2007), pp. 67–94.
- ROE, F., *Ancient coffers and cupboards* (London: Methuen, 1902).
- SHERLOCK, D., *Suffolk Church Chests* (Ipswich: Suffolk Institute of Archaeology and History, 2008).
- SCHOVE, D. J. AND LOWTHER, A. W. G., 'Tree-rings and medieval archaeology', *Medieval Archaeology*, 1 (1957), pp. 78–95.
- SIMPSON, G., 'The Pine Standard Chest in St Margaret's Church, King's Lynn and the Social and Economic Significance of the Type', *British Archaeological Association Conference Transactions*, 31 (2008) pp. 53–65.
- VON STULPNAGEL, K. H., *Die gotischen Truhen der Lüneburger Heideklöster* (Cloppenburg: Museumsdorf, 2000).

ELECTRONIC SOURCES

www.nationalarchived.gov.uk/catalogue/ (items E 27/8 and E 27/9)

