The Elizabethan garden at Carew Manor, Beddington

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Excavation dates:	1 – 29 August 1999 29 July to 25 August 2001 3 – 14 August 2003 16 – 23 August 2004
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1. INTRODUCTION

The Elizabethan garden at Carew Manor Beddington is best known for having the first orange house in England, and the garden has been recognised as innovative and important since 1990 when Sir Roy Strong published a paper on it. This was followed by the authors' paper published in *Garden History* in 2005 which summarised documentary and archaeological research which we and others had carried out from the early 1980s. The description of the archaeology was necessarily highly summarised, and more has subsequently been learnt from work on the finds and the site. This report aims to bring together the available evidence for the Elizabethan garden. In doing so it will necessarily repeat material which has already been published in earlier Carshalton and District History and Archaeology Society Occasional Papers. This is, however, unavoidable, if we are to produce a comprehensive overview of this very complicated site.[1]

Acknowledgements

The investigation of the garden at Carew Manor started in the 1980s, and many people have been involved the archaeology and have helped in numerous other ways. We are grateful to the London Borough of Sutton, Carew Manor School and Sutton Parks Service for permission to excavate. Thanks are due to Mrs Mavis Peart the former Chairman of the Governors, the two head teachers Brian Wilson and Martin Midgley and the successive school caretakers. We would like to thank the people who have worked on the archaeology over the years including a small group of long-standing diggers who were involved in the ups and downs in a decade and a half that the excavations took place. These include Roger Brown, Jane Howard, Mike and Pat Bale, Val Coleman, Peter Stephenson and Derek Bradford as well as several who are no longer with us: Doug Cluett, Ron Green and Stan Coleman. Some of these and others also carried out a project to sort and catalogue the finds which was a small part of a much larger project on Beddington Park which was supported by the Heritage Fund and the Community Fund. Bill Wyatt and Sarah Wheeldon helped facilitate this, and Steve Morris took a key part in the organisation of it. Andrew Skelton, Bev Shew, Mark Stephenson helped in various ways. Phil Johnson took some of the photos and Paul Williams and his Belgian friend Rony Van Belle translated the inscription that was once in the banqueting house. Thanks are also due to Valary Murphy and Siobhan Neale of Sutton Museums Service and Kathleen Shawcross and Abby Mathews from Sutton Archives. Clive Orton proof read the report and helped in other ways.

A note on conventions

Context numbers are in square brackets [].
Special find numbers are in pointed brackets <>.
All four trenches had their own sequences of context and special find numbers. There is therefore a context [CU1] and another context [CW1] etc.
Maps and plans are north orientated unless otherwise noted.
The size of a find is an approximate measurement of its longest dimension.
On drawings of cross sections through finds the original surface is edged in black.

[1] The earlier publications are Phillips 2013 on the orangery, Phillips 2015 on Beddington Park Cottages, Phillips 2016 on investigations in the garden and Phillips and Burnett 2016 on the house and moat. These reports contain a great deal of material relating to the owners, house, outbuildings and 18th-century and later gardens which is not relevant to the Tudor garden and not repeated here.

2. SIR FRANCIS CAREW

The creator of the garden, Sir Francis Carew, was descended from a line of courtiers established at Beddington since the second half of the 14th century. Sir Francis' father, Sir Nicholas Carew K.G. (c. 1495-1539), was particularly successful. He rose to prominence as a star performer in the tiltyard, and by 1517 he was one of the King's 'minions' or young favourites. His father Sir Richard (d.1520) had spent many years in royal service at Calais, which may have been the root of Nicholas's strong Francophile leanings. Sir Nicholas served on several embassies and was well known and liked at the French court and well regarded by the French king Francis I. Apart from a number of short interludes, he remained in Henry VIII's favour, benefiting from various grants of land and office, including being made Master of the Horse in 1522 and a Knight of the Garter in 1536. Although he did not scruple to acquire former monastic property, he leant towards religious conservatism and was one of the courtiers who conspired to bring about the downfall of the protestant Anne Boleyn. In 1539 the conservative faction that he supported was ousted and he was executed.

We know very little about Francis' early life. His father's execution for treason meant that his inheritance was forfeited to the king. His mother Elizabeth was allowed to keep a house and land in Wallington, near Beddington, and a group of properties in Sussex.[2] She died in 1546 but Francis would not have come into full possession of her lands in Wallington and Sussex until he came of age about 1551.

Sir Nicholas Carew's conservative court faction had been sympathetic to Mary, so there was a moral debt to be repaid when she came to the throne; Francis was restored to his father's estates in January 1554. The inheritance was substantial: there were nine manors and some other miscellaneous property in Surrey, as well as land in Lincolnshire, Northumberland and Northamptonshire, which were added to Wallington and the Sussex property which Francis inherited from his mother. Parts of the estate may have been encumbered. After Nicholas's execution some of the property had been granted to Thomas Darcy and despite Mary's grant Francis appears to have bought the lands from him in 1556, presumably to consolidate his title.[3]

Francis's background might suggest that he had Catholic leanings. His mother Elizabeth was a Catholic and chose William Saunder of Ewell, a staunch Catholic, as the executor of her will. In 1560 Francis's sister Isabel married William Saunder's son, Nicholas, who was also a Catholic and would later become a recusant.[4] The marriage took place in Beddington church, which suggests that it had Francis's approval. However, one of Francis's other sisters, Ann, married the protestant Sir Nicholas Throckmorton. Francis's own beliefs are less clear. He seems to have remained on good terms with both sides of the family and remembered the descendants of both in his will. Whatever his religious convictions, and their strength or lack of it, Francis did not retain Mary's favour, as he was committed to the Fleet prison on 15 November 1556. On his release about a month later, he had to enter into a recognisance to 'be of good bearing as well towards the king and queen's majesties as to all their liege people and subjects'. The cause of this incident is not known and the recognisance was cancelled on the 13 November 1558, a few days before Mary's death.[5]

[2] TNA, *Letters and Papers Henry VIII,* 14 pt. 2, It. 113-5.
[3] TNA, *CPR Philip and Mary 1553-4*, 214-5 & 1555-7, 90.
[4] Bindoff 1982 vol. 3, p. 273-4.
[5] TNA, *Acts of the Privy Council*, New Series 6, 17 & 30-31.

Francis does not appear to have had any difficulty in accepting Elizabeth's accession. She made the first of many brief visits to Beddington in August 1559.[6] During her reign Francis was twice considered as a possible ambassador. On the first occasion in 1561 his brother-in-law, Sir Nicholas Throckmorton, who was then ambassador in Paris, was asked,

> for his opinion touching the succeeding of Mr Carew in his [Throckmorton's] place, who answered that although there was in him some meet parts, yet there lacks in him a second and greater degree than to be a good courtier; that is, skill in negotiation of matters, not having been traded or given thereunto, but chiefly to pleasure; and though he is glad of such honour shown to his brother, yet he thinks him not a meet man that could succeed him.[7]

These comments on Francis's character may not have been wholly disinterested, as Sir Nicholas was strongly Protestant and may conceivably have felt that Francis's religious beliefs were suspect. It is also possible that he knew that his brother-in-law did not want the job. This was certainly so in 1572 when Elizabeth wanted to make Francis ambassador to Scotland. He 'made great labour to the contrary by way of the ladies of the privy chamber and others' and evaded the post.[8] The circumstances are perhaps revealing. An English army was besieging supporters of Mary Queen of Scots in Edinburgh Castle. The English Ambassador Henry Killigrew wanted to end the siege by force and was supported by most of Elizabeth's courtiers. Elizabeth herself wanted a negotiated settlement and presumably thought that Francis was the person to achieve this.[9] Francis avoided the post and never held national office although he was active in the administration of Surrey from the 1570s. This included being one of the four commanders of the Surrey militia during the Spanish Armada crisis. In general though, Francis appears to have been content to quietly enjoy his house and gardens, which were visited many times by Queen Elizabeth.[10] Francis never married and died in May 1611.

[6] Colthorp 1986.
[7] TNA, *Calendar of State Papers (CSP) Foreign 1561-2*, It 274.
[8] Hasler 1981 vol. 1, p. 537-8.
[9] Read 1960 p. 537-8.
[10] Fourteen visits are currently known in 1559, 1567, 1576, 1580, 1581, 1582, 1585, 1587, 1590, 1591, 1595, 1598, 1599 and 1600.

3. THE SITE

Carew Manor is located in the London Borough of Sutton about 2.6km west of central Croydon. It stands by the river Wandle at the foot of the North Downs and is on the eastern edge of Beddington Park which is a surviving fragment of the Carew's deer park. The Carew family established themselves at Beddington in the second half of the 14th century but, by then, the site of the manor was already ancient. The Tudor house stood on a large moat island with the church to the southwest of it.[11]

Nineteenth-century maps show gardens to northeast, east and southeast of the house with outbuildings to the northwest and the park to the west (figure 1). The relationship of these areas to the Tudor garden is both complex and uncertain. However, these boundaries provided the framework in which the study has been conducted and the excavations have taken place.

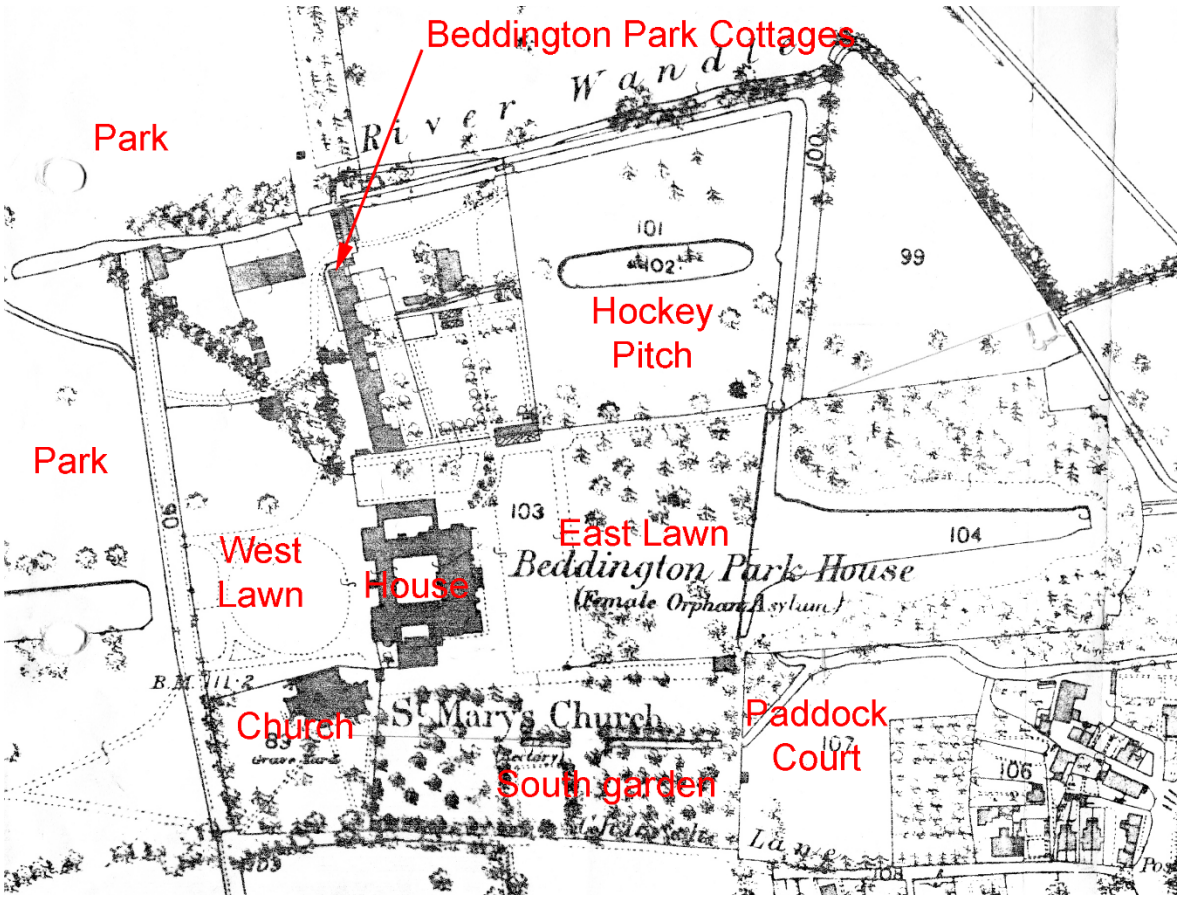

Figure 1. The 1868 Ordnance Survey map with the names of the garden areas used in the report.

[11] For a history of the house and its owners see Phillips and Burnett 2016.

4. DOCUMENTARY EVIDENCE

4.1 Two key descriptions

The best descriptions of Sir Francis Carew's garden were made by two travellers. The first is from the diary kept by the Moravian Baron Waldstein who visited Beddington on 26 July 1600:

> We made a four mile detour via Beddington in order to see a most lovely garden belonging to a nobleman called Francis Carew. A little river runs through the middle of this garden, so crystal clear that you see the water-plants beneath the surface. A thing of interest is the oval fish-pond enclosed by trim hedges. The garden contains a beautiful square-shaped rock, sheltered on all sides and very cleverly contrived: the stream flows right through it and washes all around. In the stream one can see a number of different representations: the best of these is Polyphome playing on his pipe, surrounded by all kinds of animals. There is also a Hydra out of whose many heads the water gushes.[12]

The second was also from a diary, in this case kept by a gentleman accompanying the Landgraf Otto of Hessen-Kassel on a visit to England. He came to Beddington in May 1611:

> In the first garden we saw a very fine fountain with neatly made fishes frogs etc. swimming in the fountain as if they were alive. In the other garden we saw a great number of figgs, oranges, lemons - all trees which were bearing fruit at the time. Item Taxum, Laurocerasum, Pomum Adami, cuius folia melissi odorem fere habent. Nerion vel Rododendron with beautiful red flowers, it is, however, poisonous. Not far away there is a stream of water cheerfully running out of a little hill which is handsomely furnished with all sorts of neatly made animals and little men as though they were alive. Further down are two little corn mills, well made, driven by the water. There are also small boats and a little naval vessel lying at anchor on the water. Further up there is a beautiful pleasure house, artificially built with all kinds of shell. Inside an animal with many heads with jets of water issuing forth. Nearby runs a very clear and clean water with many trout therein. Not far away is an exceedingly fine pleasure house built all of mineralibus or various kinds of brass in cheerful fashion, the ceilings made like the sky from which rain pours down. Coelum pluens etc. On top is a fine and pleasant cabinet on whose ceiling Flanders Holland and Zealand etc. are beautifully painted. There is a mirror in the pleasure house which is laid in with all sorts of marble. Lapide Lydio.[13]

The Hessen description refers to two garden areas: the first garden and the other garden. The household accounts mention three areas: the privy garden, the great garden and the orchard.

4.2 The garden areas

4.2.1 The privy garden

The accounts provide several scraps of information about a privy garden. There was a 'dore at ye steyres in ye prevey garden'; a payment for gillyflowers to set in it; a door from the hall to the privy garden, and a privy in the privy garden.[14] There are also references, in 1573, to a privy bridge which had a 'grate' beneath it where 'the fyshe was kept'.[15]

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[12] Waldstein 1981 p. 163 and 165.
[13] Quoted from Strong 1990.
[14] Sutton accession 72/17 f. 5 v; SHC 281/4/25 p. 3; SHC 281/4/14; SHC G6/3/1 f. 25 account 2 August 1607.
[15] SHC 281/4/9.

4.2.2 The Great Garden

There are payments for weeding the Great Garden in August 1570.[16]

4.2.3 The orchards

There appears to have been an old orchard and a new one.

The Old Orchard appears in the household accounts for 1566-7:

> It Paid to woodestocke et martin for scowryng et makynge cleane
> of the pannes in the olde orcharde et by the stable
> It pd to woodstocke et martin for making cleane ye Ryver w[i]thin
> the olde orcharde for xvi daies a pese et a halfe at viiid ye daie xxijs
> It pd more to them for settyng [illegible] newe Rayles over
> ye Ryver between ye olde orcharde et ye parrocke at ij daies A pese
> Ay viijd ye daie ijs viiijd.[17]

The parrock was a long tapering enclosure used for driving deer for hunting, the outline of which was preserved in the field boundaries shown on the 1820 enclosure map.[18] The Old Orchard evidently adjoined the parrock, and the river flowed from one to the other through rails which contained the animals but allowed the water to pass. The exact position of these is considered in section 18.8 below.

The accounts for May 1570 include a payment for making a bridge in the walks in the Old Orchard.[19] In June there were payments for 20 days mowing and haymaking in the Old Orchard and Orchard.[20] In 1572-3 a sluice was built or repaired and there was a payment for a scaffold for the gardener to cut the hedges, although the latter was simply for the 'orchard'.[21]

The New Orchard is mentioned in 1545 in connection with a land swap carried out by Richard Carew, who owned the house 1492-1520. It consisted of three acres of land and was enclosed within the park.[22] No subsequent reference to it has been found and it may have become the 'Old Orchard' of the second half of the 16th-century.

The household accounts for December 1573 include a payment to John Waker for carrying three 'burthen' of cherry trees and the accounts for the following January and February include a payment for carrying pear trees.[23]

4.3 The oval pond

There are two sources for this in Sir Francis Carew's lifetime. The first is Baron Waldstein who mentions an 'oval fish-pond enclosed by trim hedges'. The second is a passing mention by Thomas Coryate who walked from England to Italy at the beginning of the 17th-century and wrote an account called *Crudities*. When he described the Roman amphitheatre at Verona he thought of Beddington:

> The cavea or greene plaine in the middle is made in the form of an egge shape at the

[16] SHC 281/4/21
[17] Sutton accession 72/17 f. 2r.
[18] Lasdun 1991 p. 24.
[19] SHC 281/4/7.
[20] SHC 281/4/11, 12, 13.
[21] SHC 281/4/22 f9v and f7r.
[22] Gowans 1983 p. 65-6.
[23] SHC 281/4/24 p. 2 and 9.

> ends, and broad at the sides, very like to a pond that I have seen in one of Sir Francis Carewes gardens in Middlesex: and in length nine & thirty pearches, in bredth two and twenty and halfe ...[24]

Coryate says that the Verona amphitheatre was 39 perches by 22.5 which is 196m by 113m. This seems to be an exaggeration as Ward-Perkins says that the amphitheatre is 152m by 123m.[25] It is, none the less, large and would invite comparison with an equally large feature.

The household accounts for 1574 contain several payments relating to a pond, but we cannot be certain that it is the same one.[26]

> It payd to Thomas wonnan for castinge of the pond for a daye and a haufe xiiij^{d}
> It payd to Thomas Roger for castinge of the ponde for a daye and a haufe xiiij^{d}
> It payde to Legger for castinge of the ponde for a daye and a haufe xiiij^{d}
> It payde to Richard mathew for castinge of ye ponde for j daye x^{d}
> It payd to Thomas white for castinge of ye ponde for a daye x^{d}

So five men were paid for a total of 6.5 man-days casting a pond. The meaning of 'casting' is not entirely clear. The *Oxford English Dictionary* gives the general meaning of cast as throwing, which in this context might be throwing water and mud of out pond or throwing in nets to catch fish. It clearly could mean excavation as the following payment shows:

> It pd to Chiswicke et whyte for making et castynge of a pitte iny^{e} cou^{r}se
> for water to watter yo^{r} Cattell at for one daies a pese at viij^{d}y^{e} daye xvj^{d} [27]

The amount of work seems excessive for simply netting fish so it seems likely that the pond was drained and cleaned.[28]

In 1650 the house was let to the Earl of Warwick who carried out a number of repairs. and submitted accounts to Carew trustees to reclaim the costs. There are a series of payments relating to an 'egg pond' which may well be the same as the oval pond.[29]

June 1650	
For fowr men to clense and make cleane the egg pond at fifeteen pence p diem	00-10-00
More for two Bricklayers for four dayes and a halfe to mende the brickworke about ye Eggpond at twenty pence a day	00-13-04
For two labourers fowr dayes and a halfe	00-04-06
More for A Loade of Bricks to mende the egg pond with	00-10-00
It: For A Carpenter to make two Penstocks foe ye eggpond: for one day and a halfe at twenty pence the day	00-02-06

Four men cleaned the pond for a total of 8 days which is not much more than the Elizabethan payments. In 1708 Nicholas Carew paid 7s 6d for cleaning a pond.[30]

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[24] Coryate 1905 vol. 2 p. 20.
[25] Ward-Perkins 1981 p166. In the early 17th-century the amphitheatre may have been partly filled with soil which would make its floor area greater.
[26] SHC 281/4/24 p. 15.
[27] SHC 281/4/7.
[28] Casting might also refer to the placing of a clay lining but this is unlikely because the water table is fairly high.
[29] SHC 2152/1 p. 3.
[30] BL Add 30335 f. 57v.

4.4 The pleasure house with a painting

Waldstein mentions

> an exceedingly fine pleasure house built all of mineralibus or various kinds of brass in cheerful fashion, the ceilings made like the sky from which rain pours down. Coelum pluens etc. On top is a fine and pleasant cabinet on whose ceiling Flanders Holland and Zealand etc. are beautifully painted. There is a mirror in the pleasure house which is laid in with all sorts of marble. Lapide Lydio.

The ceiling painting links this to a building mentioned in Aubrey's *History of Surrey*:

> In the Summer-House, round a red and white Marble Table, (formerly a grave stone, I conjecture) is this Dutch inscription
>
> HIER LEGHET MYN WROWE
> MARGRIETE (AN ANGEL WITH A LABEL) DE
> MEDEWE BANS. HEREN DACH
> DECEMBE BYD OBER D YELE
>
> at the end is a hawke with a label; this was brought from abroad by Sir Franc. Carew, who built this pleasure house; on the top of which is painted the Spanish Invasion of 1588, much decayed; under which was a cold bath.[31]

The cold bath might have been inserted in place of the grotto at some point in the 17th-century.

The inscription is enigmatic and it is possible that there were missing sections which Aubrey does not indicate. If it is a monumental inscription the full text might have read:

> Hier leghet myn vrowe [for 'vrouwe'] Margriete de wedewe vans heren […, die staerf in het jaer M CCCC…..de …] dach December bid over de ziele

which translates as:

> Here lies my wife Margeret the widow of lord […, who died in the year M CCCC….. the …] day of December , pray for the [her] soul".[32]

The inscription may have been damaged while it was in the banqueting house, but it is also possible that parts were erased by Francis Carew to create a deliberately obscure inscription: it may not be coincidence that all the details that would identify Margriete are missing.

It is possible that Aubrey is right in saying that Francis brought the table from abroad but it could have been acquired in London. In 1580 English troops lead by Sir John Norris sacked the city of Mechlin between Brussels and Antwerp. Camden says that they stole many marble tombstones from the churches and sent them to England where they were openly sold.[33]

The descriptions of the painting on the ceiling are somewhat contradictory. Waldstein says that the painting showed Flanders, Holland and Zealand – the present Netherlands and Belgium and presumably the southern North Sea – while Aubrey refers to the Spanish Amada where the action was in the channel between Plymouth and Dunkirk. Waldstein's account may be more reliable as the painting was 'much decayed' or perhaps altered when Aubrey saw it.

Many members of the English elite had a commitment to the Protestant cause which extended

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[31] Aubrey 1718 vol. 2, p. 159-60.
[32] Interpretation and translation by Rony Van Belle. Personal communication.
[33] William Camden *Annales Rerum Gestarum Angliae et Hiberniae Regnante Elizabeth (1615 and 1625): a hypertext critical edition* by Dana F Sutton. Revised 1 February 2001. http://www.philological.bham.ac.uk/camden/.

to the support of the French Huguenots and the rebels fighting Spain in the Low Countries. The leading figure in this was Robert Dudley, earl of Leicester, who developed close links with William of Orange and his associates in Holland and Zealand. In January 1576, a Dutch embassy offered Elizabeth the sovereignty of the rebellious provinces. She refused, but the idea returned at intervals and was supported by Leicester, Walsingham and others. It culminated in Leicester leading an English intervention in the United Provinces and becoming governor general in 1586-7.[34] It seems likely that the painting at Beddington alluded to this episode. Leicester and Francis Carew seem to have been on friendly terms. He visited Beddington in May 1573 and the following month Francis sent trout to him.[35] In November 1584 Leicester visited Nonsuch, and Francis sent him a gift of fat rabbits, in April 1585 he was at Beddington feeding the fish and Francis sent him trout in May and a spaniel in September.[36]

It would be logical for the inscription of the marble table to be linked to the subject of the painting. Two Margarets served as regents of the Spanish Netherlands in the 16th-century. One was Margaret of Hapsburg who served 1507-15 and 1519-30 and the other was Margaret of Parma who served 1559-67 and 1580-82. The first ruled during a time of peace and prosperity while the second saw a collapse into civil war as a result of Philip II's intransigence over religious and other issues. Margaret of Parma was inclined to be more conciliatory, but she was overruled, and eventually replaced by sterner governors who ultimately failed. In 1581 the rebellious states repudiated Philip's rule and after a long war Spain eventually had to accept the loss of the northern part of the territory, which became the Dutch Republic. The damage to the tomb might suggest the ruin of Spanish or specifically Margaret of Parma's rule, although she seems a curious scape goat – the real decisions lay with Philip II. Perhaps there were other less obvious meanings.

4.5 The Banqueting House, mount and rock

The household accounts contain a series of payments relating to a mount and a house on the river which may or may not be the same structure:

Sutton accession 72/17 f. 5v 29 September 1566 - 25 March 1567
It pd for tagynge oute of the wurke oute of ye locke of ye monte bridge
et settyng of it into A newe stocke et mendyng of ye staple viijd

SHC 281/4/11 4 - 11 June 1570
It pd to edmonde Collenes et hs men for vj daies wurking a ye house upon ye water x^{d}
It pd to John wallas for viij^{c} of pennye nayle for ye plumer xvj^{d}
It pd to him more for a ^{c} of short brode nayle for to nayle ye ley^{a}dowts iiij^{d}

SHC 281/4/13 18 - 25 June 1570
It pd for a Bushell of here for ye house upon ye Ryverv^{d}

SHC 281/4/16 9 - 15 July 1570
It pd to hym for A plat locke et a keye for y^{e} dore beyonde y^{e} house upon y^{e} ryrv^{er}

SHC 281/4/18 23 - 30 July 1570
It pd for A plate Lok for y^{e} dore beyonde y^{e} Ryver v^{s} iiij^{d}

[34] Strong and Van Dorsten 1964 p. 1-19.
[35] SHC 281/4/23 pages 8 and 19.
[36] Adams 1995 p. 192, 246, 247 and 310.

SHC 281/4/21 recto 13 - 20 August 1570
It pd to wm freye for sawing of a C et a halfe of y^e^ bridge ij^s^vj^d^
It pd to Ric wonam et henray for xij daies wurking at y^e^ bridgex^s^
It pd to Edmand Collens for iij daies wurking for y^e^ moding of batilments of the syds of y^e^ stone of y^e^ bridge et his man likewise ij daies iij^s^ iiij^d^
It pd to Collens for a daie ~~helping y^e^ carte~~ plastring xij^d^

SHC 281/4/21 verso 13 - 20 August 1570
It pd to y^e^ smyrthe for a plate to sett upon y^e^ hole of y^e^ monte gate ij^d^
It pd to him for ij hope for y^e^ barrell of y^e^ drabridge y^t^ weyeda xj^li^ xxij^d^
It pd for mendyng of ij gogins <~~et A Ronde pynne~~ viij^d^
It pd for v stone great nayls et xv__ for y^e^ bridge vij^s^ viij^d^
It pd for ij Ryngs for y^e^ ronde pynns et ij keys y^e^ same iiij^d^
It pd for sharpening of xx^iiij^ nayles y^t^ were olde for y^e^ bridge iiij^d^
It pd for sharpening v keys for y^e^ same ~~j^d^~~ iij^d^
It pd for a payre of crosse garnitts y^t^ weyed v^li^ et a halfexiij^d^ dd

SHC 281/4/23 p. 21 21 - 28 June 1573
It pd to symons white and Rogers for making of a hove at y^e^ monte
for a daye A pese at viij^d^ ye - daie a pese xvj^d^

In July 1607 Irons was paid for one day at the mount house, presumably for maintenance work.[37]

It is difficult to know if these entries refer to one or two structures, although taken as a whole this group of payments would fit a rock with an internal room set in the river and approached by a drawbridge with decorative battlements. Both the rock and the river appear to be close to a boundary, as there are payments for locks for the door beyond the house on the river and for the door beyond the river. There was also enough water around the structure for a 'hove' or fish pen.

It is also difficult to know whether these are the structures mentioned by Waldstein, the Hessen gentleman and Coryate:

> Waldstein - The garden contains a beautiful square shaped rock, sheltered on all sides and very cleverly contrived.
>
> Hessen gentleman - Not far away there is a stream of water cheerfully running out of a little hill which is handsomely furnished with all sorts of neatly made animals and little men as though they were alive.
>
> Coryate - In one of these walks [at Verona] is a delicate little refectory: at one side whereof there is a curious artificial rock, adorned with many fine devices, as scollop shells, and great varieties of other pretty shells of fishes brought from Cyprus: and mosse groweth upon the same as if it were a natural rock. This place certainly is contrived with as admirable curiosity as ever I saw, and moystened with delicate springs and fountains conveighed into the same by leaden pipes. I have seen in England one place something like to this, even in one of the gardens of that noble Knight Sir Francis Carew of Middlesex, who hathe one most excellent rocke there frame all by arte, and beautified with many elegant conceits, not withstanding it is somewhat inferior unto this.

[37] SHC G6/3/1 f. 23 r, accounts 5 July 1607.

The little men must have been an obvious feature and if they are the same structure it is odd that Waldstein does not mention them.

A mount house also appears in Sir Francis Carew's Probate Inventory of 1611.[38] The document is in poor condition and is only partly legible but the following sequence of rooms appears:

In the Chamb[e]r ov[e]r the pantry
In the Chamb[e]r ov[er] the larder
In the Chamb[e]r ov[er] it

There is then:

In the olde gallery
...able a cubbard seaven et twenty
..ten mapps eleaven stoole et six
In the newe mount house
...a square table of India wood and six
..tooles of Walnuttree a Couch Covered w[i]th
..greene et five et twenty glasses w[i]th fethers

The room sequence then continues:

In the Butlers Chamber …
In the Stewards Chamb[e]r
..n the Falcon[er]s Chamber
..n the Cooks Chamb[e]r

The sequence of rooms suggests that the gallery was close to the kitchen at the southeast corner of the house and that the mount house was attached to the gallery.

An internal gallery in this position seems unlikely. It is therefore possible that this gallery ran out into the garden from near the southeast corner of the house and that the mount house stood at the end of it. If so the gallery would have crossed the moat.[39]

The Warwick reparations accounts of 1650 include repairs to a mount house:

For two Bricklaiers six dayes to mende ye little house by the Mounthouse, and the stones of the Mounthouse	00-10-00
Ite for two Labourers to serve them six dayes	00-06-00
More for two bushells of haire to mende ye little house by the Mounthouse	00-01-00
For a thousand of lath nayles for the litle house by the Mount	00-01-08
More for 3 bundles of laths for the little house by the Mounthouse	00-04-06
More for halfe a bushell of tyle pins	00-01-00 [40]

[38] SHC 2163/7/3
[39] The gallery, but not the banqueting house, appears to be listed in an inventory of the house taken in 1562 (BL Add MS 29605) and it may have been created by Francis Carew's father Nicholas (d. 1539). Galleries running from the house into the garden were created for Henry VII at Richmond (Thurley 1993 plan 11), Henry VIII at Hampton Court (Thurley 1993 plan 5) and for Wolsey at the Manor of the More, Rickmansworth (Thurley 1993 plans 9 and 10). Du Cerceau's *Les Plus Excellents Bastiments de France* shows examples at Blois and Villers-Cotterêts. Nicholas Carew was a Francophile who served as an ambassador to France of several occasions.
[40] SHC 2152/1 p. 2.

4.6 The hydra grotto

Waldstein mentions 'a hydra out of whose many heads the water gushes' while the Hessen gentleman says 'Further up there is a beautiful pleasure house, artificially built with all kinds of shell. Inside an animal with many heads with jets of water issuing forth'. These must be the same structure.

The Accounts for the week beginning 9 October 1603 include payments for work on a 'dragon house' which might be the hydra:

> 'John sherlocke demandeth for the sawing of 1j^{c} iij^{xx} foote of oken borde for the dragon howse at ij^{s} the hundred v^{s}iij^{d}
>
> It pade to John shirlocke for v daes worke at x^{d} the dae iiij^{s} ij^{d} and to George tappesfilde for v daes at viij^{d} the dae iij^{s} iiij^{d} in all vij^{s} vi^{d}' [41]

4.7 Fountain with fishes and frogs

The Hesse description says that 'in the first garden we saw a very fine fountain with neatly made fishes frogs etc. swimming in the fountain as if they were alive'.

4.8 The Force Mill

In 1610 a commission of Surrey landowners investigated a proposal to divert part of the flow of the river Wandle to supply water to London. They produced a hostile report with a long list of people who would suffer from the project including Sir Francis Carew

> in respect of a force [m]ill w^{ch} conveyeth the water into his house. To the domage of the said S^{r} Frauncis Carew in regard of the greate costs . . . bestowed upon the said River for the delight of our late Soveraigne Lady the Queens Majestie and continued for the pleasure and delight of the K[inges] most . . . Ma^{tie} [42]

This must have been some kind of water-driven pump which is likely to have supplied the garden fountains in addition to the house.

The Warwick reparation accounts of 1650 include several payments for a force mill which is likely to have been the same machine:

> June: 5:th 1650
> It: For a Millwright to mende the force
> Mill: two days three shillings p diem 00-06-00
> More: for boards to mende the Mill 00-02-03
> For halfe a hundred of nailes 00-00-03 [43]

4.9 The features in the stream

Waldstein says that 'In the stream one can see a number of different representations: the best of these is Polyphome playing on his pipe, surrounded by all kinds of animals'. The Hessen gentleman says that 'Further down [from the little hill] are two little corn mills, well made, driven by the water'. There are also small boats and a little naval vessel lying at anchor on the water. These perhaps stood downstream of the rock.

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[41] SHC G6/3/1 f. 2 v, account 9 October 1603.
[42] Giuseppi 1908 p. 190.
[43] SHC 2152/1 p. 6.

The accounts for 1607 have the following:

> It[e]m paid to Kennylie for ij dayes worke at the store howse doore and the fishe chamber at xiiijd a daye ijs iiijd [44]

The fish chamber may have been a pen in the river for holding fish. It is conceivable that this was referred to in October 1607,

> It[e]m paid for iiij dayes aboute the pann
> betwixt the milles at Xd p[er]diem in all Vjs Viijd

'Betwixt the milles' would place the pan or pen between the 'two little corn mills, well made, driven by the water.' of the 1611 description. These would be vulnerable to flooding so it is unlikely they would be in the main river.

There was also a 'grate benethe the preveye bridge were the fyshe was kept' on which work was done in May 1570.[45] The pens may have been used for raising prime trout. There is a reference to them being taken to London presumably to Francis's house there.[46] In 1570 Thomas Roger paid for taking of trowts for my lord cardinal – almost certainly Cardinal Chatillon and in 1585 the Earl of Leicester gave a gratuity to a servant who delivered trout from Beddington. The earl also went fishing there and fed the fish.[47]

The identity of Polyphome is unclear. It could be Polyphemus the monstrous one-eyed cyclops who features in Ovid's *Metamorphoses* and Homer's *Odyssey* who lived in a cave with his sheep. He played a reed pipe but not melodiously and did not attract 'all kinds of animals'. Pan, the Greek god of the wild and of shepherds and flocks also played pipes. He is not, however, usually seen as attracting a following of animals, although they could have been seen as a normal attribute of a wilderness – perhaps like the collection of exotic animals with the goddess Diana on the plasterwork in the High Great Chamber of Hardwick in Derbyshire. One of the shepherds decorating the Great Grotto in the Boboli garden in Florence is playing on a pipe but is surrounded by sheep rather than assorted animals.

The god Apollo is often portrait with a group of animals enchanted by his music, but he played the lyre not the pipes. In classical mythology pipes seem to be rustic instruments suitable for a god of wild places, shepherds, or an uncouth monster.

4.10 Grate pother place

The accounts for 1570 include a payment to 'Ric wona' and his man two days working for the grate pother place.[48] The *Oxford English Dictionary* says that pother means smoke, commotion or uproar.[49] The nature of the pother place is unclear, but if it is a noisy place it might have been some sort of garden trick.

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[44] SHC G6/3/1 f. 34 r, account 15 November 1607.
[45] SHC 281/4/9.
[46] SHC 281/4/6.
[47] SHC 281/4/14; Adams 1995 p. 246-7.
[48] SHC 281/4/11.
[49] Second edition, 1989. A list of food in the HMC report on the papers of the Marquise of Salisbury mentions 'oxen alive' and 'oxen pothered' so the term could also mean slaughtered. However, a slaughter place would usually be called a slaughterhouse which is unlikely to have been called 'great'. Historical Manuscripts Commission *Calendar of the manuscripts of the most hon. the Marquise of Salisbury ... preserved at Hatfield House, Hertfordshire*. Part 1. HMSO, 1883 item 786.

4.11 Planting and plant houses

The Hessen gentleman mentions the following plants:

> In the other garden we saw a great number of figs oranges and lemons - all trees which were bearing fruit at the time. Item Taxum, Laurocerasum, Pomum Adami, cuius folia melissi odorem fere habent. Nerion vel Rododendron with beautiful red flowers, it is, however, poisonous.

Taxum was yew. Laurocerasum was probably the cherry laurel Prunus Laurocerasus which was native to southeast Europe and the Middle East. It was introduced into Italy in the second half of the 16th-century and was soon widely planted.[50] Nerion vel Rhodedendron was probably Nerium Oleander which is native to the Mediterranean. Pomum Adami – Adam's Apple – is likely to be a type of lime.

Francis bought pomegranates in Paris in 1562 and Evelyn mentions them at Beddington in his diary entry for 27 September 1658.[51]

Gerard mentions two other south European plants at Beddington. One is Bladder nut (Nux vesicaria) which grew in the garden hedges of Sir *Francis Carew* near Croydon seven miles from London.[52] He mentions several other English gardens where it grew including his own garden and William Cecil's London House. The second plant was Land Caltrops (Tribulus terrestris):

> Which he 'growing in a moist meadow adioining to the woode or Parke of Sir Frances Carew, neere Croidon, not farre from London, and not else where, from whence I brought plants for my garden.[53]

In the Mediterranean it is an invasive weed and it seems likely that the plant was a garden escape.

The citrus plants, figs and oleander would need cover if they were to survive the harsh winters of the late 16th-century and there are documentary references to the houses for them. The orange house became quite famous and is described in section 4.12 below. A fig house is mentioned the household accounts for November 1607:

> It[e]m paid to John Shurlock for V dayes aboute the figg house
> at xvjd p[er] diem - vj^{s} viij^{d} and to keneby for vj dayes at
> xiiij^{d} p[er] diem - vij^{s} in all xiij^{s} viij^{d} [54]

In April 1607 'Sherlock's man' and 'kennely' were paid for four days work 'aboute the trayninge howse'. A few lines later:

> It[e]m Irons iij dayes about the trayning howse iijs vjd
> It[e]m more for halfe a bushell of tyle pinnes viijd [55]

This suggests that roof repairs were being carried out. It is not clear if this was a building for raising plants or training horses or other animals.

There are payments for setting up a frame for a vine in London – presumably in Francis Carew's house there – in November 1560, and it seems likely that there was also one at Beddington at

[50] See the Tradescant plant list in Leith-Ross 1984 p. 274. Mitchell 1988 p. 300. Lazzaro 1990 p. 28.
[51] TNA SP 12/22 printed number 42.
[52] Gerard 1597 p. 1294.
[53] Gerard 1597 p. 1066.
[54] SHC G6/3/1 f. 33v, account for 8 November 1607.
[55] SHC G6/3/1 f. 15 r, account for 19April 1607.

that time. It is not, however, directly mentioned until December 1607 when someone called Weston was paid for sawing 180ft of 'quarter and other things for the vines' and John Sherlock and his man for five days about the vines. It seems likely that they were covering them for the winter – or possibly repairing damage to the covering.[56]

In June 1607 a cherry keeper was paid for 25 days work at 4d a day. This seems to connect to a famous stunt which Sir Francis staged for Queen Elizabeth and described in Hugh Plat's *Garden of Eden*:

> Here I will conclude with a conceit of that delicate Knight, Sir *Francis Carew;* who, for the better accomplishment of his Royall entertainment of our late Queen of happy memory, at his house at *Beddington,* led her Majesty to a Cherry tree, whose fruit he had of purpose kept back from ripening, at the least one moneth after all Cherries had taken their farewell of *England.* This secret he performed, by straining a Tent or cover of canvas over the whole tree, and wetting the same now and then with a scoope or horne, as the heat of the weather required and so, by with-holding the sun-beames from reflecting upon the berries, they grew both great, and were very long before they had gotten their perfect cherry colour: and when he was assured of her Majesties comming, he removed the Tent, and a few sunny dayes brought them to their full maturity.[57]

The trick must have been first performed before 1594 as it figures in Plat's *The Jewel House of Art and Nature* which was published in that year although Sir Francis is there identified only as a Surrey knight.[58]

Gilly flowers were bought to set in the privy garden[59]. In 1607 there are payments for the seeds of coleflore, syves (chives), sweet marjeran, pursland, bazell, rape, hemp and mustard.[60] This looks like the restocking of a herb garden.

4.12 The orange house

Sir Francis is known to have bought orange and other trees during a visit to Paris in 1561-2, and it is generally assumed that this is the source of the plants in the Beddington orange house. However, there is no mention of the structure until 10 January 1608 when a man called Sadler was paid for half a day spent sweeping the snow off it.[61] The Hessen diary entry of May 1611 noted 'a great number of figgs, oranges, lemons - all trees which were bearing fruit at the time'.[62]

The orangery was maintained after Sir Francis's death and there are a series of references to it in the 17th-century. In 1650 the house, park and garden were being leased to the Earl of Warwick who submitted accounts for various repairs that he had carried out including work on the orange house:

> Jan: 14th 1652 for fo[?] severall bills for re=
> pairs of the old Stoves in the orange house
> & the repairs of the fountain house as may
> appear by their bills 7-0-0

[56] SHC G6/3/1 f. 36 v, account for 13 December 1607.
[57] Plat 1654 p. 165-6.
[58] Plat 1594 p. 6.
[59] SHC 281/4/25 p. 3.
[60] Lambert 1918 p. 11.
[61] Section 19.119.1 below. SHC G6/3/1 f. 39 r, account 10 January 1607/8.
[62] Quoted from Strong 1990.

Paid Thom:[Nich] Constable ye Carpenter for building
of a new orange house Jan 18[th] 1652 60-0-0
[Marginal note says: Allowed to Nich Constable
for repayr[s] of the orange house 60l out
of my Lds rent by M[r] Ralegh]
For two new Iron Stoves for the said orange
house being made so much bigger than it
was before that the old stoves would not serve
the turn 15-0-0
[A marginal note adds: 2 new stoves sett up by my Ld but of
little use][63]

The orange house was mentioned by several writers in the second half of the 17th and early 18th-century. The first is John Evelyn whose diary entry for 27 September 1658 notes:

> To Beddington that antient Seate of the Carews, a faire old hall, but a scambling house: famous for the first Orange garden of England, being now over-growne trees, & planted in the ground, & secured in winter with a wooden tabernacle & stoves: This seate is rarely watered, and lying low invirond with sweet pastures &c: The pomegranads beare here: here is also a fine parke.

This was followed by an otherwise unknown J Gibson in 1691:

> Beddington Garden at present in the hands of the duke of Norfolk, but belonging to the family of Carew, has in it the best orangery in England. The orange and lemon trees there grow in the ground, and have done so near one hundred years, as the gardener, an aged man, said he believed. There are a great number of them, the house wherein they are being above two hundred feet long; they are most of them thirteen feet high, and very full of fruit, the gardener not having taken off so many flowers this last summer as usually others do. He said, he gathered off them at least ten thousand oranges this last year. The heir of the family being but about five years of age, the trustees take care of the oranges, and this year they built a new house over them, but they look not well for want of trimming. The rest of the garden is all out of order, the orangery being the gardener's chief care; but it is capable of being made one of the best gardens in England, the soil being very agreeable, and a clear silver stream running through it.[64]

The 1695 edition of Camden's *Britannia* says:

> To the north-east is Beddington, where not only the orchards and gardens in general (as our Author has observ'd) but particularly its Orange-trees, deserve our mention. They have now been growing there more than a hundred years, and are planted in the open ground, under a moveable Covert during the winter months. They were the first that were brought into England by a Knight of that noble family; who deserves no less commendation than Lucullus met with for bringing cherry and filbert trees out of Pontus into Italy: for which we find him celebrated by Pliny and others.[65]

Evelyn visited the garden again on 20 September 1700:

> I went to Bedington, the antient seate of the Carews formerly & in my remembrance, a noble old structure, capacious, & in forme of the buildings of the Age in Hen:8 & Q. Eliz: (time) & a proper for the old English hospitality, but now decaying with the house

[63] SHC 2152/1 p. 13.
[64] Hamilton 1794.
[65] p. 165.

> its selfe, heretofore adorned with ample Gardens, & the first Orange trees that ever were seene in England, planted in the open ground, & secured in Winter onely by a Tabernacle of boards, & stoves, removable in summer; thus standing 120 yeares large & goodly Trees & laden with fruite, but now in decay as well as the Grotts & other curiosities, cabinets and fountaines in the house & abroade, thro the debauchery & negligence of the Heires, it being now fallen to a child under age, & onely kept by a servant or two from utter delapidation. The Estate & Parke about it also in decay: the negligence of a few years, ruining the elegances of many.[66]

The orange house survived to be mentioned in Aubrey's *History of Surrey* which was published in 1718. He says that the house

> ...having before it neat Gardens, not yet finished, with several Canals, and an orchard; but what more particularly deserves our Notice, is the fine Orangerie, where are several Orange-Trees, (transplanted from the warmer Breezes of Italian Air, into our more inclement Climate) planted in the open ground, where they have throve to Admiration for above a whole Century; but are preserved, during the Winter-Season, under a moveable Covert. They were brought from Italy by Sir Francis Carew, Knt. (who built the old Mansion House;) and it was the first Attempt of this Kind that we hear of.[67]

John Aubrey collected material for a history of Surrey but the work was left incomplete when he died in 1697. The surviving manuscript in the Bodleian Library does not contain any Beddington material, so this must have been assembled by Richard Rawlinson who filled the gaps in Aubrey's manuscript and edited it for publication. Rawlinson is known to have visited Beddington to collect material in May 1717. His account contains information about the garden not known from other sources, so it seems likely that it was based on direct observation.[68] Soon after this the orange house was rebuilt as a brick structure retaining some of the original trees.[69]

The descriptions of the wooden orange house are reasonably consistent. The structure was about 200 feet (60.96m) long, was of wood heated by stoves and was erected in the autumn and taken down in the spring. It seems likely that the main timbers were left in place all year. Late medieval and early modern timber buildings generally stood on a low dwarf wall to keep the wood off the ground, so it is likely that this was the case with the orange house. Two foundations were found in an excavation on the site of the orangery, but both of these appeared to be later than the Elizabethan period and may have been part of the repairs and re-buildings in the 17th-century.[70]

The use of wooden houses to overwinter oranges developed in Italy and had spread to elite gardens in the Loire and northern France in the first half of the 16th-century.[71] Sir Francis Carew would have had the opportunity to see oranges growing in and around Paris and to study the methods of overwintering them during a visit 1561-2 (see section 19.1 below). It is often assumed that he bought a significant number of plants, shipped them to England, and then established the Beddington orange house.[72] This may have been so, but it is probably rather unlikely. The trees were very expensive. The two myrtle trees bought for

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[66] *Diary* 20 September 1700
[67] Aubrey 1718 vol. 2 p. 159-160.
[68] Enright 1956 p. 129.
[69] The brick orangery is described in Phillips 2013.
[70] Phillips 2013 foundations [CT29] and [CT30] described on pages 47-9 and discussed in section 5-4.
[71] Woods and Warren 1988 p. 4-9. The interpretation boards at the Chateau Galliard at Amboise say that oranges were introduced there by the Neapolitan gardener Dom Pacello de Mercogliano at the beginning of the 16th-century.
[72] For example Woods and Warren 1988 p. 12.

William Cecil cost a crown each and the lemon an exorbitant 15 crowns. Sir Francis was a rich man but nowhere near as rich as Cecil so it is likely that he also bought a small number of trees. He may have augmented them at a later date, but it is more likely that he and his gardeners learnt how to propagate them. The stock of the orange house could have been built-up over time and the wooden building gradually expanded to accommodate the increasing numbers.

John Evelyn thought Beddington 'famous for the first orange garden in England'. With his long interest in gardening and his wide circle of contacts he was in a position to know and was probably correct. A letter from Willian Cecil to Thomas Windebank shows that he had an orange before Francis bought his trees, but he was clearly not growing them on a large scale. It was Francis who was the first to do this and he could because he had learnt to overwinter them on a large scale and almost certainly to propagate them.

4.13 Bird House

The early 17th-century accounts refer to 'birde howse' and include payments for hemp seed.[73]

4.14 Edmond Collens

The household accounts for 1570 contain several payments to Edmond Collens for building related work. These include repairing a lime kiln and burning lime, work on the house on the river for which a bushel of hair was bought, for 'y^{e} moding of batilments and for platering of the syds of y^{e} stone of y^{e} bridge'.[74] This all suggests that Collens was a plasterer but he was also paid for four days 'tyling of new wurke'.[75] The payments often include his man and on one occasion his boy. He seems to have been a small-scale builder paid for modest jobs rather than a large contract.

In 1574 his wife was paid for sifting oatmeal and he for 'grobing in ye uppr course'.[76]

The Beddington parish register shows that Edward Collins married Alice Napkin on 8 October 1559. Three children are recorded: John baptised 7 March 1561, Gartred baptised 14 December 1566 and James baptised 28 November 1572. The family then disappears and may perhaps have moved.

It is clear that Collens worked on the garden structures and that this may have involved decorative work on the bridge. He does not appear to be a major craftsman but his disappearance from the parish register might suggest that the experience gained led to work elsewhere.

4.15 William Jones

On 7 July 1609 William Jones of Carshalton, gardener, made his will.[77] He made various cash bequests among which were legacies of 2s 6d to the 'six usuall weeders in my Masters garden' the widows Wenham, Ley, New and Hatcher , and the goodwives Sturmie and Watson.

He clearly expected to be buried in Carshalton as the churchwardens and overseers were to be given money for the poor at the time of his funeral. He also left 10s to the 'use' of the church and the same sum for Beddington. William marked rather than signed his will but he seems to have been moderately well off as he left cash legacies totalling £113 8d with the

[73] Lambert 1918 p.8 check ref G6/3/1 f. 16v.
[74] SHC 281/4/9, 281/4/11 and 281/4/21.
[75] SHC 281/3/23 p. 2.
[76] SHC 281/4/24 p. 5 and 7.
[77] PCC probate 28 July 1609.

residue to go to his wife Joan. He was clearly wealthier than a labourer, but his illiteracy suggests that he probably not a design-level gardener. The three children of his brother James Jones of Long Ditton were left money when they came of age so it is likely that William Jones was not an old man – perhaps in his 30s or early 40s.

5. INTRODUCTION TO THE ARCHAEOLOGY

The Carew research project has involved a series of small excavations and investigations of standing structures which have been reported in a number of Carshalton and District History and Archaeology Society Occasional Papers. The material relating to the 16th-century garden is brought together here. This is followed by a detailed account of two pairs of trenches which produced the greater part of the archaeological evidence for the Tudor garden. The first pair, labelled CM and CN, were excavated in the centre of the lawn to the east of the house (figure 2). They cut through the foundations of an 18th-century walk and passed into the fill of a former water course which contained a mass of debris from the demolition of garden structure. The second pair of trenches (CU and CW) uncovered a fragment of an ornamental garden structure which had been largely demolished to make way for an early-18th-century culvert and cold bath. The surrounding soil contained hundreds of pieces of the demolished structure including a few pieces of Palissy-type pottery and ornamental metalwork which are currently unique to the site. The deposits excavated in trenches CU and CW were nearly all later than the fragment of ornamental structure which was left in place and reburied, so there was no excavation beneath it. There was therefore very little archaeological evidence for its date. However, the materials used to construct it were distinctive and very similar to the materials dumped under the walk foundation in trenches CM and CN. The latter could be closely dated by a mixture of archaeological and documentary evidence. The dumping had taken place about 1710-12 when the house and garden were being remodelled by Nicholas Carew, later 1st baronet. The following sections will describe the finds and develop this argument in detail.

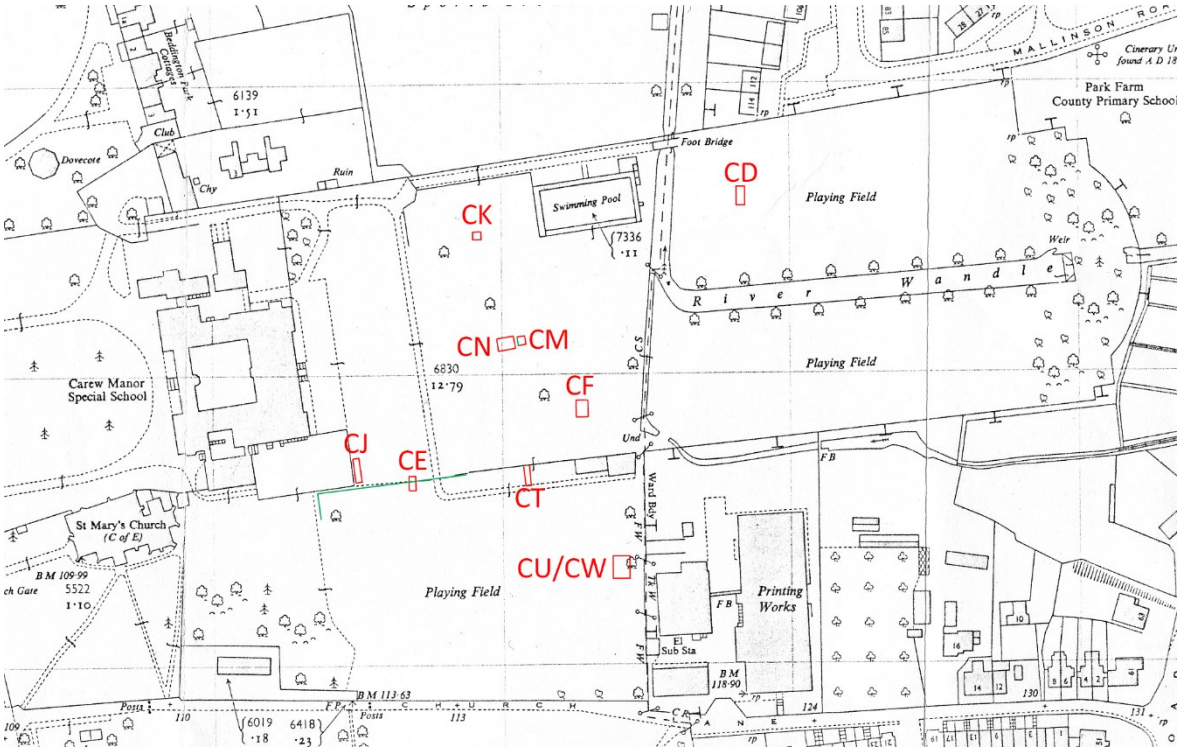


Figure 2. The 1955 Ordnance Survey map with the location of the excavated trenches. The location of trenches CP, CQ and CR is shown in figure 3.

6. A WALL ALONG THE NORTH SIDE OF THE ORANGE HOUSE?

In 1999 a trench (CT) was excavated against the south side of the north wall of the early-18th-century orange house (figures 3 and 4). A foundation [CT29] was uncovered against the south side of the wall.[78] It was made of chalk with brick on the top. It had appeared to have been partly cut away to make way for the 18th-century wall, and it is possible that it was the foundation of a shelter wall along the north side of the wooden Elizabethan orange house which stood on about the same site (see section 4.12 above and figures 4 and 5).

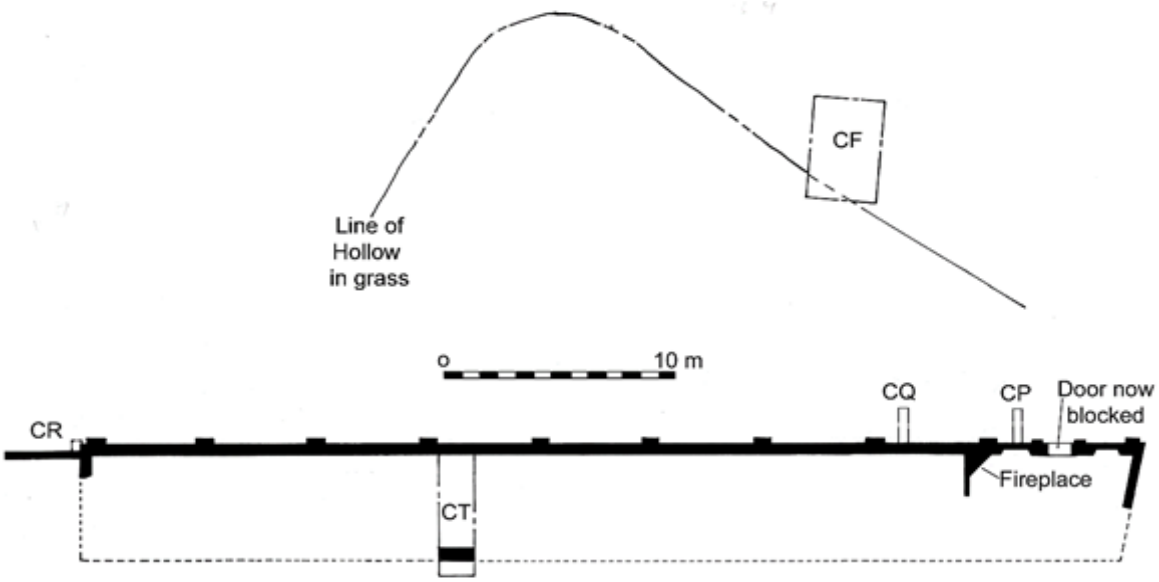


Figure 3. Plan of the early 18th-century orange house with the location of trenches CF, CP, CQ, CR and CT. North at the top.

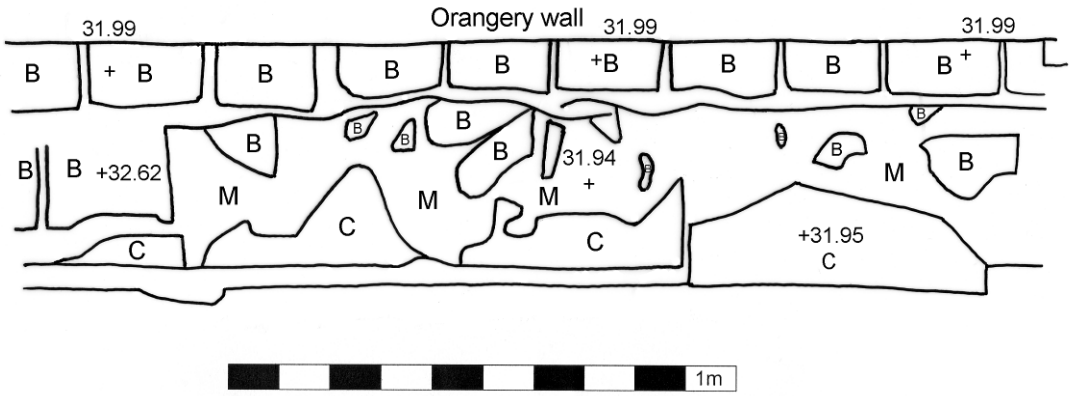


Figure 4. The top of foundation [CT29]. North at the top. B = brick, C = chalk, M = mortar.

[78] For a detailed report see Phillips 2013 especially p. 47-8.

Figure 5. The top of foundation [CT29] next to the orangery wall.

Another section of chalk foundation was exposed in trench CE which was excavated in 1990 about 20m west of the western end of the 18th-century orange house (figure 2).[79] It was aligned roughly east-west and projected 1.31m into trench CE from the east side (figures 6 and 7).

The foundation was about 0.33m deep on the south side and 0.36m deep on the north. It was 0.46m wide at the top and thickened to about 0.57m at the base. The foundation supported an 18th-century brick wall, but there was a chisel mark on the top which ran across two chalk blocks, showing that the upper surface had been levelled after construction. It is therefore possible that the foundation was the lower part of a chalk wall which had been reused as the base of a replacement brick wall.

The western end of the surviving section was rough and it was clear that the wall had once continued to the west. The structure had been robbed out but its former line was marked by a pocket of rubble which defined the bottom of the robber trench. A feature, which may have been the bottom of a post hole, was cut into the top of the deposits beneath the robber trench. It was located just beyond the end of the surviving part of the wall as shown in figure 7. It was more or less square with rounded corners about 0.29m north to south, 0.28m east to west and 0.9m deep. The fill consisted of small crushed mortar and brick with some flint and brown earth. This was very similar to the fill of the robber trench above, which suggested that the hole had been filled when the robber trench was created. The hole might possibly have held a large vertical post which was built into the original brick wall. If this was the case it may have been part of the timberwork supporting the wooden orange house or another plant house.

[79] Full report in Phillips 2016 p. 37-58. Trench CE had an east-west width of 2m. The east side was 15.6m from the end of the stub wall which projects 4.23m westwards from the west end of the orange house wall.

Figure 6. The chalk foundation in trench CE looking north.

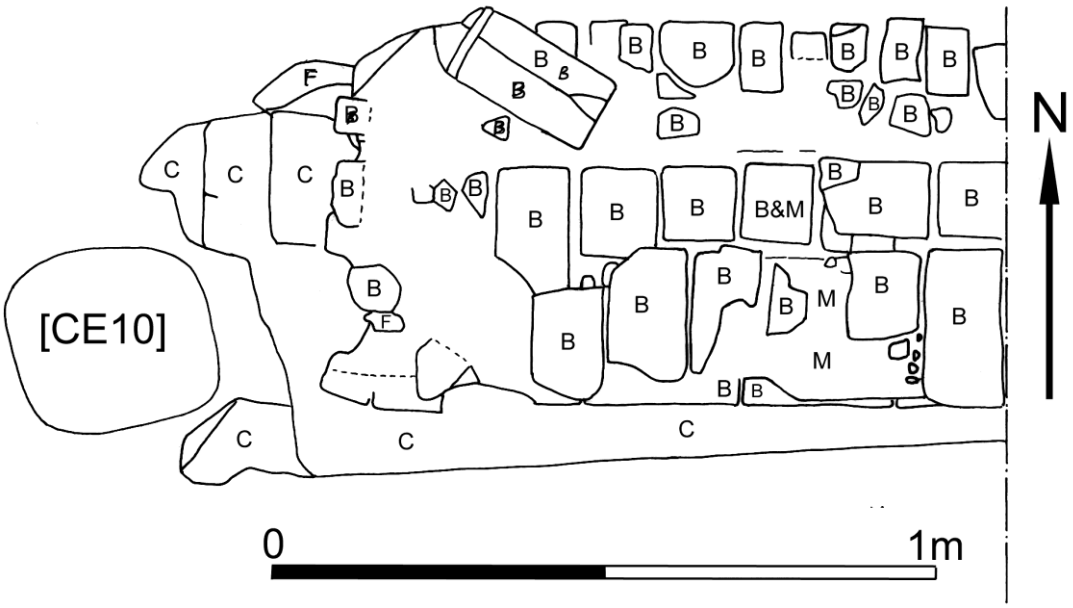


Figure 7. The top of the foundation in trench CE with layer [CE10] filling the possible post hole. B = brick, C = chalk, M = mortar, F = flint.

7. DISTILLING

An inventory of Carew made in 1562 lists the 'stilitorys' which appear following an entry for the tools in the garden. They contained:

> Item ij stilitorys a lytell cole rack
> a fyre shovell to the same[80]

Another inventory, made in 1611 following the death of Francis Carew, does not list 'stilitorys' but is incomplete.[81]

Trench CF, to the north of the orangery, contained eleven joining sherds from the top of an alembic (CF <50>, figure 8).[82] It had pale pinkish-brown body containing pink quartz. The interior has prominent wheel-throwing marks and is covered with yellow glaze which was greenish around various bubbly defects. The exterior had a few small splashes of yellow glaze. Sherds with the same distinctive fabric were found in trenches CT and CQ adjacent to the north wall of the 18th-century orange house:[83]

[CQ4]	<1>	Base angle sherd with pale brown body containing pink quartz. Base diameter of 70mm with steeply sloping slides. Exterior has a few splashes of yellow glaze with traces of green around bubbles and imperfections. Interior has prominent wheel-throwing marks. Exterior is slightly reduced and sooted especially on the base (figure 8).
[CQ4]	<2>	Wall sherd which joins <25>. Splash of yellow glaze on the exterior. Slight throwing marks on the interior.
[CQ4]	<25>	Wall sherd which joins <2>. Several small splashes of yellow glaze on the exterior and two splashes of grey material. Slight throwing marks on the interior.
[CT5]	<8>	Corner of a thick square vessel possibly a crucible. Upper surface a fracture with scraps of glassy slag. Fabric similar to alembic from trench CF but over-burnt. Three joining pieces.
[CT5]	<9>	Wall sherd. Turning marks on interior. Splash of yellow brown glaze on exterior.
[CT5]	<10>	Heavily over-fired partly vitrified pot – possibly crucible.
[CT11]	<7>	Base angle 100mm diameter. Pale pink-brown with darker exterior.

The alembic is likely to date from the late 16th or 17th-century as the sherds from [CF10] underlay a deposit of brick-cutting debris which was almost certainly connected with the construction of the orangery wall sometime between 1717 and 1721.[84] The sherds from trench CQ came from the bottom of the rubble deposit [CQ4] which contained several pieces of burnt Reigate stone often with a yellow stain on it. It is possible that this came from the hearth used to heat the still, but there is no firm evidence for this.

[80] British Library Add 29605 f. 20 recto.
[81] SHC 2163/7/3.
[82] Find CF <5>. Three sherds came from [CF7] and eight from [CF10].
[83] See Phillips 2013 section 5 for trench CT and section 4.2.2 for CQ.
[84] Phillips 2013 p. 6-7.

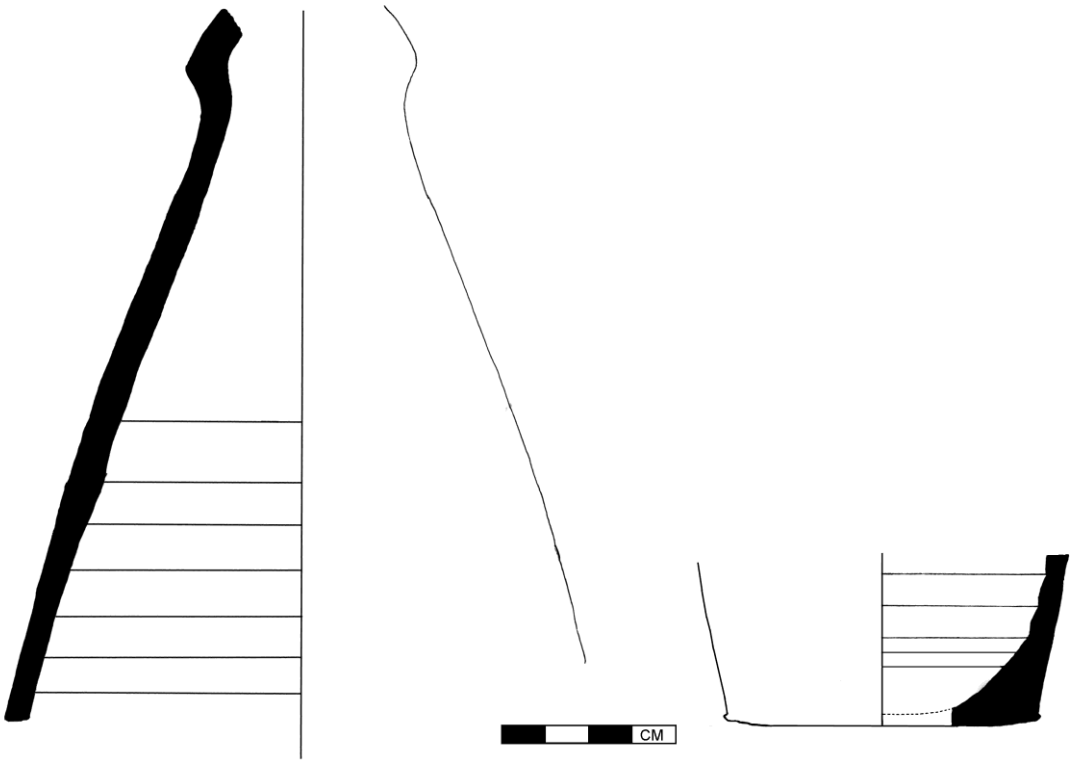


Figure 8. Alembic top CF <50> and pot base CQ <1> in a similar fabric.

The condition of the alembic and the survival of glaze on the exterior suggest that it was not heated to a very high temperature, so it was probably used to distil organic material rather than decompose minerals. Its narrow diameter is hard to parallel. Biringuccio says that when a bell is used for distilling alcohol the shell was usually deeper than normal. This would be consistent with the small size of the alembic, which suggests that it was used to distil something which would give a relatively high yield. Fermented liquids can contain up to about 18% alcohol. The yield from the distillation of plants for oil is usually so low that a small vessel would produce hardly anything. However, Biringuccio thought the bell was a poor method of distilling alcohol and that systems with metal condenser worms produced much finer spirit.[85] However, Biringuccio was writing in Italy and it is not known if metal worms were used in England in the 16th-century.[86]

The pot base CQ <1> (figure 8) was sooted but clearly only heated to a moderate temperature. If it was the bottom of the pot on which the alembic sat its narrow, potentially deep shape is odd, as steam bubbles rising through it would cause considerable turbulence and a tendency to boil over.

If finds CT <8> and <10> are parts of crucibles it seems that distillation was not the only process involved, and it is possible that other chemical or alchemical process took place. The distribution of the pottery suggests that the still was located somewhere near the orangery.

[85] Biringuccio 1990 p. 384.
[86] Haynes, Baker and Tipping 1998; Booth 2016.

8. THE HANGING FLOWER POT

Part of the side of a tin-glazed hanging flower pot was found in a contractor's trench dug into the fill of the north arm of the moat in 1983.[87] It is about 28cm in diameter. It has a cordon around the side with a large slab-like handle attached to it. This has a hole in it, presumably to allow the pot to be suspended. At least 3 such handles would been needed to keep it level. The outside is decorated with blue, green and yellow tin-glaze possibly in a floral pattern. The inside is unglazed. The form is not known elsewhere.

An analysis by Michael Hughes has shown that this was made in Antwerp, an early north European centre for the production of tin-glaze.[88] The town suffered heavily in the Dutch revolt. It was sacked and severely damaged in 1576 and besieged 1584-5.[89] The city surrendered and remained part of the Spanish South Netherlands – the future Belgium. However, the Dutch blockaded the river Scheldt, which was Antwerp's route to the sea, and the city was gradually displaced by Amsterdam as the great commercial centre of the Low Countries. The pot is thereforelikely to have been made in the third quarter of the 16th-century rather than the fourth.

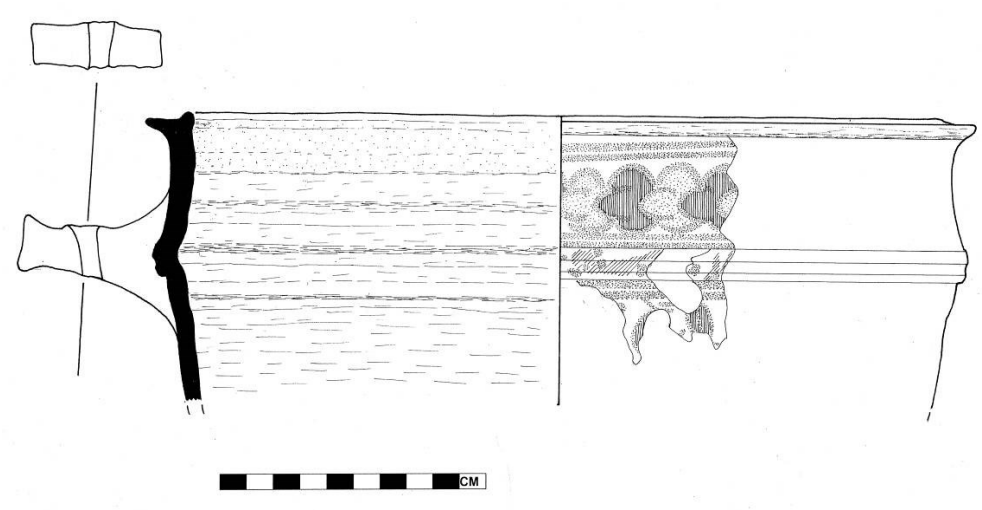


Figure 9. The hanging flower pot drawn by Clive Orton.

[87] Trench AC find <41>. See Phillips and Burnett 2016 vol. 2, p. 10-18. It was identified by Clive Orton and first published in Orton 1984.
[88] Hughes 2013.
[89] Parker 1985 p. 178, 214-5 and 239.

Figure 10. The fragment of hanging flower pot.

9. THE STRATIGRAPHY OF TRENCHES CM AND CN

Trenches CM and CN were on the lawn to the east of Carew Manor. They were on the centre line of the house and were 1m apart (figure 2). Trench CM to the east was 3m square while trench CN was 4m north-south by 5m east-west. The west side of trench CN was 69.98m from the east front of the house.

9.1 Trench CM

The grass was growing in layer [CM1] which consisted of soft dark brown soil with occasional flint pebbles and scraps of chalk. There was a circular patch of chalk 0.04m wide 1.52m from the south side of the trench and 0.5m from the east side.

Layer [CM1] rested on [CM2] consisted of brown soil which was lighter and harder than [CM1]. There were occasional flints and chalk flecks. The flint became more common towards the bottom, where it had been mixed from the underlying layer [CM3].

Layer [CM3] consisted of brown soil with many flint pebbles and some chalk, coal and cinder.

Layer [CM3] rested on layers [CM4] to [CM7] as shown in figure 11. Layers [CM5], [CM6] and [CM7] occupied broad east-west zones across the trench. Layer [CM6] was in the centre with [CM5] to the north and [CM7] to the south. Layer [CM4] filled a cut which ran roughly southeast across the northeast corner of the trench. At the north end the cut was 7cm deep. It became shallower to the south and disappeared as shown in figure 12. The cut fill [CM4] consisted of brown soil with some flint and scraps of coal.

Layers [CM5] and [CM7] were very similar and consisted of rounded and sub-angular flint of mixed size up to 0.2m in a sparse brown earth matrix. Both layers contained occasional pieces of brick.

Layers [CM5] and [CM7] both rested on layer [CM6] which consisted of tightly packed broken chalk of mixed size up to 27cm with occasional flint up to 0.33m and rare scraps of brick or tile (figure 13). There is a very sparse brown soil matrix. Much of the flint is knobbly and appeared to have been quarried from the chalk rather than dug from gravel.

Layer [CM6] rested on layer [CM8] except for a small area in the southwest corner of the trench where it rested on [CM9] as shown in figures 14 to 16.

Layer [CM8] consisted of brown earth with chalk, charcoal, occasional pockets of clay and some flint, and brick. There was a group of bricks in the southeast corner of the trench. These were randomly orientated and probably dumped. The surface of the layer contained three deep irregular east-west aligned ‘ruts’ which appear in figures 14 to 16 and in section figures 23 to 26.

Layer [CM9] occupied a small area in the southwest corner of the trench. It consisted of clay with pieces of chalk, scraps of charcoal and a piece of brick.

Layer [CM8] rested on [CM10] in the southern end of the trench and [CM11] in the northern end as shown in figures 17 and 18. Layer [CM10] consisted of clay with chalk and flint (much large) and some yellow-green sandy material possibly Reigate stone. It also contained some limescale-covered rubble which is described in section 10.1 below. At this point [CM9] still occupied the southwest corner of the trench and [CM8] still occupied the east side. The group of randomly-oriented bricks were also still present in the southeast corner. In the northeast corner of the trench there was a mass of broken chalk of mixed size, mostly around 0.05m to 0.1m but with at least one piece as large as 29cm (layer [CM 13] figure 17). This contained a

piece of brick, two pieces of tile, occasional chalk pebbles, some large flint and a large lump of mortared flint.

The relationship between layers [CM8], [CM9], [CM10] and [CM13] was not completely clear. As a whole the deposits consisted of mixed dump, the main components of which were broken mortar, flint with mortar on it, and orange clay with some chalk, brick and other rubble.

The deposits rested on [CM11] which covered most of the trench as shown in figure 19.[90] A small area on the east side of the trench was numbered [CM14]. This turned out to be the top of the underlying layer and is described below.

Layer [CM11] consisted of loosely bound mortar, with large lumps of mortared flint, some tile and occasional brick. The material became larger from west to east. On the west side of the trench most of the pieces were under 0.05m, in the centre many pieces were over 5cm but most under 10cm, while there were many larger pieces on the west side. Much of the rubble had limescale on it and is described in section 10.1.

Layer [CM11] rested on [CM14] and [CM15] as shown in figures 20 and 21. [CM14] consisted of a thin layer of dark brown soil with many well-rounded flint pebbles, some sub-angular flint and occasional brick.

When [CM14] had been removed, [CM15] was found to cover the whole of the trench (figure 22). This consisted of broken mortar with much brick, tile, chalk, flint and Reigate stone. There was a pocket of broken Reigate stone towards the west side of the trench.

[CM15] rested on [CM16] which consisted of rounded gravel in a stiff dark silty matrix. The gravel was up to 8cm in size but was mostly smaller. A small sample of this was dug.

[90] Part of [CM11] was excavated as [CM12] until it was realised that they were the same deposit.

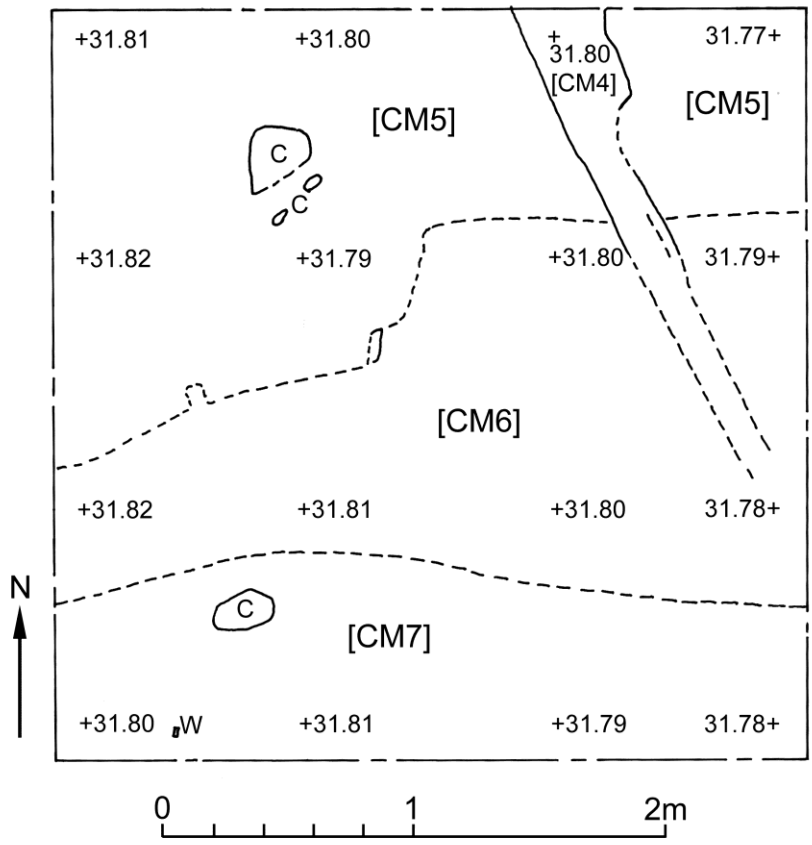


Figure 11. The tops of layers [CM4], [CM5], [CM6] and [CM7]. C=chalk.

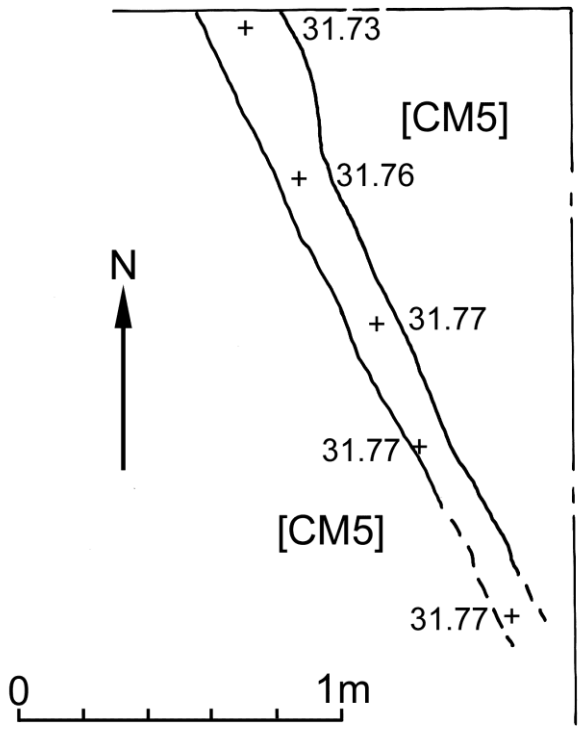


Figure 12. The cut in the northeast corner of the trench which was filled by layer [CM4]

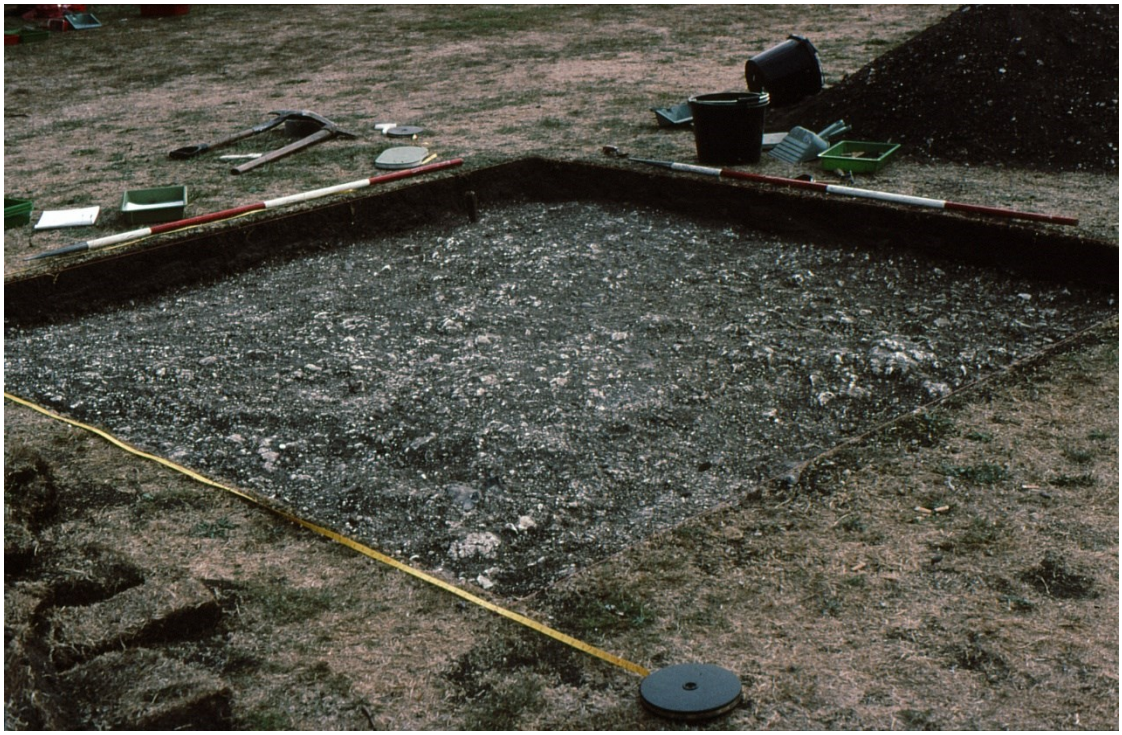


Figure 13. The top of [CM6] looking southwest.

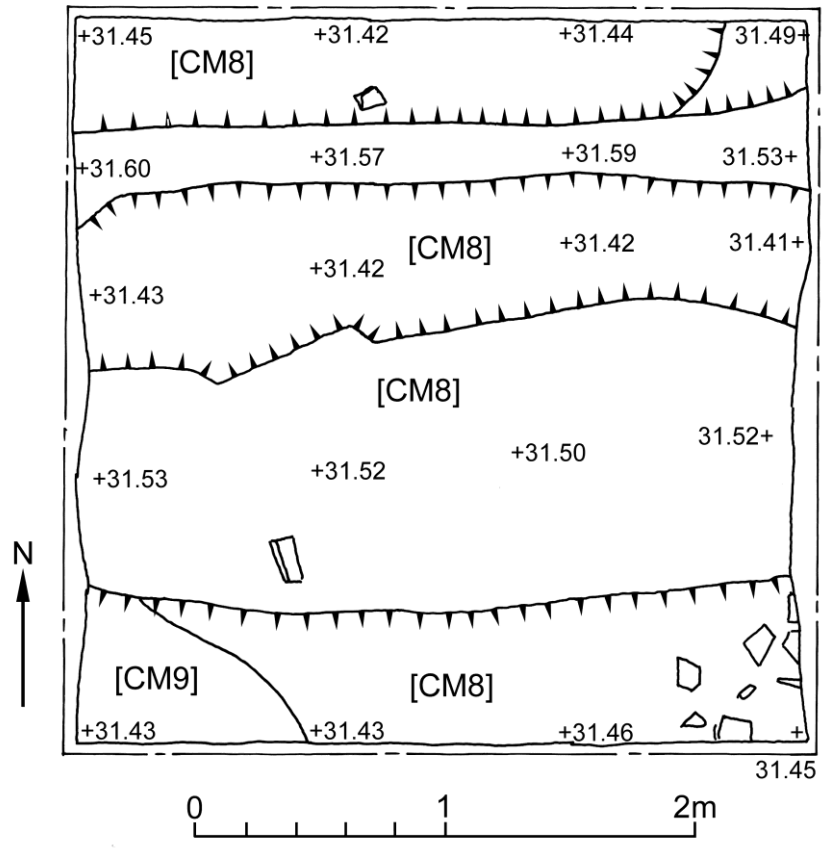


Figure 14. The top of layers [CM8] and [CM9] showing the 'ruts' running east-west across the top of the former.

Figure 15. The trench in the state shown in figure 14 looking southeast with the 'ruts' in the top of [CM8].

Figure 16. The trench as shown in figure 14 looking west.

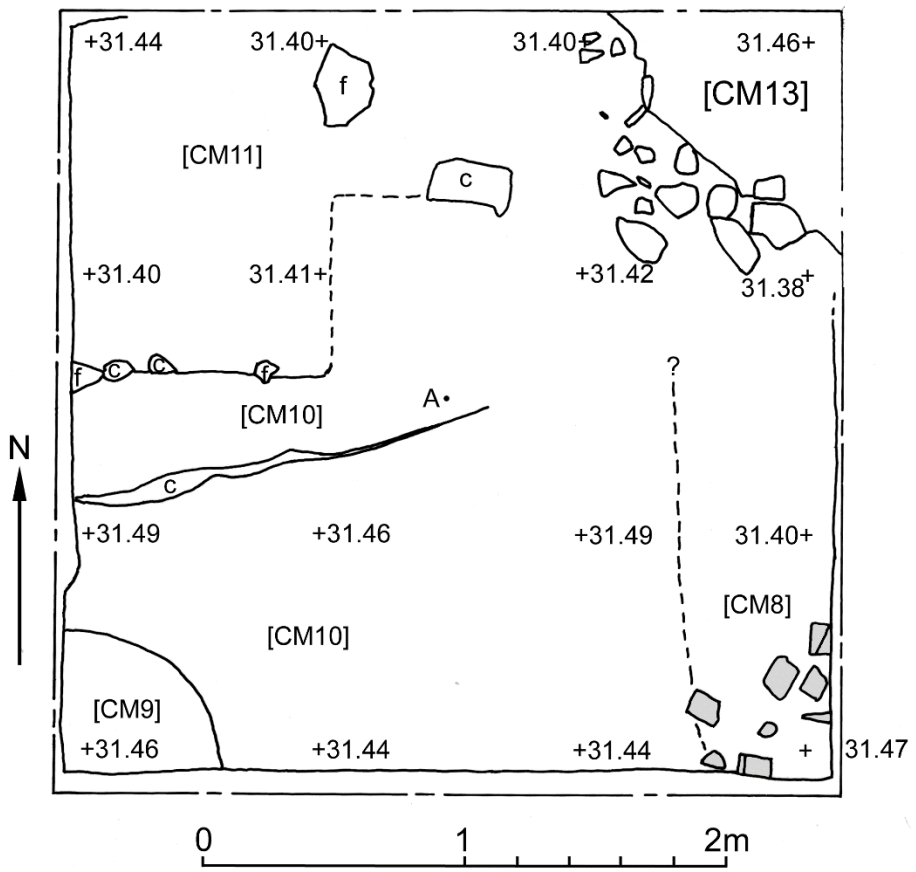


Figure 17. Layers [CM9], [CM10], [CM11] and [CM13] with part of [CM8]. A = earth filled auger hole, c = chalk, f = flint, grey shading = brick.

Figure 18. The trench CM in the state shown in figure 17 looking northeast.

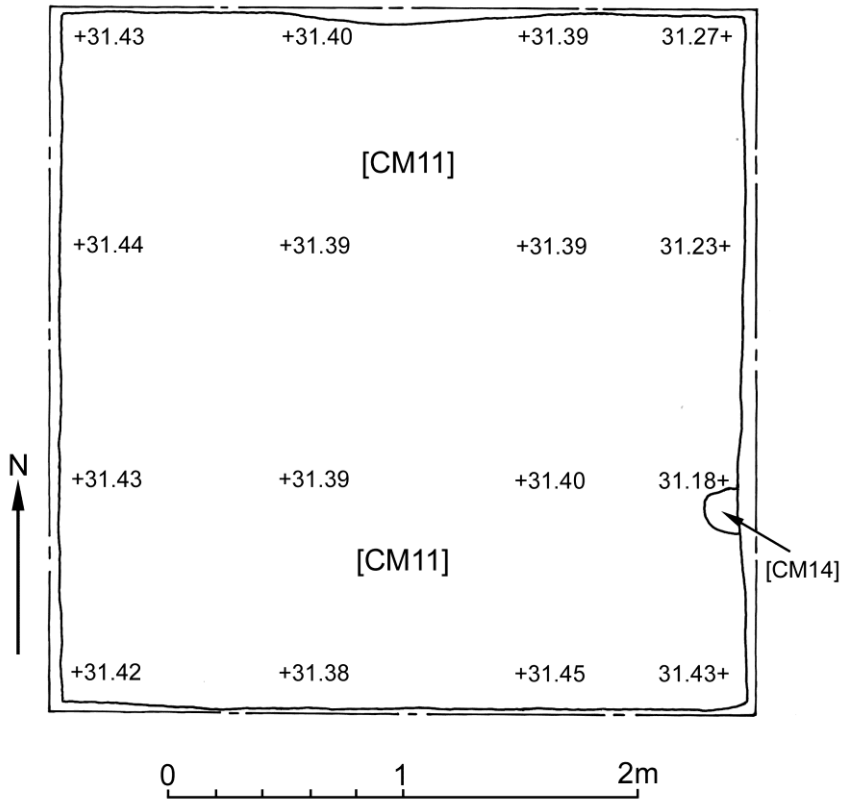


Figure 19. The top of layer [CM11].

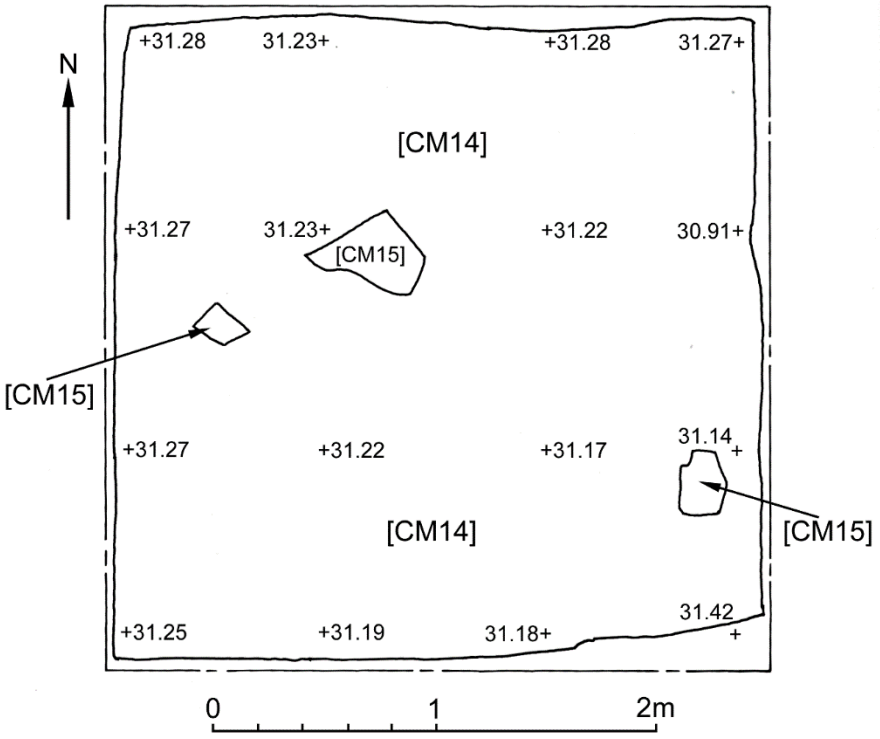


Figure 20. The top of layers [CM14] and [CM15].

Figure 21. The top of layer [CM14] with [CM15] exposed in some areas as shown on figure 20. Looking northwest.

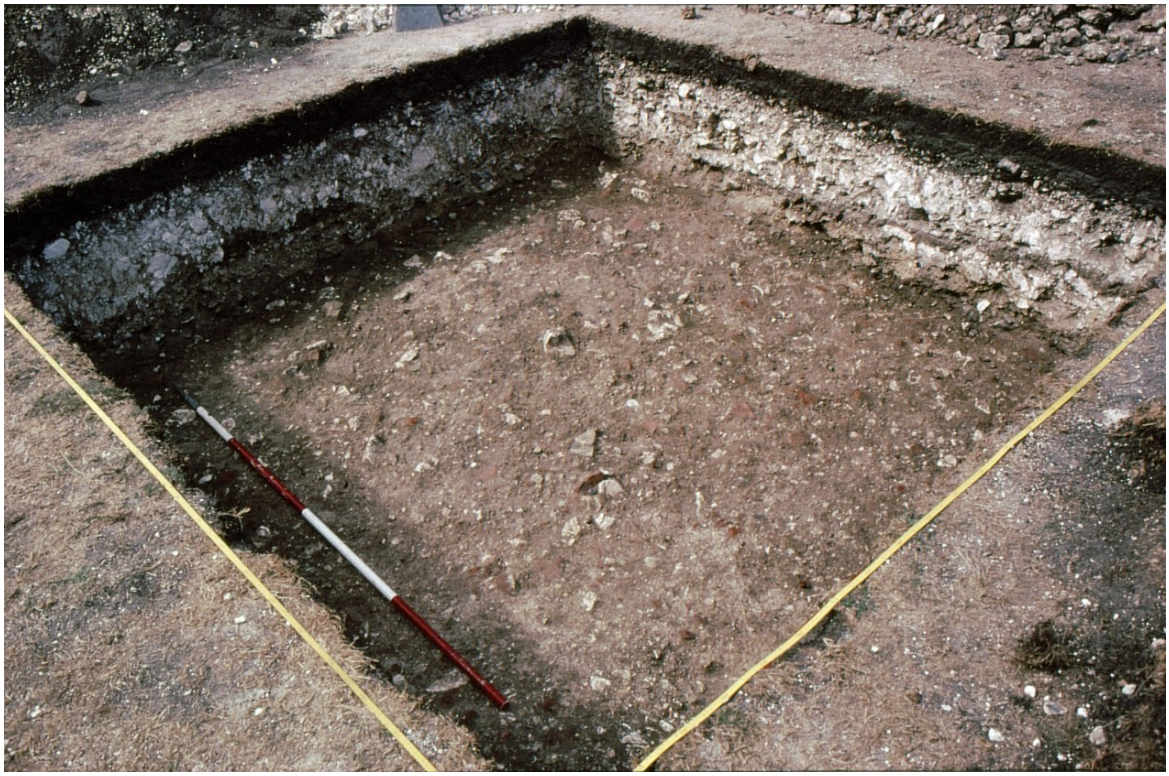


Figure 22. The top of [CM15] looking northwest.

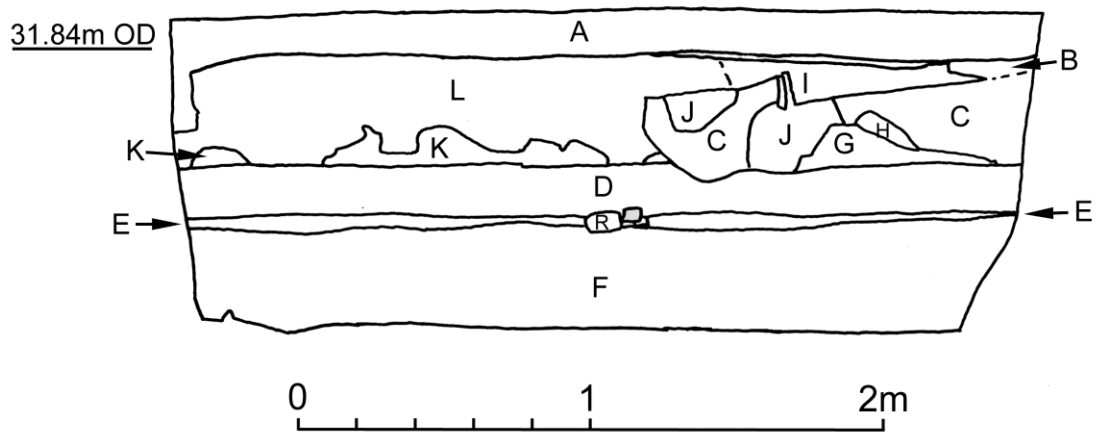


Figure 23. The west side of trench CM.

A	Dark brown soil.
B	Small gravel.
C	Broken chalk. Very little earth.
D	Flint, chalk and mortar.
E	Brown soil.
F	Rubble – Reigate stone, chalk, brick and tile.
G	Medium brown soil with chalk fragments.
H	Small broken chalk in medium brown soil.
I	Broken chalk in brown soil, occasional flint.
J	Crushed chalk in sparse grey to light brown matrix.
K	Orange clay with scraps of chalk.
L	Broken chalk in sparse grey to light brown matrix. Occasional flint.
R	Reigate stone.
	Brick shaded grey.

Figure 24. The west side of trench CM.

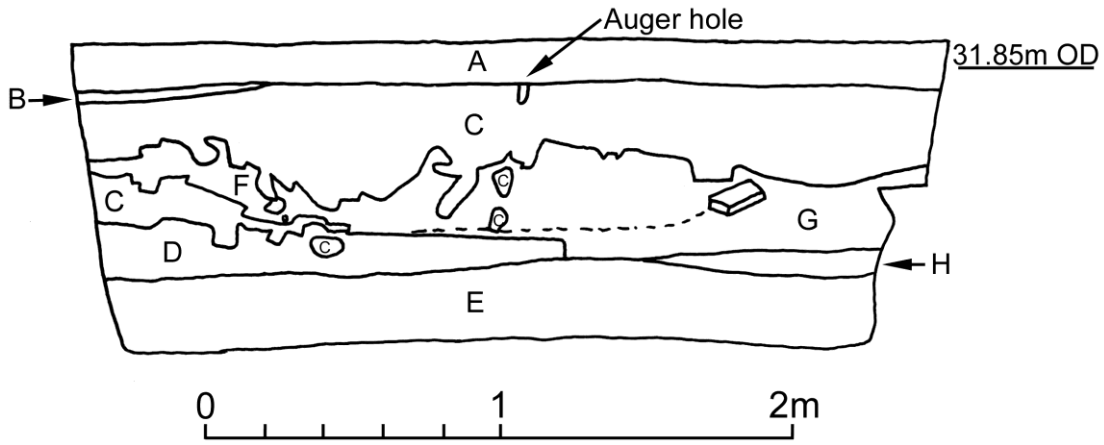


Figure 25. The east side of trench CM.

A Dark brown topsoil.
B Small gravel.
C Broken chalk. Occasional flint.
D Medium brown earth with rounded flint.
E Rubble – mortar with brick, chalk and tile.
F Brown earth with scraps of chalk, charcoal and occasional flint.
G Brown soil with clay.
H Brown soil with flint.

Figure 26. The east side of trench CM.

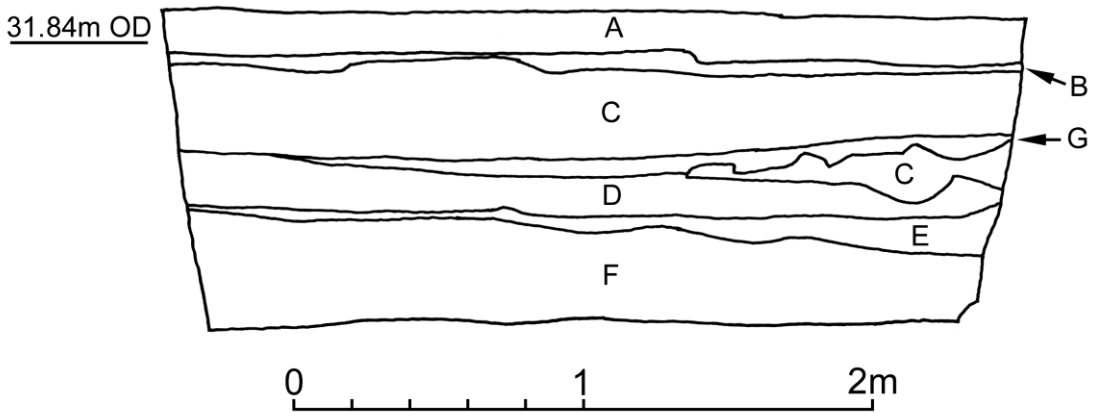


Figure 27. The north side of trench CM.

A Dark brown soil.
B Small gravel.
C Broken chalk with very little earth. The chalk gets coarser towards the bottom from small pebbles to pieces with a median size of 5cm.
D Crushed mortar with chalk and flint.
E Brown earth.
F Rubble – mortar, chalk, brick, tile and Reigate stone.
G Medium brown soil.

Figure 28. The north side of trench CM.

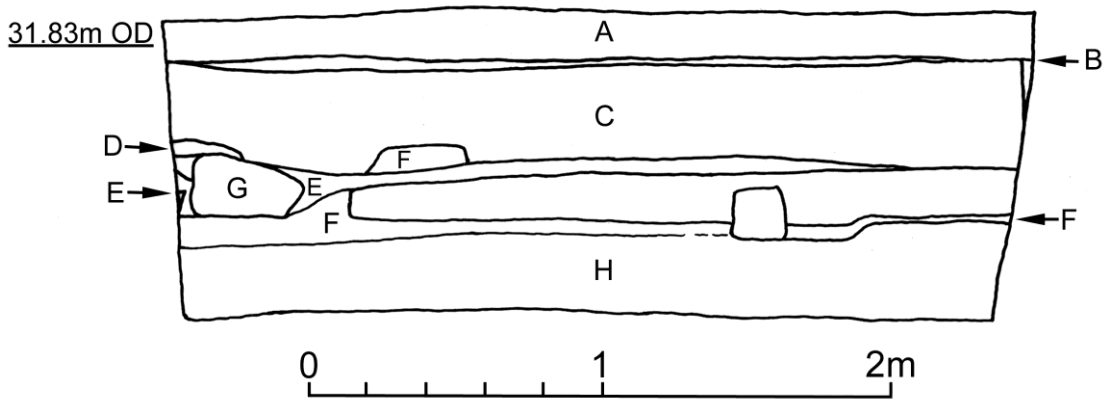


Figure 29. The south side of trench CM.

A Dark brown topsoil.
B Small flint.
C Broken chalk in a matrix of crushed chalk and pale brown soil.
D Brown soil.
E Orange clay.
F Brown earth with flint.
G Flint and mortar.
H Mortar with brick, chalk and flint.

Figure 30. The south side of trench CM.

9.2 Trench CN

The turf was growing in layer [CN1] which consisted of brown top soil. This rested on layer [CN2] which consisted of rounded and sub-angular gravel in a sand matrix. The deposit was fairly loose. The gravel was up to 18cm across but mostly below 4cm. It varied in shape. There were some rounded pebbles but it was mostly sub-angular, although some of the larger pieces were still fairly knobbly.

The gravel rested on layer [CN3] the top of which is shown in figures 31 and 32. On the south side the top of the layer was fairly smooth with small pieces of chalk mostly under 4cm. There were signs of slight east-west ridges. The north side was rougher with larger chalk up to 12cm. On the north edge of the trench there was a shallow U-shaped cut or depression [CN4] which was filled with the soil layer [CN1] at the top and gravel layer [CN2] at the bottom. To the west of this there was a shallow east-west aligned gulley also with a U-shaped cross section. It was filled with sub-angular gravel in orange sand which was excavated as layer [CN5] but was probably part of layer [CN2].

On excavation layer [CN3] consisted of crushed chalk which was sometimes in a sparse earth or orange clay matrix. The chalk contained flint up to 15cm across which was knobbly and un-weathered and looked freshly quarried. The layer contained some pieces of brick and tile and a piece of wooden water pipe bound with an iron hoop.[91]

Layer [CN3] was removed by mattocking. An area of crushed chalk was encountered in the northern part of the trench which was greyer than the chalk in [CN3].[92] It is possible that this layer extended up to figure 31 and is more or less the same as rougher area of chalk recorded there.

Layer [CN3] rested on layer [CN7] the top of which is shown in figures 33, 34 and 35. This consisted of orange clay with some chalk and flint. When the layer was excavated the clay was found to be absent from a strip about 0.5m wide along the north side of the trench. This area consisted of dark brown soil. It should probably have been assigned a separate context number but was excavated as part of [CN7].

There were two parallel deep irregular hollows in the top of [CN7] which were almost certainly cart ruts. The southern rut was numbered [CN9] and the northern one [CN10].

Rut [CN10] was filled by the crushed chalk layer [CN6] while rut [CN9] was filled by layer [CN8] which mainly consisted of crushed chalk with some knobbly flint similar to the overlying layer [CN3]. In some areas [CN8] consisted of brown earth with about 25% small broken chalk mostly under 5mm often with much knobbly flint.

The ruts were irregularly shaped and had an uneven bottom as shown on figures 33, 34 and 35. The northern one [CN10] was deeper and more regular while the southern one was more uneven and in places very shallow. The width between the wheels of the carts was probably around 1.4m judging by the east side of the trench where the rut bottoms were most clearly defined.

Layer [CN7] rested on layers [CN11] and [CN12]. Layer [CN11] covered most of the trench and [CN12] was only exposed along the northern edge as shown in figures 36, 37 and 38.

Layer [CN11] consisted of chalk rubble and large knobbly and angular flint in a matrix of mortar and sand. The mortar was pale brown, quite coarse and spotted with chalk and occasional small piece of flint. The flint rubble was mostly in the 15 to 20cm size range. The flints often had mortar on them and there were some lumps with several flints mortared together forming

[91] Find number <4>.
[92] This was excavated as [CN6] but was probably part of [CN3].

masses up to 36cm across. There was a scatter of brick and roof tile and several large lumps of stone in a group close to the south of the trench. The cart ruts had penetrated through [CN7] and worn into the top of [CN11].

Layer [CN11] rested on layers [CN12], [CN13] and [CN14] as shown in figures 39, 40 and 41.

Layer [CN12] occupied the north and centre part of the trench and [CN13] the west as shown on figure 39. However, when the two deposits were excavated the boundary between them was very unclear and it is likely that they were really one context. The deposit consisted of grey-green silty sand with scattered chalk and flint, mostly under 2cm in size, some brick, and few patches of pea-gravel. There were a few scraps of Reigate stone where the layer passed under [CN14].

A thin layer of the green sandy-silt of [CN12] extended over the northern end of [CN14] but the deposit also passed under it. Layer [CN12] must, therefore, have been deposited in two episodes, a main lower one and a thin upper one laid down after the rubble [CN14] had been dumped. The boundary between the two episodes was not detected in the rest of the trench. It seems likely that layers [CN12], [CN13] and [CN14] were the result of a single dumping episode of mixed materials, each deposit being a shot of waste.

Layer [CN14] was initially exposed in the southeast corner of the trench. When the deposits were excavated, it was found that it extend northwards and passed under a thin layer of [CN12] as noted above. It consisted of rubble with chalk, brick, broken mortar, Reigate stone and some flint. The layer was loose with many cavities.

Layers [CN12], [CN13] and [CN14] all rested on [CN15] which consisted of gravel in a dark stiff silty matrix. The top of this was between 30.86 and 31.04m OD. At the east end of the trench the matrix was slightly looser because it was sandier. The gravel contained frequent patches of brown iron stain and occasional pieces of chalk. At the west end of the trench the layer contained lumps of stiff white clay-like material. The east and west ends were tested with a mattock towards the centre of the section. The west end was then excavated by trowel and about six square metres were excavated to a depth of about 5cm. A small hole was then mattocked in the centre of the trench and carried to a greater depth with a trowel. A scrap of mortar was found at 30.67m OD about 0.23m below the top of the gravel. The gravel became clean at a depth of 30.56m OD about 0.34m below the top of the gravel. The probe ended at 30.53m OD without reaching the bottom of the gravel. The layer contained a large piece of a Tudor Brown pot which suggests that the gravel had moved in or after the 16th-century and that it was the bed of a channel not a pond.[93]

[93] Find <20> from trench CN. See figure 72.

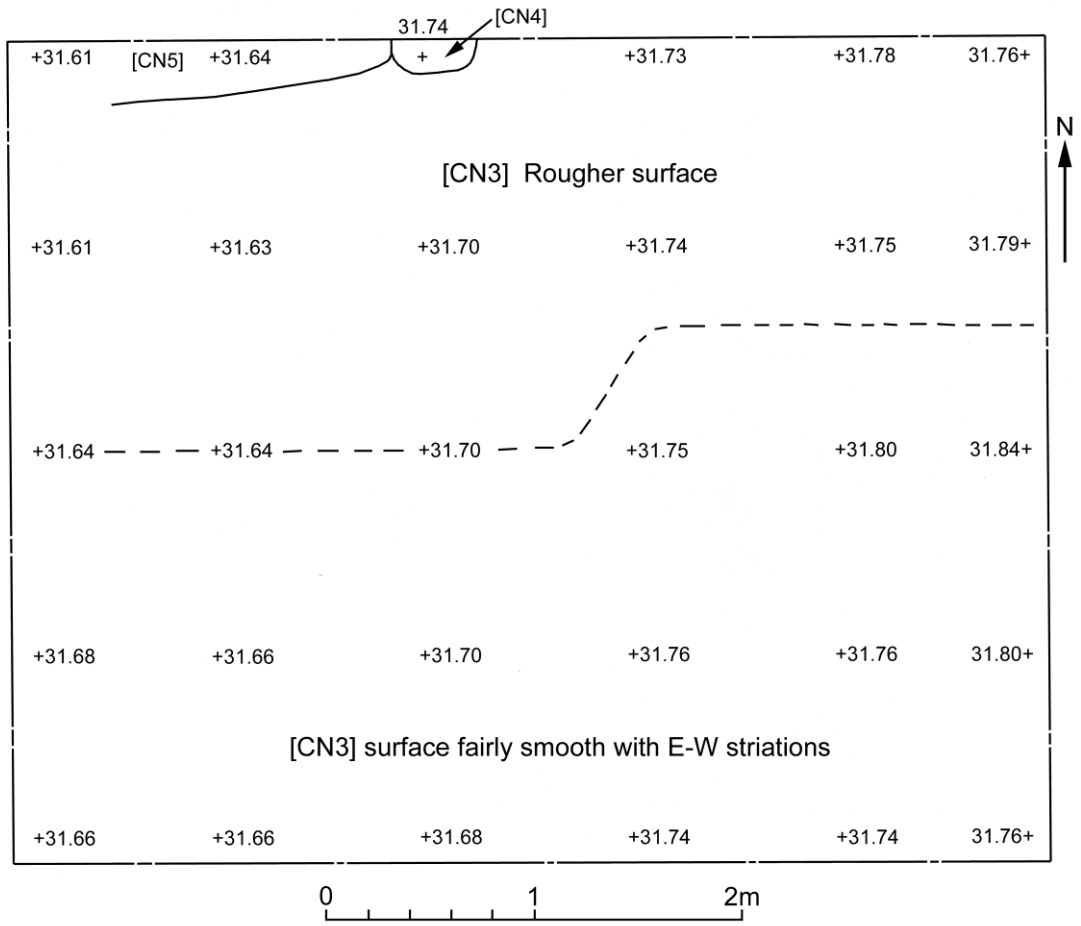


Figure 31. The top of layer [CN3] with [CN4] and [CN5].

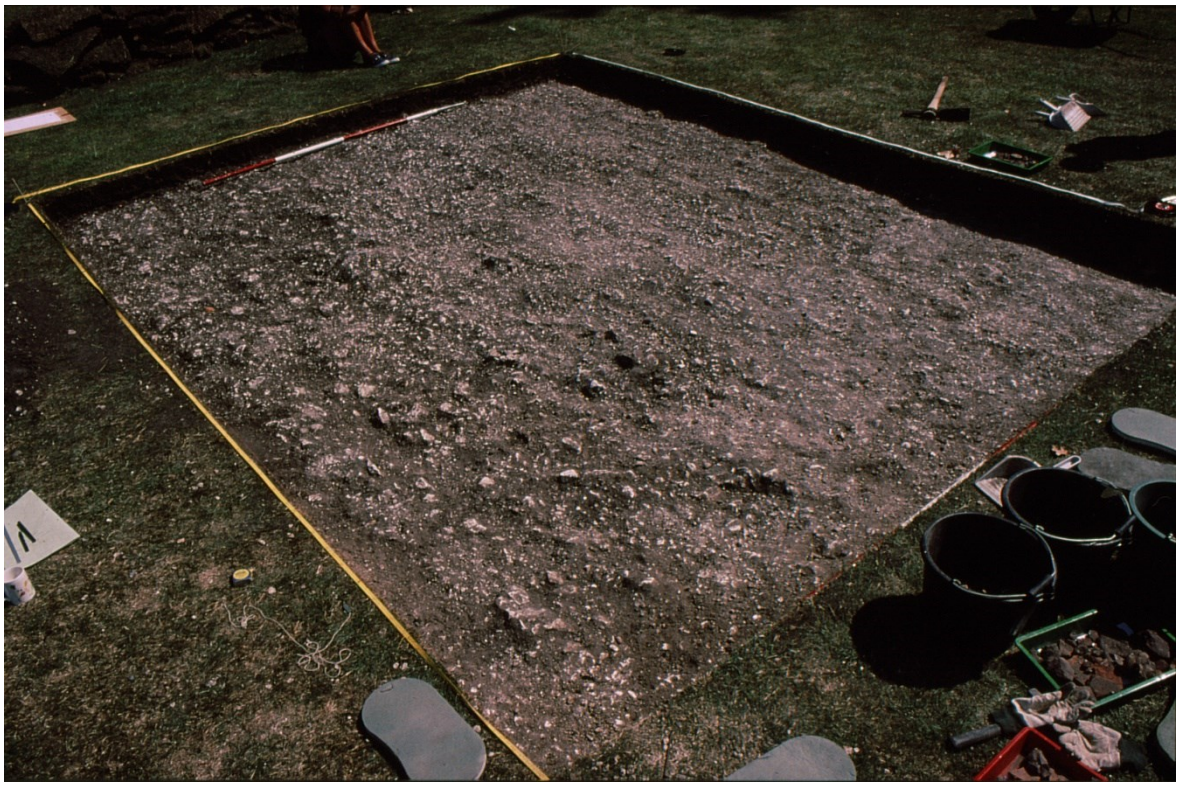


Figure 32. The top of layer [CN3] looking southeast.

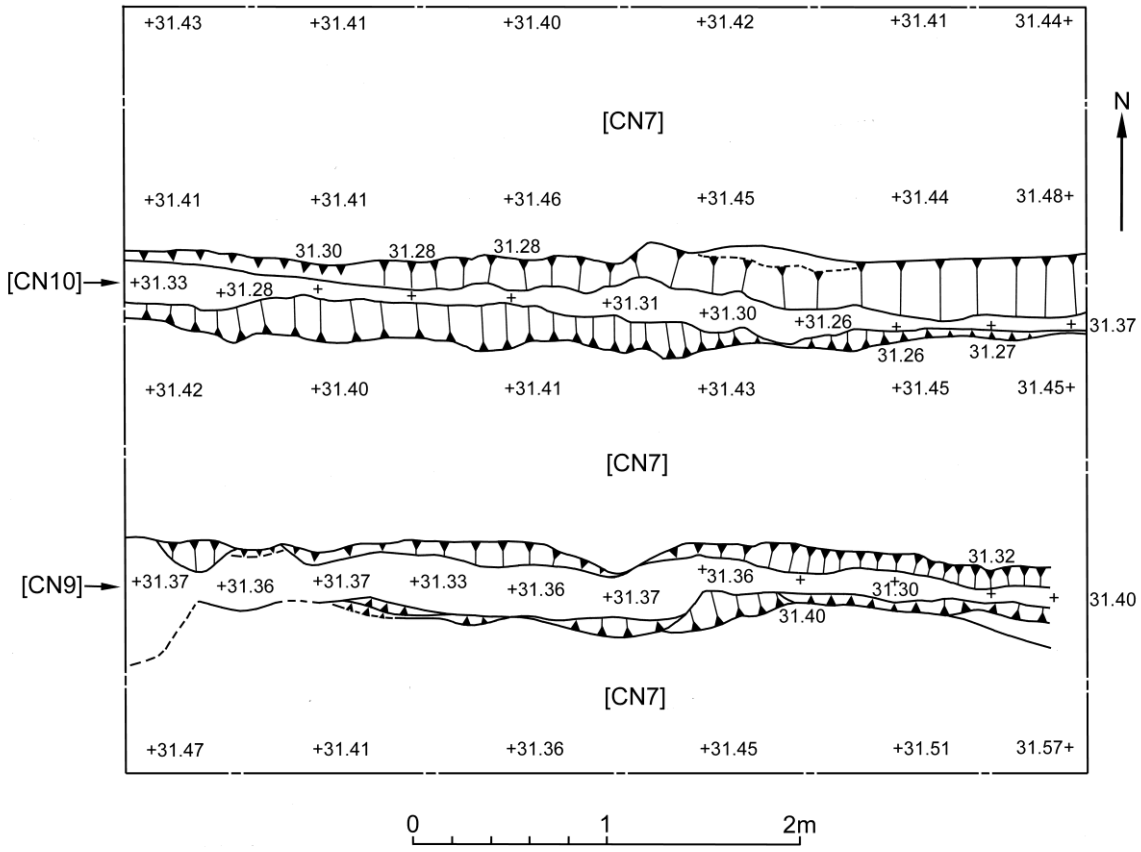


Figure 33. The top of layer [CN7] with ruts [CN9] and [CN10]. When layer [CN7] was excavated it was found that the gully [CN9] had been under dug and that the west end was wider than shown here.

Figure 34. The top of layer [CN7] with rut [CN10] in the foreground and [CN9] behind it. Looking southwest.

Figure 35. The top of layer [CN7] with rut [CN9] in the foreground and [CN10] behind it. Looking northwest.

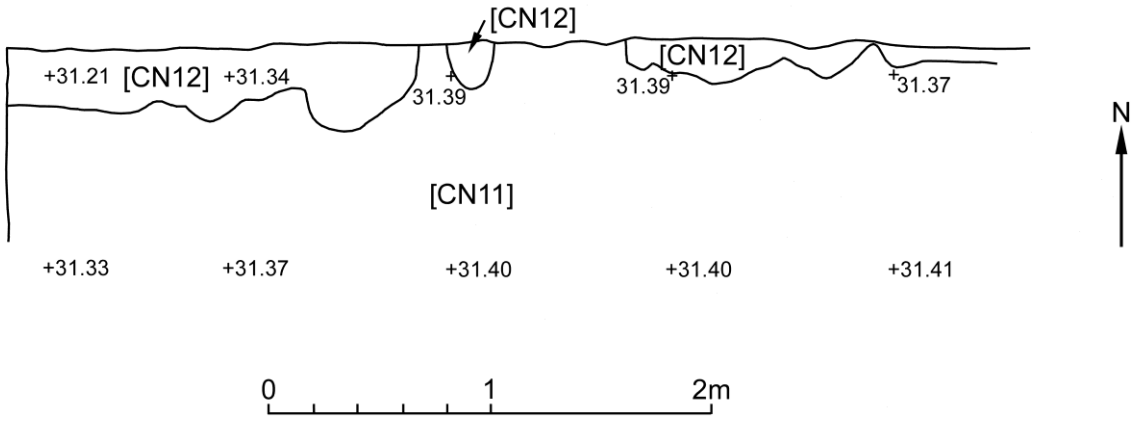


Figure 36. The northwest corner of the trench showing the tops of layers [CN11] and [CN12].

Figure 37. The top of [CN11] looking northeast. Layer [CN12] can be seen as a narrow dark area on the left by the side of the trench.

Figure 38. The top of [CN11] looking northwest. Layer [CN12] is the dark area along the trench edge to the left of the scale.

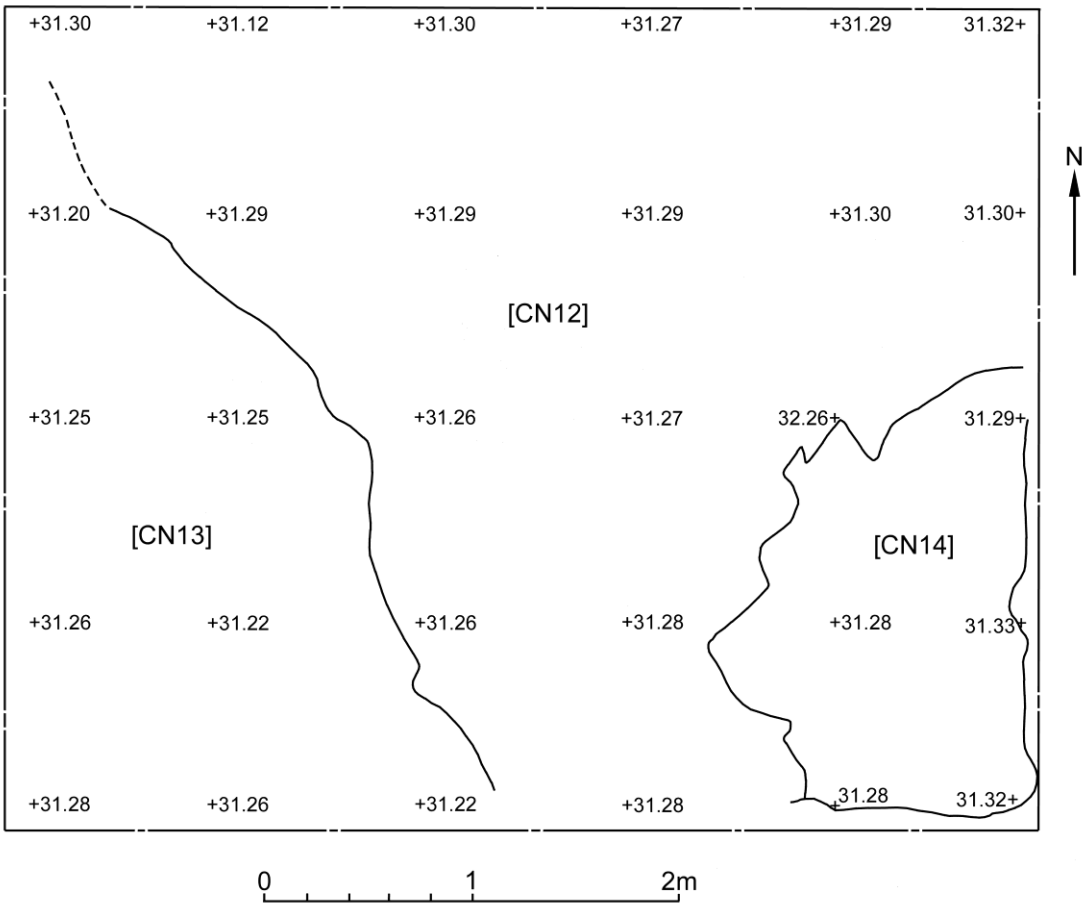


Figure 39. The tops of layers [CN12], [CN13] and [CN14].

Figure 40. The trench after the removal of layer [CN11] showing the tops of layers [CN12], CN13] and [CN14] as shown on figure 39. Looking southwest.

Figure 41. The trench after the removal of layer [CN11] showing the tops of layers [CN12], [CN13] and [CN14] as shown on figure 39. Looking northwest.

Figure 42. The top of [CN15] looking northwest.

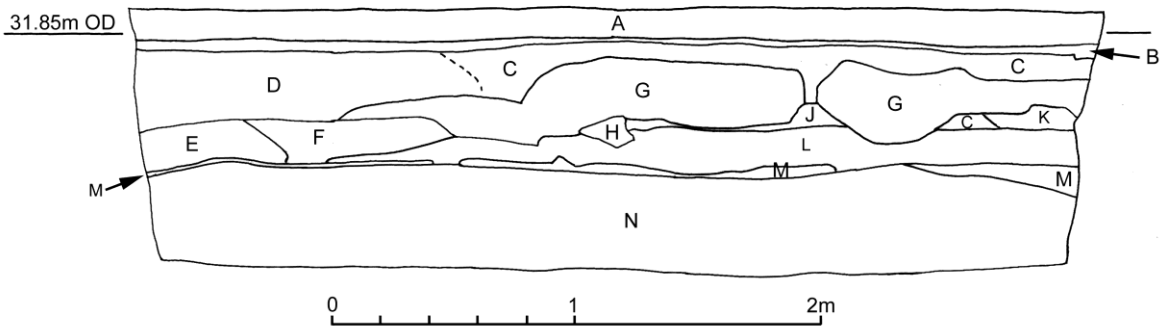


Figure 43. The east side of trench CN.

A Dark brown topsoil with a few small stones.
B Small rounded and subangular gravel mostly under 2cm in size.
C Small crushed chalk with sparse soil.
D Loose chalk up to 10cm in a matrix of small crushed chalk.
E Mortar, flint and earth.
F Broken chalk and angular flint in a patchy matrix of crushed chalk and orange clay.
G Densely packed crushed chalk.
H Chalk and flint.
J Chalk and flint.
K Orange clay.
L Chalk and flint with half a brick.
M Brown earth.
N Rubble.

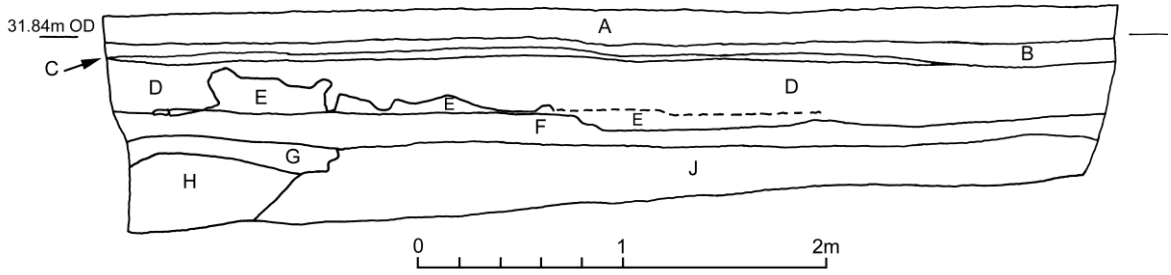


Figure 44. The south side of trench CN.

A Dark brown top soil with a few small stones.
B Small rounded and subangular gravel with a scatter of larger flints to 6cm.
C Small chalk and flint in an earth matrix.
D Broken chalk in crushed chalk matrix.
E Orange clay with chalk and brick.
F Chalk and flint.
G Brown earth with lumps of chalk – in places mostly chalk.
H Rubble – brick, stone and mortar.
J Dark soil.

Figure 45. The south side of trench CN.

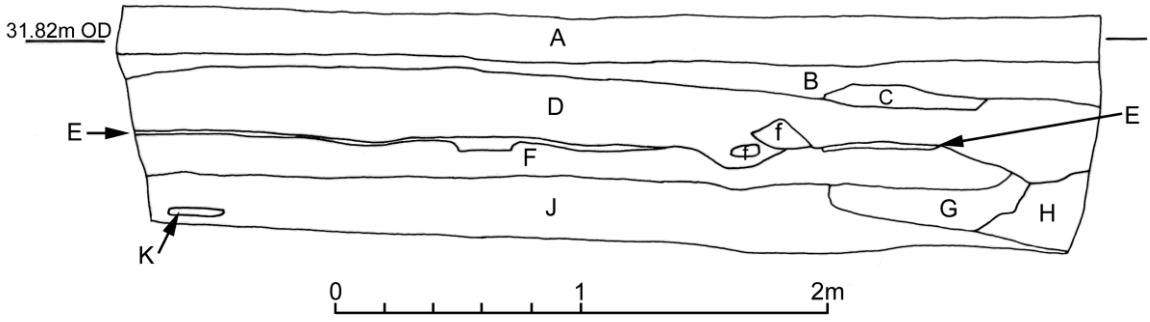


Figure 46. The west side of trench CN.

A	Dark brown top soil with a few small stones.
B	Small rounded and subangular gravel.
C	Earthy chalk rubble.
D	Broken chalk in a matrix of crushed chalk.
E	Orange clay with chalk and brick.
F	Rubble – flint, chalk and pale brown mortar.
G	Rounded and subangular gravel in brown sand. Some peg tile.
H	Brown soil with flecks of chalk, mortar and flint.
J	Dark soil.
K	Pocket of mortar.
f	Flint.

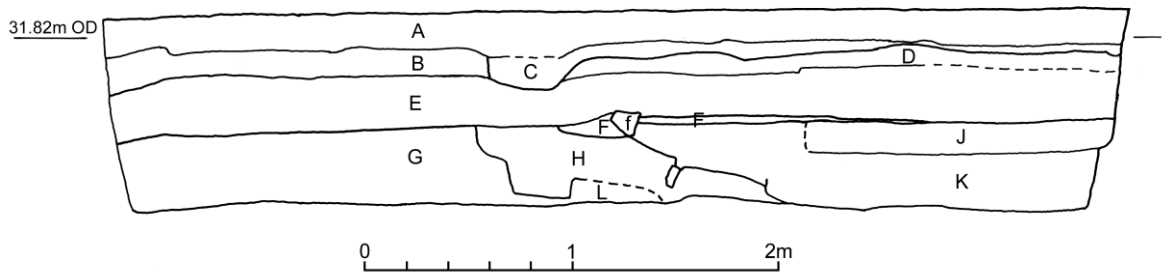


Figure 47. The north side of trench CN.

A	Dark brown top soil with a few small stones.
B	Subangular and rounded flint up to about 6cm, but mostly 1 to 2 cm in sparse earth matrix.
C	Brown earth with 10% rounded and subangular flint pebbles mostly under 15mm. One or two larger up to 4cm. A piece of tile.
D	Small chalk mostly under 10cm and 50% under 5cm in sparse earth matrix. Occasional large chalk to 8cm.
E	Crushed chalk.
F	Pale brown sandy earth with chalk flecks. A flint.
G	Brown earth with occasional brick, flint, tile and mortar.
H	Grey-green sand. One flint to 5cm, a few others to 1cm. A few flecks of chalk.
J	Brown earth with about 50% chalk, mortar and a little angular and rounded flint.
K	Rubble – mortar, chalk brick and flint.
L	Stiff dark brown sandy earth.
f	Flint.

Figure 48. The north side of trench CN.

9.3 Summary of the stratigraphy in trenches CM and CN

The stratigraphy of the two trenches was similar. In both trenches the topsoil rested on patches of gravelly soil, which was in turn underlain by a mass of densely packed broken chalk and flint about 0.3m thick. This was obviously the foundation of a path or walk which, in a dry summer, can be traced as a parch mark on the grass. The mark is about 9m wide and runs eastwards across the garden on the centre line of the east front of the house and must, on the evidence of the finds beneath it, have been part of the 18th-century garden.

In both trenches the chalk foundation rested on several layers of dumped material which in turn rested on gravel. In trench CM the dumped material could be divided into four broad groups. From top to bottom these were:

- Layers [CM8], [CM9], [CM10] and [CM13] the main components of which were broken mortar, flint with mortar on it, orange clay with some chalk, brick and other rubble. There were deep ruts across the top of these deposits, presumably made by the carts used to transport and dump the material.
- Layer [CM11] which consisted of loosely bound mortar, with large lumps of mortared flint, some tile and occasional brick. This material probably came from a demolished garden structure and is described in section 10.1.
- Layer [CM14] which consisted of a thin deposit of dark brown soil with many well-rounded flint pebbles, some sub-angular flint and occasional brick.
- Layer [CM15] which consisted of broken mortar with much brick, tile, chalk, flint and Reigate stone. There was a pocket of broken stone towards the west side. This consisted of small pieces of Reigate and occasional oolitic limestone. Many pieces had fragments of Tudor mouldings. There were also a few fragments of the window mouldings used on the early 18th-century house.

These deposits rested on layer [CM16] which consisted of rounded gravel in a stiff dark silty matrix – probably the bed of a water course.

The upper part of trench CN had the same general stratigraphic sequence as CM, with soil, gravel and a densely packed chalk track foundation. The chalk rested on a layer of orange clay with some chalk and flint. The clay was absent from a strip about 0.5 m wide along the north side of the trench where it was replaced by dark brown soil. There were three layers below this: [CN14] which consisted of loose rubble with chalk, brick, broken mortar, Reigate stone and some flint, and [CN12] and [CN13] that both consisted of grey-green sand and silty sand. These all rested on dark silty gravel [CN15] which appears to have formed the bottom of a pond or stream as in trench CM.

The thin soil layer [CM14] appears to mark a break in deposition which is absent from trench CN.

Any cut through the chalk track foundation would have been easily identified so the material below it was exceptionally well sealed. The finds in these deposits are considered below.

10. THE FINDS FROM BELOW THE CHALK TRACK

This section covers exotic and unusual finds which may be relevant to the garden and also closely datable finds from below the chalk track foundation.

10.1 The upper rubble layer [CM11] and related material

10.1.1 The rubble

The main deposit of this rubble was layer [CM11] although some obviously related material was found in layers [CM8], [CM10] and [CM13].

Layer [CM11] consisted of loose flint, mortar and chalk rubble in a matrix of broken mortar. There was some Kentish rag stone, Reigate stone and peg tile. There was very little brick in the deposit and no moulded stone from windows or other building fenestration. Some of the material had yellow limescale on it and these pieces were retained, together with some of the large rubble. In all 365 pieces of the retained material were allocated a special find number and examined in detail. These were selected for a study of the limescale on them, so they were not a statistically valid sample of the whole rubble deposit. However, provided this limitation is kept in mind, they do provide useful information. The key features of the various materials are described below.

Flint above 2cm in size was common in the deposit and was present in 21% of pieces in the sample. Much of it was large and knobbly with an intact cortex and, in some cases, attached chalk. This had obviously come to the site from a quarry rather than river gravel. It frequently had mortar on it and had clearly been part of a structure.

Mortar. The most common type was white and exceptionally fine with a thin scatter of small chalk and flint. The sand in it was fine and grey and almost certainly came from the Thanet beds which underlay the southern part of the garden. There were at least three other fairly common types of mortar:

- Rough grey-brown mortar with small pieces of chalk and a few scraps of angular flint.
- Grey-brown mortar similar to the above but with few inclusions.
- Pale grey mortar with some chalk and flint.

There was one piece of pale slightly pink mortar with much quartz, some chalk, and rounded and angular flint (find <238> figure 49). It contained a rounded brown pebble 15mm across and had a yellow deposit on the surface. It was 20mm thick. One side had a smooth concave surface which at 15x magnification appears to have a thin layer of white limescale on it with thin irregular black lines through it. The other side was attached to grey-green mortar which contained rounded flint to 5mm. One piece of this flint was 2mm across and green suggesting that it came from the Thanet beds.

Figure 49. <238> from trench CM. Grey-green mortar (top in the photo) attached to pinkish mortar (left and bottom).

Chalk above 2cm was present in only 7% of the studied pieces. It was generally rubble without worked surfaces.

Peg tile. A very high proportion of this had mortar on it, suggesting that it had been built into a structure rather than used on a roof. Several pieces of tile were cemented together face to face, apparently to form a course within a wall or structure. In one case from trench CM this was at least three tiles thick (figure 51). Another tile, also from trench CM, had been broken when it was set in wet mortar (figure 51). On the context sheet the layer was said to have 'a little' tile but it was present in 43% of the retained pieces. It must therefore have had a disproportionately high amount of yellow limescale.

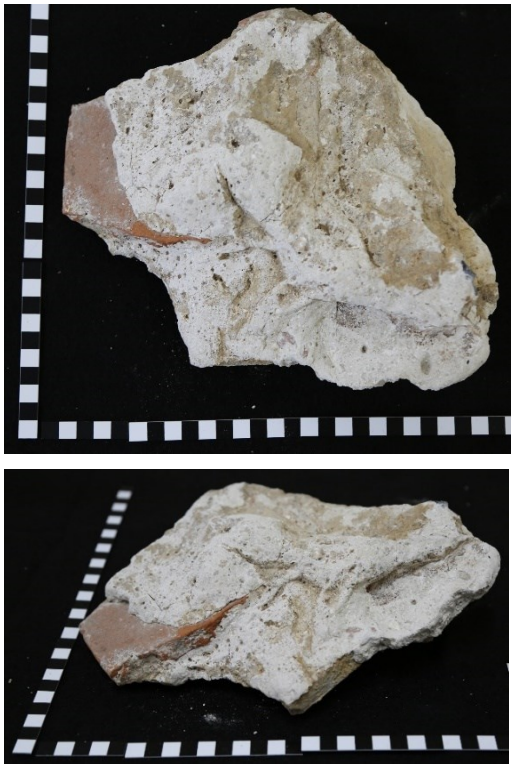


Figure 50. Find <59> from [CM11]
Fine white mortar with several pieces of chalk, two pieces of tile, and a knobbly flint embedded in it. Grey-brown mortar on one side. Size 280mm. Shape fairly flat about 60mm thick. One side has a good deal of yellow limescale on it which is thicker around the edges but also spreads thinly over much of the centre. The thickest coverage on this side is on tile, the flint, the fine white mortar, and parts of the grey-brown mortar. The limescale on the flint is mostly grey. A thin cover on much of chalk. The other side is mostly fine white mortar with some tile and a little flint and chalk. Yellow limescale on parts of the fine white mortar, chalk and flint. The fracture appears to cut through mortar-filled peg hole. The fine white mortar along the break is covered with yellow limescale, but this is not present on the tile fracture. There is a contact surface probably with another piece of tile. Both pieces of tile were broken before they were put in the mortar. They are not parallel with each other and if they formed a course it would be very rough. One tile has the full width preserved (150mm). 2,297g.

Figure 51. Find <81> from [CM11]
Fine white mortar with three pieces of tile forming two courses separated by 12mm of mortar. Size 170mm. At least one piece of the tile was broken before it was set in the mortar. The mortar also contains a knobbly flint with slightly rounded fractures and a piece of chalk. Yellow limescale on the flint, mortar, chalk and tile, mostly on one side. Some clay and a patch of iron stain on the tile. One tile has a surviving corner: the others are too heavily embedded in mortar to tell. 1,393g.

Reigate stone. There were 20 pieces (5%) in the material allocated special numbers. Some of this was rubble and some had worked surfaces Find <205> (figure 52) had a handle-like shape which may have come from a weathered carving or may be the remains of a fossil. Find <2> (figure 53) consisted of rubble with a curved U-shaped slot in it which might have held a lead water pipe with an external diameter of about 18mm.

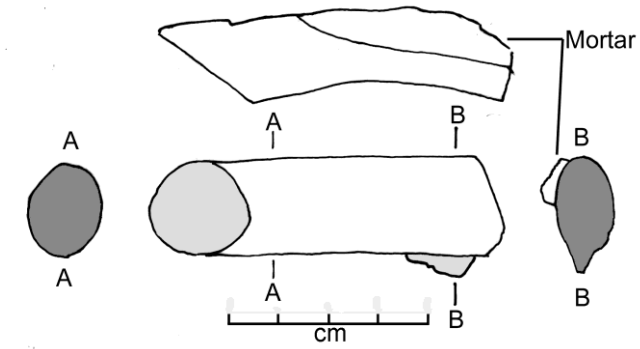
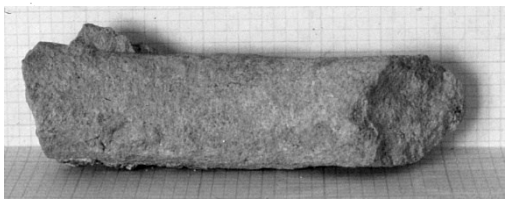
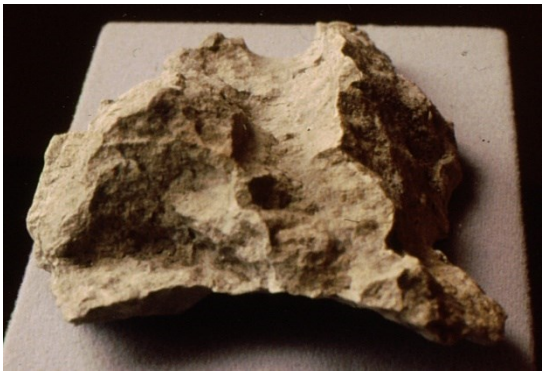
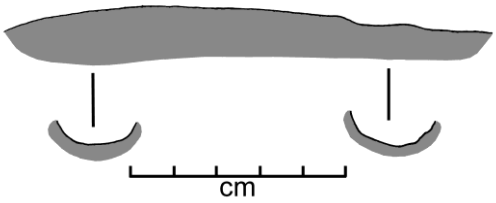


Figure 52. Find <205> from [CM11]
Reigate stone with oval cross-section about 20 by 12mm. Size 72mm. Curves along its length giving a handle-like appearance. One side has a small fillet of stone suggesting that it is part of a high relief carving. Surface heavily weathered. 31g.







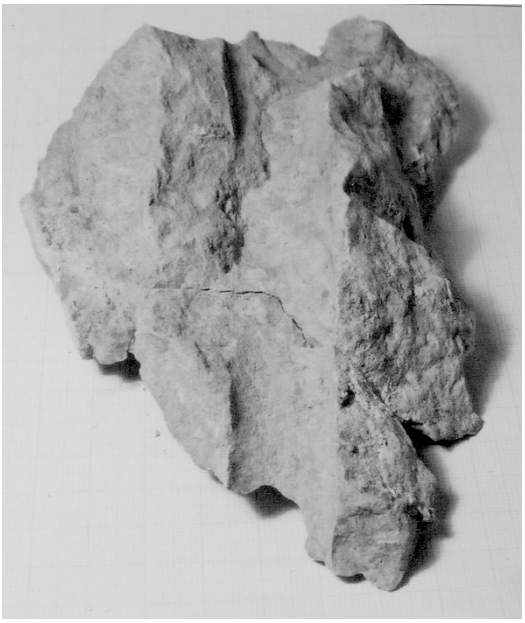


Figure 53. Find <2> from [CM11]
Two joining pieces of Reigate stone (?) with a size of 165mm. All the surfaces are fractures apart from a U-shaped slot which, with the two pieces together, has a maximum length of 130mm. The longitudinal section of the slot is not flat but has a convex curve. Where it is best preserved the slot is 18 to 18.5mm wide. In section the bottom is slightly flattened rather than being perfectly round. It seems likely that this slot was made to carry a lead pipe. A little mortar and yellow and white limescale on the fractures. 371g. The drawing shows a profile of the bottom of the slot with two cross sections.

Kent rag stone. There were 30 pieces (8%) in the material allocated special numbers. A few pieces had worked surfaces but most did not. Some had fluting, possibly as a result of natural erosion before the block was quarried (figure 55). One piece (figure 54) was bonded to a tile which had been broken while the mortar was soft. Some of the other stone had mortar on it but this did not join it to other materials.

Figure 54. Find <7> from [CM11]
Kentish rag stone 330 by 190mm. No worked surfaces. Part of a tile fixed to the stone with a rather coarse grey mortar which contains small scraps of chalk and some, mostly angular, flint. The tile is broken into four pieces which are held in place by the mortar. The tile presumably broke when the mortar was wet. Two peg holes in tile 50mm apart centre to centre. One is square, the other probably made with a square peg. A few patches of grey limescale on the tile. Some grey limescale on the Kentish rag on the opposite side to the tile. About 5kg.

Figure 55. Find <74> from [CM11]
Kentish Rag with one fluted surface, and a small part of another surface at right-angles to it. Size 65mm. Grey and a little yellow limescale on the surface and fractures. 91g.

Red Brick. There were 11 pieces (3%) of red brick in the material allocated special numbers. These were numbered because they had limescale on them but brick was not common in the deposits as a whole. Most of the brick was under 60mm thick and had rough surfaces suggestive of stacking on straw. Smooth bricks over 65mm thick, which are typical of the site after about 1715, were conspicuously absent.[94]

Yellow ceramic. Three pieces of the rubble largely consisted of yellow ceramic and a further piece of rubble contained scraps of it.[95] There were two substantial pieces. Find <1> may have been a paving brick although it had some limescale. The other – find <61> – was wedge shaped which is not consistent with a paver. The function of this material is therefore unclear.

Figure 56. Find <1> [CM10]
Part of a block of yellow ceramic with a lump of mortar attached to the surface. The ceramic is similar in colour to yellow delft but the fabric is coarser and more porous, with cavities where the clay was not fully compacted when moulded. Maximum surviving height 43mm, width 58mm, and length 60mm. Maximum thickness of the mortar 20mm. White limescale on the side of the ceramic. There also appears to be a line of yellow material between the ceramic and the mortar that might be limescale. The mortar contains a much sand and scatter of small dark spots. 173g.

[94] For details of bricks used on the site in the early 18th-century see Phillips 2016 p. 85-8.
[95] Finds <1>, <4>, <61> and <494>.

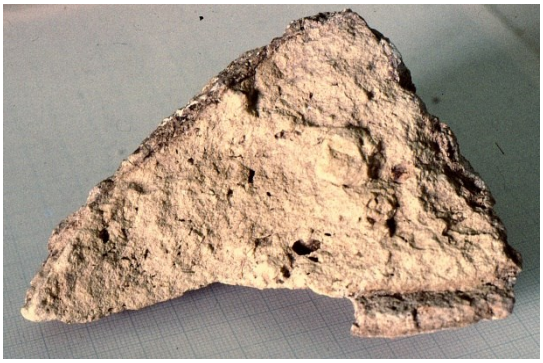


Figure 57. Find <61> from [CM11]
Yellow ceramic with parts of three faces from a wedge-shaped block. One face (A) has a surviving depth of 90mm. Another (B) at right angles to it and has a surviving depth of 50mm. A third face (C) is at right angles to the second and at an angle of about 45 degrees to the first. Fabric pale yellow and porous with small cavities up to 5mm. Few inclusions apart from grog up to 15mm in size in a similar but denser fabric.

Parts of the faces have a hard-grey crust up to 5mm thick which could be either limescale or mortar. This crust is overlaid by fine white mortar. On face A there is another layer of 'crust' lying on top of this mortar which may once have been attached to another piece of yellow ceramic. The thickness of the mortar between the two 'crusts' varies from about 1 to 9mm over a distance of 40mm suggesting that the blocks of ceramic were not laid square. Face C has some yellow limescale. 179g.

Limescale. Many pieces of rubble had areas of yellow, white, light grey and occasionally dark grey or brown limescale. The white and grey limescale was not recognised during the excavation as it is difficult to distinguish from mortar without a magnifying glass. It is, therefore, probably under-represented in the finds. Many pieces of rubble have limescale on several faces and there are obvious instances of it forming in cracks. The limescale was closely examined on 220 pieces. Of these 53 pieces had, or probably had, one colour limescale resting on another as follows:

	Certain	Probable	Total
Yellow over white	19	18	37
Yellow over grey	7	3	10
White over yellow	1	0	1
Brown over white	0	1	0
Grey over white	0	1	0
White over grey	1	0	1

Yellow limescale over white or grey are the most common combinations.

Iron embedded in rubble fragments. Find <211> consisted of an angular flint with mortar. It had a patch of rust about 0.5mm thick with a size of 27mm on the surface of the mortar. This was not flat but bent at right angles and may have been be partly embedded in the mortar.

There was also a lump of rust with flint and chalk embedded in the surface (<100>). It is quite heavy and must have an iron core.

Non-ferrous metals. One piece of mortar (<11>) had a straight pin or piece of wire about 0.5mm in diameter embedded in it.[96] The exposed length was 9mm. The metal had a greenish patina suggesting copper or copper alloy.

10.1.2 Discussion of the finds

The rubble in layers [CM8], [CM10], [CM11] and [CM13] appears to have come from the demolition of a structure which consisted largely of mortar and flint with courses of tile. There was very little brick and no obvious fenestration such as window mouldings. It is not

[96] Find <11>.

clear whether the Reigate stone, Kentish rag stone and brick were part of this structure although it seems likely. It is difficult to see this material as coming from a conventional building and probably came from a garden structure such as a rock, grotto or cascade. This is consistent with the U-shaped slot in Reigate stone find <2> which most likely held a lead pipe for a water jet. Some of the Kentish rag stone had a ridged surface which was probably the result of natural weathering before it was quarried. The material may have been selected for its decorative effect. The widespread presence of limescale is also consistent with a garden structure, It had often been deposited in cracks suggesting that water moved through the structure, at least occasionally.

The limescale is of several colours – white grey and yellow. Ford and Williams say that many speleologists attribute coloration to traces of metals in the calcite lattice.[97] However, studies by Gascoyne 1977 and White 1981 have shown that there is a poor correlation between the strength of colour and the quantity of trace elements. Most colour was due to organic matter and Lauritzen 1986 showed that this was predominantly humic and fulvic acids of high molecular weight produced by decomposition in soil. It is therefore possible that the changing colour in the limescale is due to a build-up of vegetation and other organic material within a decaying structure.[98] The mortar in the rubble is very soft but there is no sign of it being scoured by water, suggesting that the flow in the cracks was gentle with no major differences in water pressure.

10.2 Finds from the lower rubble layer [CM15]

This layer consisted of chalk, brick, flint tile and Reigate stone rubble in a matrix of broken mortar. There were pockets of broken Reigate stone towards the west side of the trench.

10.2.1 Worked stone

There were many small broken pieces of Reigate stone and a little oolitic limestone, in many cases with mouldings and tool marks. The date and architectural context of these mouldings has been considered in Phillips and Burnett 2016 so this report will focus on the evidence for the deposition date of the context.

The identifiable mouldings were mostly gothic and most appear to have come from fairly plain windows of 15th or early 16th-century date. There were several pieces from a large four-light window which probably came from the great hall in the house.[99]

There were only four pieces which were probably post-Tudor. Three of these can be matched with the roll mouldings around the edge of the windows which were probably installed by Nicholas Carew, later 1st baronet, around 1710-12.[100] The fourth piece of early-18th-century material was a block of oolitic limestone with a drip-slot in the underside. Similar pieces have been found in other contexts on the site and appear to be windowsills, probably of early-18th-century date.[101]

Several pieces of stone showed clear evidence of secondary reworking, either through rough tool marks in a finished surface or through cuts into the fracture. This appears to have been

[97] Ford and Williams 1989 p. 342.
[98] Gascoyne 1977, White 1981 and Lauritzen, Ford and Schwarz 1986.
[99] Phillips and Burnett 2016 vol. 1 p. 47-49 and 142-145.
[100] Finds <101>, <107> and <176>. For the windows installed about 1710-12 see Phillips and Burnett 2016 vol. 1 p. 28-32 and 160-166.
[101] Find <157>. For other examples see Phillips and Burnett 2016 vol. 1 p. 167-169.

done with straight-bladed chisels rather than the comb and toothed chisels which were often used for the first working of the Reigate stone.

A block of stone with both Tudor and early 18th-century mouldings has been found elsewhere on the site.[102] It seems likely that the stone from [CM15] was mason's waste created when the Tudor house was being remodelled, and the stone reused, about 1710-12. It appears that garden structures were being demolished about the same time.

10.2.2 Brick

Layer [CM15] included 182 rough-finished bricks with a median thickness of 51.75mm and 12 pieces with a smooth finish and a median thickness of 61mm. [103] The former was most likely Tudor but the smooth-finished brick was probably 18th-century which is consistent with its greater thickness. The two thickest pieces were 67mm and 67-68mm. Comparison with other bricks at Carew suggests that these are likely to date from 1718-20 or later.[104] However, one of the bricks has a one rough face and mould marks around the top edge. This suggests that it was Tudor despite its thickness and the fact that the other faces were smooth. The second thick brick had a diagonal hack-mark which is typical of the 18th-century.

10.2.3 Tin-glazed tiles

Figure 58. Find <549> from [CM15]
Tin glazed tile. Very fine pale yellow body. Brown, blue, and green decoration on a white background. Full thickness not preserved. Size 30mm. 2g.

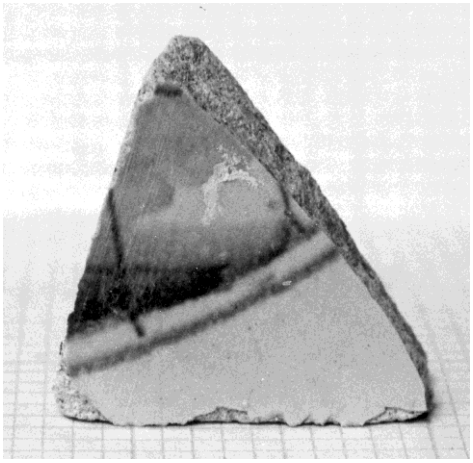


Figure 59. Find <550> from [CM15]
Purple manganese decoration on a faintly purple background. Pale buff body 6 to 8mm thick. The back looks heavily rubbed. Size 30mm. 4g.

A second similar piece of tile (find <551>) was found in [CM15]. It had a pale buff body 4.5mm thick with plain white tin glaze with a hint of purple very similar to the background colour of <550>.

[102] Phillips and Burnett 2016 vol. 1, p. 147.
[103] Where the brick was recorded as having a variable height or width it has been averaged. Values marked with a query have are included.
[104] Phillips 2016 p. 85-88.

Figure 60. Find <552> from [CM15]
Fine pale yellow body with sparse quartz, grog and black grains. 16mm thick. Spotted purple, yellow, ochre, green and white tin glaze one side. Traces of mortar on the edge and fracture. 6g.

A lead tie

Figure 61 find <6> from [CM15]
Lead tie. Roughly triangular cross section tapering to a point which is bent into a small hook. The other end flattened. Length 72mm. 14g.

10.3 The finds from [CN11]

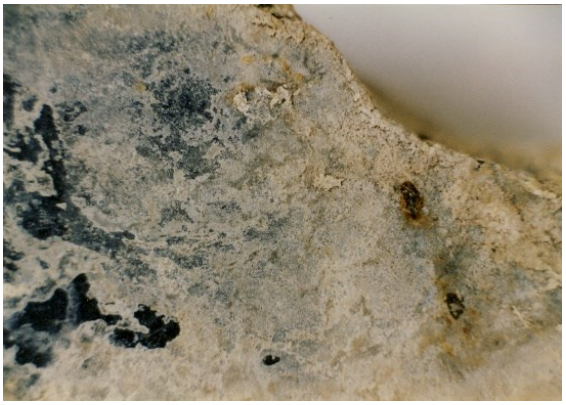
Figure 62. Find <22> from [CN11]
Rim sherd from a porcelain tea-bowl with orange-brown and green over-glaze decoration on a white background. On the outside there is a line just below the rim, with foliage and a building below and also a pair of lines. Interior has a line below the rim. Possibly Japanese. Mid-17th-century or later. 3g.

Figure 63. Find <5> from [CN11]
Yellow ceramic 'brick'. Soft rather coarse fabric. Grey limescale on the surface and parts of the fracture. Minimum thickness 26mm. 26g.

10.4 The finds from layers [CN12] and [CN13]

Figure 64. Find <21> from [CN12/13]
Tin-glazed tile with spotted white, green, yellow, ochre and dark brown glaze. Fabric similar to <6> (figure 69). White glaze with a trace of brown penetrated into a crack which is now a fracture. Size of glazed surface 45mm. 7g.

Figure 65. Find <25> from [CN12/13]
Slab of black marble 20-24mm thick. Surviving edge 106mm. It has one smooth surface and edge and an uneven back. There is mortar on the back and edge but not on the fractures. The surfaces and fractures have a thin but widespread coating of white limescale shown in the details below. 169g.



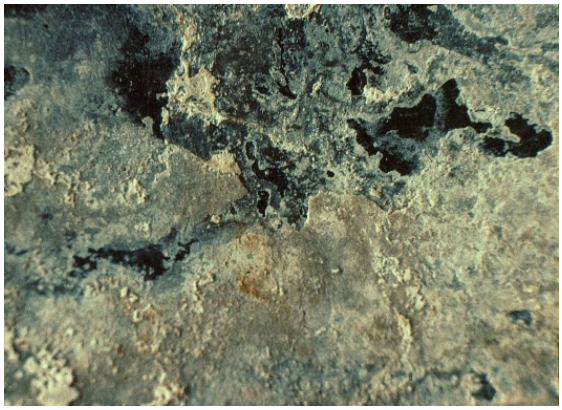


Figure 66, Find <24> from [CN12/13]
Piece of pink marble with one straight roughly worked edge. Size 80mm. Size of edge 45 by 18mm. Limescale and mortar on one fracture. Traces of mortar or calcite on the worked surface and the other fracture. 87g.

Figure 67. Find <10> from [CN12/13].
Piece of Dendrophylliid or stag horn coral with traces of clay on the surface. 52g.

Figure 68. Find <11> from [CN12/13].
Acropora coral. Some patches of white material on the surface, probably mortar. 24g.

10.5 The finds from rubble from layer [CN14]

Layer [CN14] was a rubble deposit containing chalk, brick, broken mortar, Reigate stone and some flint. There were many pieces of small broken Reigate stone and some oolitic limestone. The moulded fragments were probably all late gothic. There were several pieces with mouldings from the large four light window identified in [CM15].[105] The brick had the following sizes:

[105] Finds <12>, <14> and <18>.

	Height (mm)	Width (mm)
25%ile	50	111
50%ile	52	114
75%ile	54	116.5
Sample size	225	51

There were 222 pieces of rough-finished – probably Tudor – brick with surviving heights for which the median was 52mm. There were only three pieces of smooth finished brick with surviving heights were 61, 63 and 66mm giving a median of 63mm.

Tin-glazed tiles

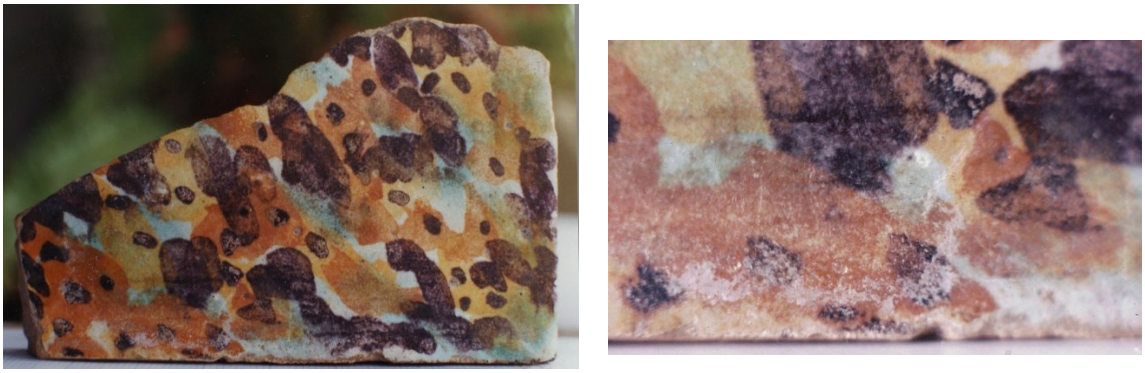
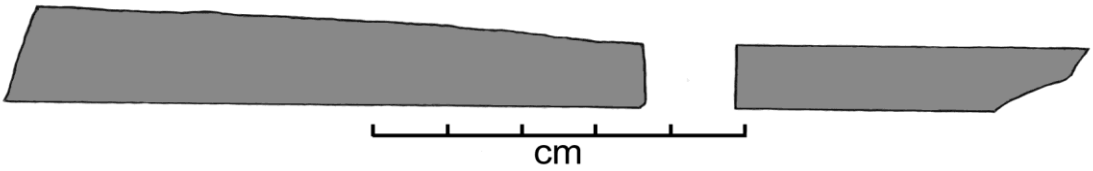


Figure 69. Find <6> from [CN14]
Spotted white, green, yellow, ochre and dark brown glaze. The fabric is pale brown. It is 9mm thick along one edge and thickens to 13mm (see sections below). The back of the tile is unusually smooth and looks as its it has been rubbed or ground down to produce the tapering thickness. At 15x magnification parts of the surface looks smooth and worn and in a few small areas the glaze has worn through. Near the longest edge parts of the glaze are covered with a thin discontinuous layer of white material which is probably limescale as shown in the detail top right. 66g.



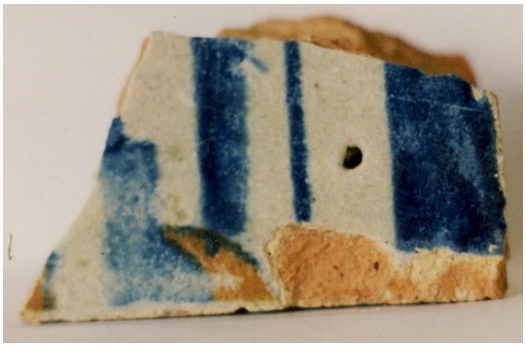


Figure 70. Find <8> from [CN14]
Corner of a tile. 16mm thick. Coarse pale red body striped with dark and slightly lighter clay. The sides and top of the tile are covered with a thin cream-white slip. The top surface is tin-glazed with blue, white and ochre decoration. A little mortar and white limescale on the sides. 20g.

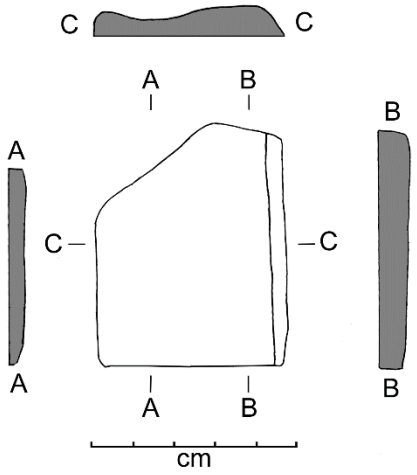


Figure 71. Find <42> from [CN14]
Plain pale blue glaze. Yellow body spotted with a scatter of red grog. There is one original edge with some glaze on it. One other edge may be original but the other has been cut. The back has had a hollow rubbed in it presumably to fit the tile to a surface with a ridge on it. Late 17th or 18th-century.

10.6 Finds from gravel deposit [CN15]

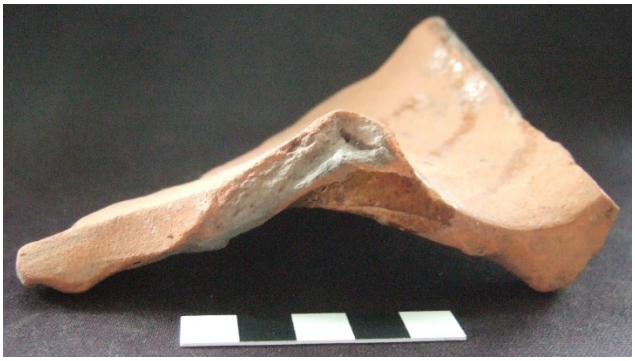


Figure 72. Find <20> from [CN15]
Piece of Tudor Brown pottery. Possibly a very large jug with an angular spout. Rim diameter possibly 250mm. Surviving height 140mm. 157g.
Left: the side. Above: the top.

Figure 73. Find <19> from [CN15]
Granite or meta-granite. Traces of fine white mortar on one side. Found cleaning the top of the layer. Size 70mm. 125g.

10.7 Discussion of the finds below chalk walk foundation

The deposits below the chalk foundation are clearly waste dumped to fill a channel. The rubble falls into two main groups. Layers [CM15] and [CN14] were very similar and contained a mass of small pieces of stone and broken brick. In both cases the stone was very fragmentary with evidence of reworking. The identifiable mouldings were mostly late gothic, and both deposits produced fragments of a large four light window or set of windows. Layer [CM15] contained a few mouldings that can be connected to the windows installed when Carew Manor was refaced around 1710-12. Blocks of stone with both gothic and early-18th-century moulding have been found during building work in the house, so it appears that some of the stone from the earlier windows was reused in the 18th-century. The fragments in layers [CM15] and [CN14] are probably masons' debris from this work which took place around 1710-12.[106]

The rubble in [CM11] was very different from that in [CM15] and [CN14]. It contained very little brick and worked stone: it was not from a structure with brick walls and windows. The main components were mortar, peg-tile that had been set in mortar, flint and Reigate stone, oolitic limestone and Kentish rag stone rubble mostly without worked faces. Much of the material has limescale on parts of the surfaces and the fractures. This material had clearly not come from the house but is very similar to the materials used to construct the ornamental structure found in trench CW described below (section 12).

There was much Kentish rag stone in [CM11] but not in [CM15] and [CN14]. It is possible that this hard, difficult to carve, stone was considered unsuitable for reuse in the early 18th-century and was therefore not present in the mason's rubble. It is also possible that it had a specific use in the ornamental structure, perhaps at the waterline of a pool. The textured surface would be consistent with this (figure 55).

Several unusual finds from the deposits can also be connected with the ornamental structure found in trench CW and described in section 12. These include the metamorphic rock, marble and coral. It therefore appears that the rubble from [CM11] had either come from the demolition of the structure found in trench CW or from some similar garden feature.

Pieces of spotty tin-glazed tile came from several contexts:

<522>	[CM15]	Below the chalk foundation.
<1>	[CN1]	Top soil.
<21>	[CN12/13]	Below chalk foundation.
<6>	[CN14]	Below the chalk foundation.

Several pieces of similar tile were found in the excavation of the Portioner's House in Beddington Park. Three of these were analysed by Michael Hughes and matched tin-glazed tiles produced in Antwerp, suggesting that the material is of 16th-century date.[107] In the early 18th-century the Portioner's house was the rectory of Beddington. It had had this use since at least 1601 and it may have been the rectory in the second half of the 16th-century.[108] This seems an unlikely location for expensive imported tiles, so it seems likely that they were salvaged and reused during the early-18th-century building work. It is not clear whether they originally decorated a room in the house or a garden structure.

The pieces of yellow ceramic were roughly finished and were probably made as paving bricks. However, several pieces had limescale on the surface suggesting that they had been

[106] Phillips and Burnett 2016 vol. 1, pages 28-32, 47-49, 142-5 and 160-166. A very clear example of reworking appears on page 147.
[107] Hughes 2013; Phillips 2020 *Portioner's House* p. 80-82. Finds <2>, <6> and <9>.
[108] TNA C12/1543/14 bill of complaint.

part of some wet garden ornament and they may have been used as decoration as they have a golden colour when wet.

The solid nature of the chalk foundation meant that the deposits below it were exceptionally well sealed, so that the objects within them should provide a secure date. The layers contained four clay pipe bowls:

[CM14]	<203>	Front and foot of clay pipe bowl. L21. No mark. c.1680-1710.
[CM15]	<202>	Lower part of L25 pipe bowl marked WR. Part of stem and another joining part making a total length of 60mm.
[CN14]	<7>	L25 lower part of bowl. Marked W?
[CN14]	<9>	L25 part of bowl. Marked W? Large cross inside base. Close to the boundary of [CN12].

There was also a tin-glazed tile (figure 71) which is likely to be late 17th or 18th-century and a piece of Japanese porcelain with a late 17th or early 18th-century date (figure 62). There is therefore nothing which is inconsistent with a date of about 1710-12 suggested by the building rubble.

11. THE STRATIGRAPHY OF TRENCHES CU AND CW

Trenches CU and CW consisted of four seasons' work on a watercourse, culvert and a fragment of an ornamental structure on the eastern edge of the garden area south of the Orangery wall, where 19th-century maps show a stream entering the grounds.

The 1999 excavation (trench CU) uncovered part of the stream bed and the exit arch of a brick culvert. The stream bed contained pieces of metamorphic rock and other decorative material which suggested that the site was immediately downstream of a garden structure. In 2001 trench CW was opened on the east side of CU, which uncovered the top of the culvert with a fragment of ornamental garden structure on the south side of it. Further work was done when the trench was re-excavated and extended in 2003 and 2004.

The following sections describe the stratigraphy of the site as a whole rather than as a season by season narrative.

11.1 The upper deposits

11.1.1 Trench CU

Trench CU was 3.2m north-south by 2.5m east-west. The turf was growing in layer [CU1] which consisted of brown top soil with a scatter of flint and rubble. The flint was mostly rounded and was concentrated on the east side of the trench. The layer contained a wooden socket for a goal post.

The removal of [CU1] exposed the top of a brick culvert and the retaining wall of the exit from which the water had flowed (figure 75). The area west of the wall was treated as [CU2] which is described as part of the channel fill in section 11.5. The deposits to the east of the retaining wall and to the north and south of the culvert were numbered [CU3] and [CU4] and were left in *situ* (figure 75).

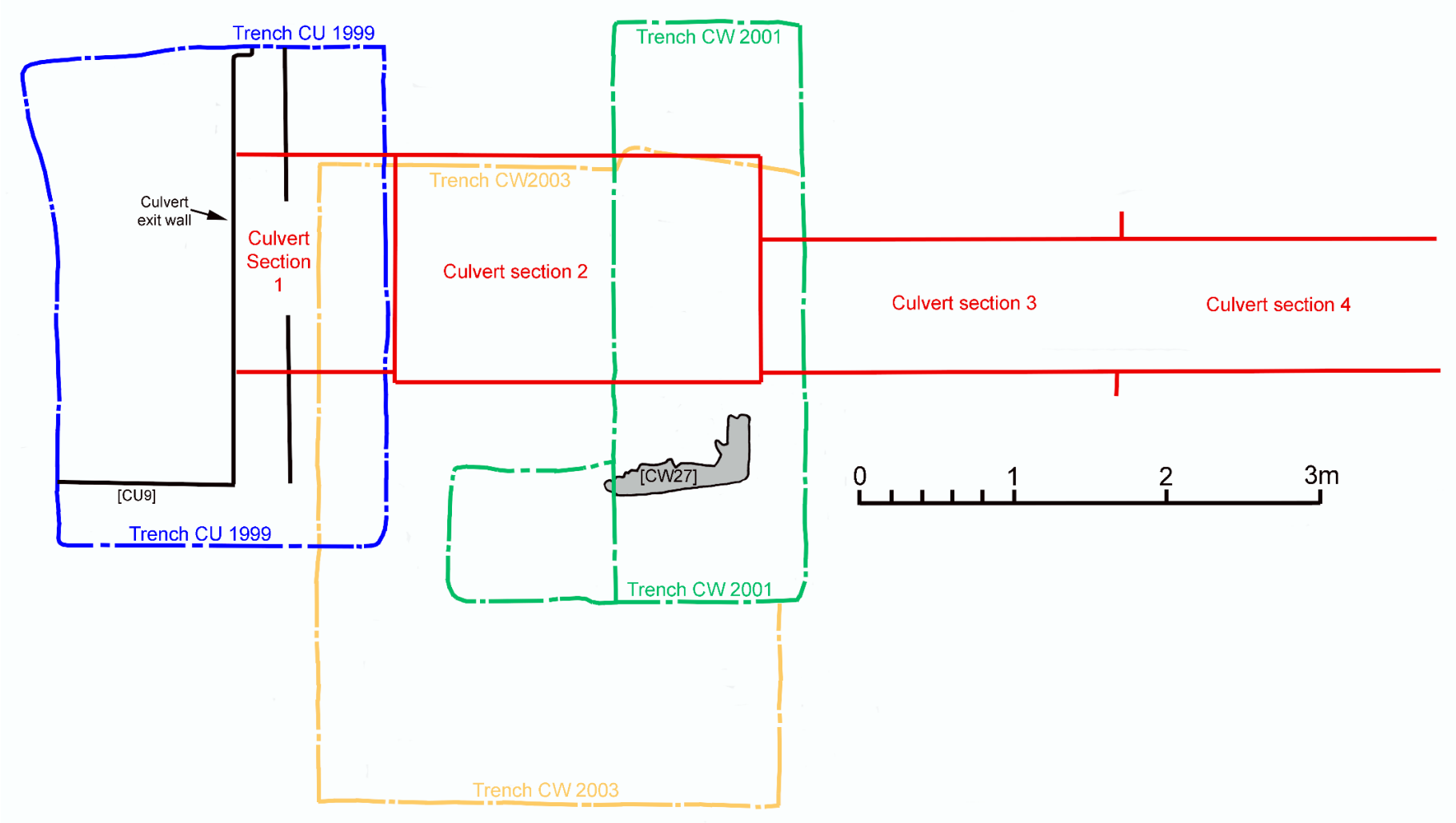


Figure 74. Trenches CU and CW with the culvert and the ornamental structure. The 2004 trench was within the one dug in 2003.

Figure 75. The trench after the removal of [CU1] showing the top of the exit retaining wall and the culvert. Context [CU2] to the right of the retaining wall, [CU3] foreground left, and [CU4] background left. Looking south. The culvert and retaining wall are described in section 14.1.

11.1.2 Trench CW 2001

Trench CW 2001 was initially 4m north to south by 2.5m east to west. It was soon reduced to a trench with an east-west width of 1.5m wide on the west side of the original. This was excavated with an inwards slope on the west side so the width at the bottom was 1.2m as shown in figure 74. An extension was later added to the west side of the south end. This was 0.8m north to south by 1m east to west. The surface of CW was excavated as [CW1].[109] This consisted of loose brown soil with modern finds. When it was removed a large mass of rubble appeared in the centre and west side of the trench. This was treated as layer [CW3] while the surrounding deposits were [CW2]. Further excavation showed that the rubble was the fill of a large cut [CW37]. Most of the subsequent excavation was in the fill of this cut and an area on the south side of it. A fragment of an ornamental structure formed the south side of the cut.

The cut and its fill are described in section 11.2 while the deposits to the south of it are described in section 11.3.

11.1.3 Trench CW 2003

The 2003 trench re-excavated most of the 2001 trench and extended it to the south and west as shown in figure 74.

The uppermost layer [CW100] consisted of brown soil with some chalk and flint and modern finds. When this had been removed it was found to rest partly on rubble deposit [CW101] which filled cut [CW103], and partly on soil deposits which lay to the west and south of the cut.

[109] Excavated as [CW21] in the extension.

The cut [CW103] and fill [CW101] were the same as cut [CW37] and layer [CW3] in the 2001 trench. These are described in section 11.2.

Layer [CW102] and the underlying deposits at the south end of the trench are described in section 11.3.

11.1.4 Trench CW 2004

The work in 2004 was largely within the previous trenches. An area of topsoil [CW203] was removed from above the north side of culvert section 2 to expose the northern edge of cut [CW37].

11.2 The cuts and fill above culvert sections 1 and 2

11.2.1 The cut above culvert section 2

A deep cut [CW37] extended from the base of the top soil to the top of culvert section 2. The eastern side of the cut was excavated in 2001, the western side in 2003 and some remaining fill in 2004.[110] The cut was rectangular, about 1.4m north to south by 2.7m east to west, with rough more-or-less vertical sides.

The cut coincided with several features:

- The west side of the cut was above the bonding break between culvert sections 1 and 2 (figure 191).
- The south side ran along the inner face of the decorative structure [CW27].
- The east side ran over the east end of culvert section 3 so that the broken end of the section projected into the cut by about 0.3m.
- The north side lay just north of northern edge of culvert section 2.

The fill consisted of brown earth with a great deal of loose rubble including soft red brick, some yellow stock brick, peg tile, flint cobbles and knobbly flint, mortar, chalk, numerous fragments of decorative rock, shells and a few pieces of coral. [111]

There were a number of fragments from a broken culvert (see section 15.1.5). They were made of soft red brick bonded with grey mortar. The inner side of the arch was covered with grey bumpy limescale which was sometimes covered with a thin black film.

The upper part of the deposit on the west side of the 2001 trench was excavated as [CW4] (figure 76).[112] It consisted of closely packed flint in a brown earth matrix. The top was fairly smooth and it may have been a path which continued southwards beyond the cut as layer [CW105]. If so, the path was recent, as it overlay the cut fill and was probably contemporary with it. If it was a path, it was poorly made and fairly narrow and much less substantial than the drive foundation to the south of the cut (see section 11.3).

The deeper parts of the cut fill excavated in 2003 and 2004 had less rubble and more soil.

The fill contained a number of finds of Victorian or early-20th-century date. These include two joining sherds from the base and side of a blue porcelain bowl or jug marked ‘W.B. COBR…’. probably William Brownfield of Cobridge, Staffordshire who was working in the

[110] The cut was numbered [CW37] in 2001 and [CW103] in 2003.
[111] The fill was excavated as [CW3], [CW4], [CW5], [CW6], and [CW7] in 2001; [CW101] in 2003 and [CW203] in 2004. In this report the cut is referred to as [CW37] and the fill as [CW3].
[112] Excavated as [CW22] in the extension to the 2001 trench.

second half of the 19th-century. The base of the fill on the south side of culvert section 2 contained several pieces of dense sharply-moulded yellow stock brick with frogs, which were likely to date from the late 19th or early 20th century.

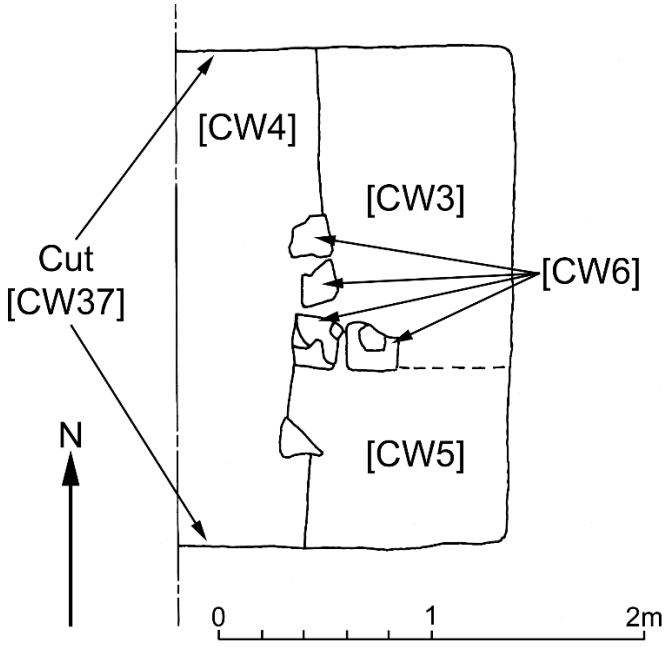


Figure 76. The fill of cut [CW37] in 2001 showing the tops of layers [CW3], [CW4], [CW5] and [CW6]. These overlay the east end of culvert section 2.

11.2.2 The cut above culvert section 1

In 2003 an east-west aligned cut [CW113] was found about 0.45m south of the inner side of culvert section 1 (figure 84). The fill [CW108] consisted of hard brown soil with some rubble and other finds, while the deposit to the south [CW110] was brown soil.

A second cut [CW118] was found at a lower level about 0.9m south of the inner side of culvert section 1 (figure 87). The cut may have been present in the western extension to the 2001 trench where it formed the boundary between layers [CW23] and [CW24] (figure 78). Here it was about 20cm south of the edge of cut [CW37]. The fill was presumed to be on the north or culvert side of the cut where it was recorded as layer [CW24] in 2001 and [CW117] in 2003. The former consisted of flint of mixed size in a matrix of clayey sand while the latter was described as fairly loose medium-brown soil. Both contained some rubble.[113]

11.3 South of the ornamental structure and cut [CW37]

This section deals with the deposits south of the ornamental structure which was on the edge of cut [CW37].

Part of the area immediately south of the cut and the ornamental structure was excavated in 2001. The excavation was extended further south and west by the 2003-4 trench as shown in figure 74. This had the unfortunate effect of splitting the deposits into two areas.

When the topsoil had been removed in 2001 the area south of the cut was occupied by layer [CW2] which consisted of brown sandy soil with about 5% flint of mixed size and shape.

[113] Layers [CW23] and [CW24] were similar being largely gravel. The matrix of [CW24] was darker and more clayey than [CW23].

Layer [CW2] rested on [CW8] which consisted of soft dark brown soil. It rested on [CW10] and [CW11] as shown on figure 77.

Layer [CW11] consisted of flint in a matrix of dark brown earth which gradually became sandy with depth. It rested on [CW10] which covered the top of the ornamental structure and consisted of stiff orange-brown sandy clay with much flint. When the top of the ornamental structure was exposed an arbitrary layer change was made on the south side of it to separate the finds above the structure from those to the side. The new context was [CW20], the top of which was at 32.54 to 32.55m OD close to the highest points of the structure. It consisted of orange-brown sandy clay with flecks of mortar and some charcoal. It contained a significant number of ornamental finds including several pieces of metamorphic rock and single pieces Wealden marble, red limestone and coral. There were also some pieces of Reigate stone and brick.

Layer [CW20] rested on [CW30] at about 32.15m OD. The change was again arbitrary and was made to separate the finds. Layer [CW30] contained three pieces of metamorphic rock.

Layer [CW30] rested on layers [CW31] and [CW32], the latter being adjacent to the ornamental structure as shown in figure 81. Layer [CW31] consisted of stiff orange clay while layer [CW32] consisted of very hard grey-brown sandy silt with a substantial clay content. The top of these was at about 32.03m OD.

Excavation continued in 2003 as layer [CW119] and the trench was excavated to the top of a gravelly deposit [CW233] which was cleaned and drawn in 2004 (figure 90). This was probably natural and was not excavated.

In 2003 the trench was extended southwards by 1.35m. In this area the topsoil rested on layer [CW102] which consisted of orange-brown sandy soil with a scatter of flint pebbles and some small chalk.

This rested on [CW104], [CW105] and [CW106] as shown on figure 83.

Layer [CW104] consisted of orange-brown sandy soil with occasional flint and chalk, which was probably the same deposit as the overlying layer [CW102]. It rested on [CW105] which consisted of flint, some with mortar on it, in a matrix of brown soil (figure 84). It rested on layer [CW115] which consisted of rounded and sub-angular gravel in broken loose sandy mortar (figure 85). Layers [CW105] and [CW115] appear to be the same as layers [CW11], [CW22] and [CW23] in the 2001 trench. The latter extended the gravel deposit northwards to the edge of the cut over culvert section 2.

Gravel layers [CW105], [CW115] and the associated deposits appear to be the foundation of a substantial walk along the eastern edge of the garden. The east side of the top was at about 32.79 to 32.88m OD and was more or less flat, but the west side sloped downwards and had probably either slumped or been slighted.

There were no closely datable finds from layer [CW105], but [CW115] contained a piece of siliceous limestone similar to the material in the decorative structure, a little brick, tile and a few other items which are not closely datable.

There was a mass of mortared soft red brick [CW111] on the edge of the trench at the northwest corner of [CW105] (figure 85 and 86).[114] This lapped over the edge of the gravel and appeared to be a wall which ran westwards beyond the side of the trench. It did not align with the southern outer channel wall [CU9] (section 14.8.2), and its significance is unknown.

[114] One brick had complete dimensions: length 225mm, height 68mm and width 108mm.

Layer [CW106] lay to the east of [CW105] and butted up against it. It consisted of very hard orange-brown sandy soil.

Layer [CW115] and [CW106] rested on [CW116] which covered the whole of the south end of the trench as shown in figure 87. It consisted of orange-brown sandy silt the top of which sloped down from 32.66m OD on the east side of the trench to 32.39m OD on the west.

The 2003 excavation ended in this layer.

Work resumed the following year, when the deposit was divided into three as shown in figure 89. Layer [CW200] on the east side of the area consisted of brown slightly orange sand. Layer [CW201] to the west of it was similar to [CW200] but more orange. The boundary between the two was not clear and could be seen in some states of dampness and not others. Layer [CW202] to the west consisted of brown silty sand which was hard when dry and soft when damp. There was a scatter of small flints and rubble with more flint on the western edge.

Layers [CW200] and [CW201] rested on layers [CW213] and [CW214] (figure 93). The first was orange-brown sandy silt and the other dark soft brown sandy silt. The boundary between the two was again indistinct. The western side of the trench, below [CW202] was occupied by three layers [CW210], [CW211] and [CW212].

Layer [CW210] consisted of orange clayey sand.

Layer [CW211] was of light brown sandy silt which would form a ball when damp and was hard when dry. It contained a few green patches towards the east side.

Layer [CW212] consisted of rounded and sub-angular flint in a loose sandy matrix. The flints were mostly 60 to 70mm across but ranged up to 130mm. Some had traces of mortar on them. There was also a piece of chalk.

There were two key finds from the above deposits: a piece of post-medieval redware and an L25 pipe bowl.[115] The latter shows that the deposits are no earlier than the beginning of the 18th-century. Layer [CW212] also contained two pieces of Wealden marble similar to those found in the culvert.[116]

When the above deposits had been removed the trench was in the state shown in figure 96 and 97.

The deposits consisted of the fills of several cuts into layer [CW227] which consisted of orange-brown sandy clay – probably natural hill wash.

There were two wide shallow cuts [CW224] and [CW226] to the east of [CW227]. They were filled by layers [CW223] and [CW225] which consisted of fine medium-brown silt. Layer [CW223] contained charcoal flecks and the two deposits had slightly different colour when wet, but were essentially the same.

On the southern edge of the trench cut [CW219] was filled by layer [CW218] which consisted of brown silt with flint pebbles. It was hard when dry and darker and sticky when wet. The top of the cut was well defined but on excavation the edge was difficult to detect except when very wet when it was a little darker than layer [CW227].

In the western end of the trench layer [CW227] was overlaid by [CW222] which consisted of medium brown sandy silt which was sticky when wet and very hard when dry.

[115] The pipe bowl was find <2028>.
[116] Finds <2272> and <2273>.

There was also a suspected east-west aligned cut [CW220] on the east side of the trench which was filled by [CW221]. However, the cut disappeared when it was trowelled and probably did not exist.

There were very few finds from the cut fills, the latest item being a rather doubtful piece of curved pan-tile 11mm thick from [CW218].

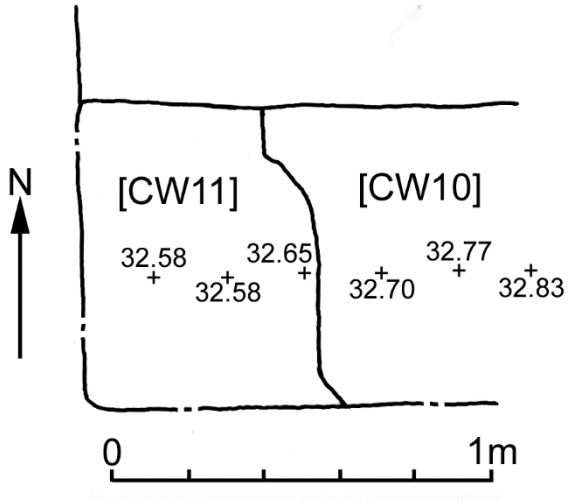


Figure 77. The tops of layers [CW10] and [CW11] in the southwest corner of the 2001 trench.

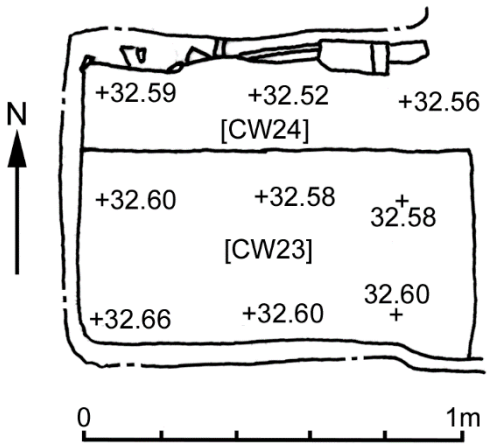


Figure 78. The extension to the west side of the south end of the 2001 trench with the tops of [CW23] and [CW24].

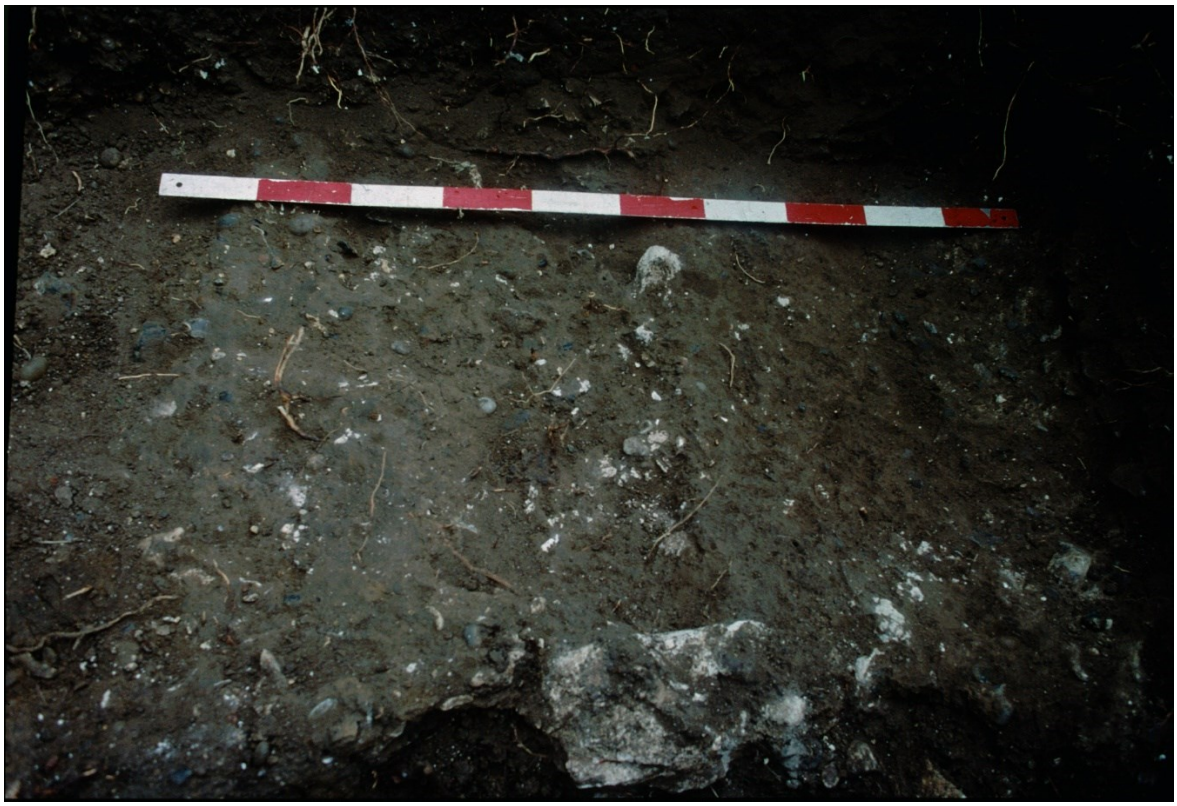


Figure 79. The top of layer [CW10] looking south in 2001.

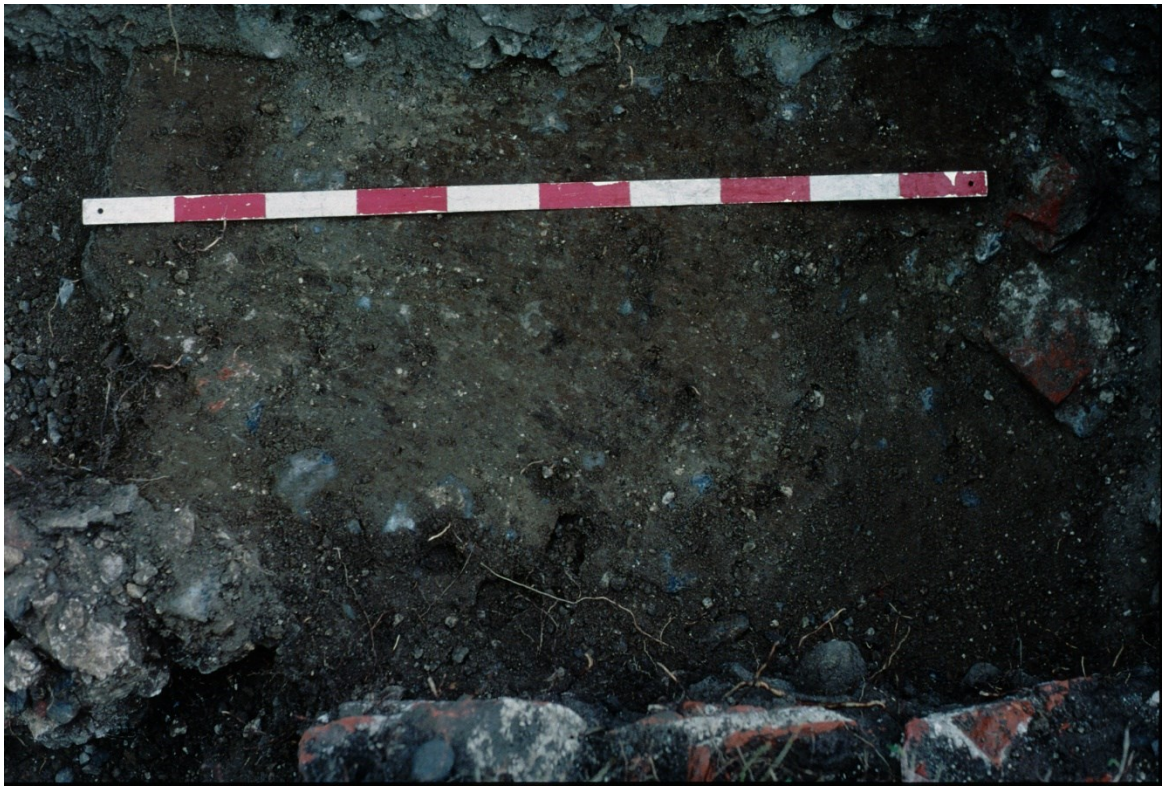


Figure 80. The extension at the southwest corner of the trench in 2001, with [CW23] and [CW24] as shown in figure 78. Looking south.

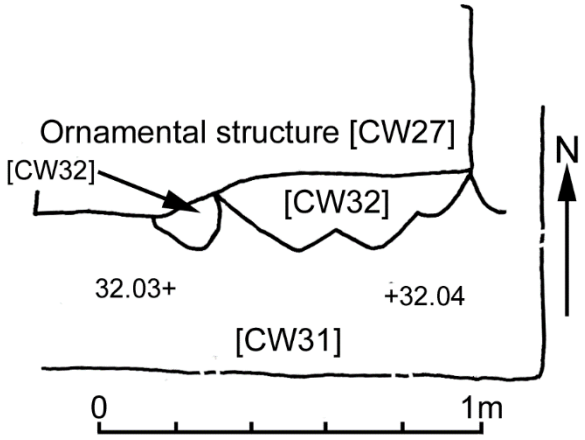


Figure 81. The southeast corner of the 2001 trench with the ornamental structure [CW27] and the tops of [CW31] and [CW32].

Figure 82. The trench as shown in drawing 81 showing the tops of layers [CW32] (next to the wall) and [CW31].

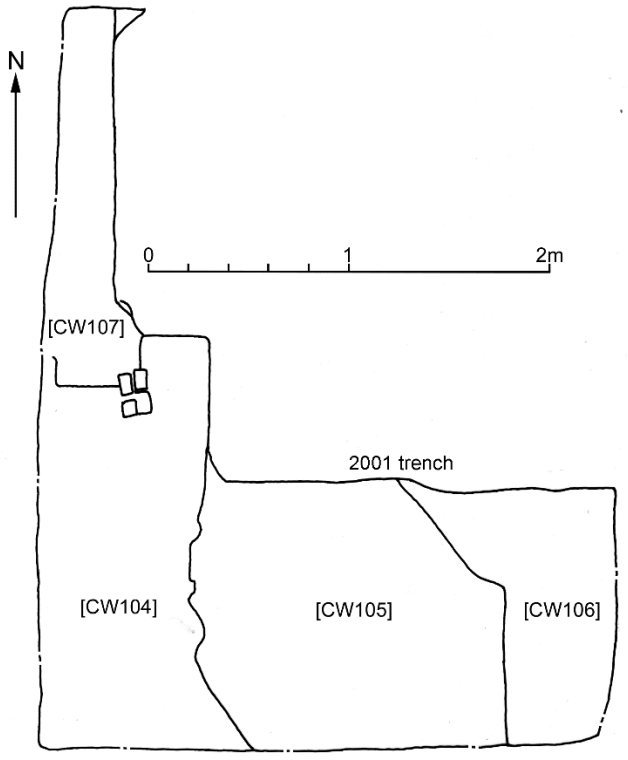


Figure 83. The south end of the 2003 trench with the tops of layers [CW104], [CW105] and [CW106].

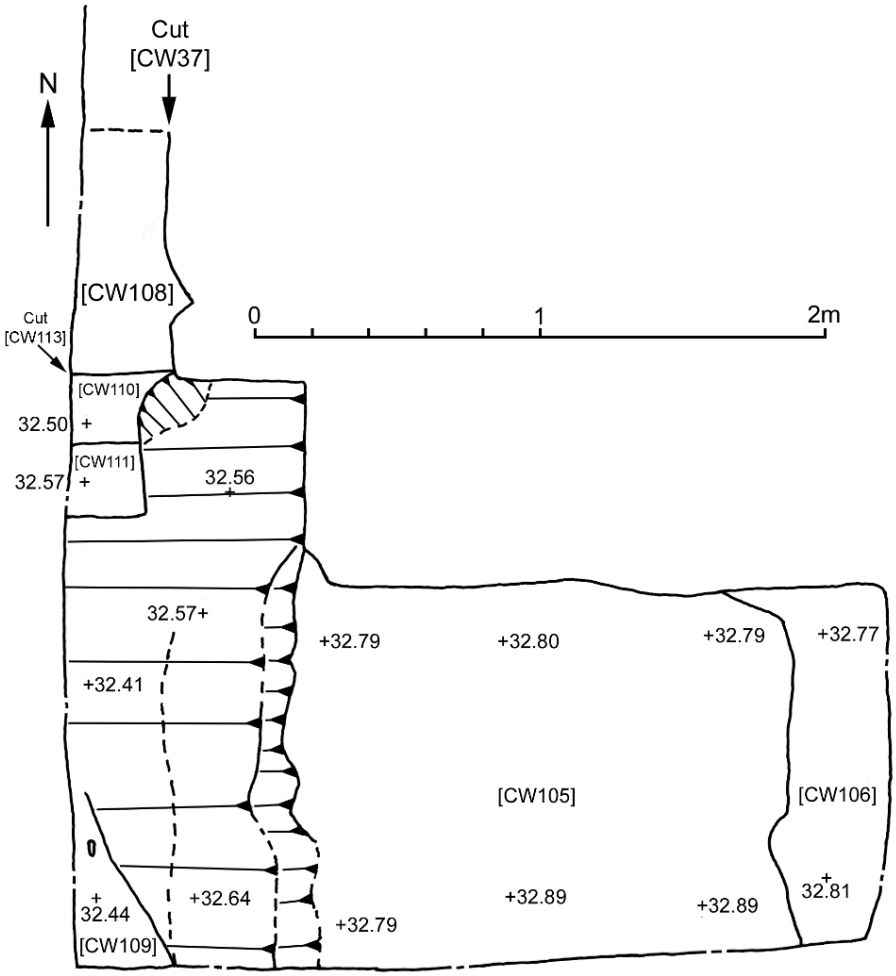


Figure 84. The south end of the 2003 trench showing layers [CW105], [CW106] partly excavated. On excavation [CW109] was found to be the same as [CW116] and was recorded as such.

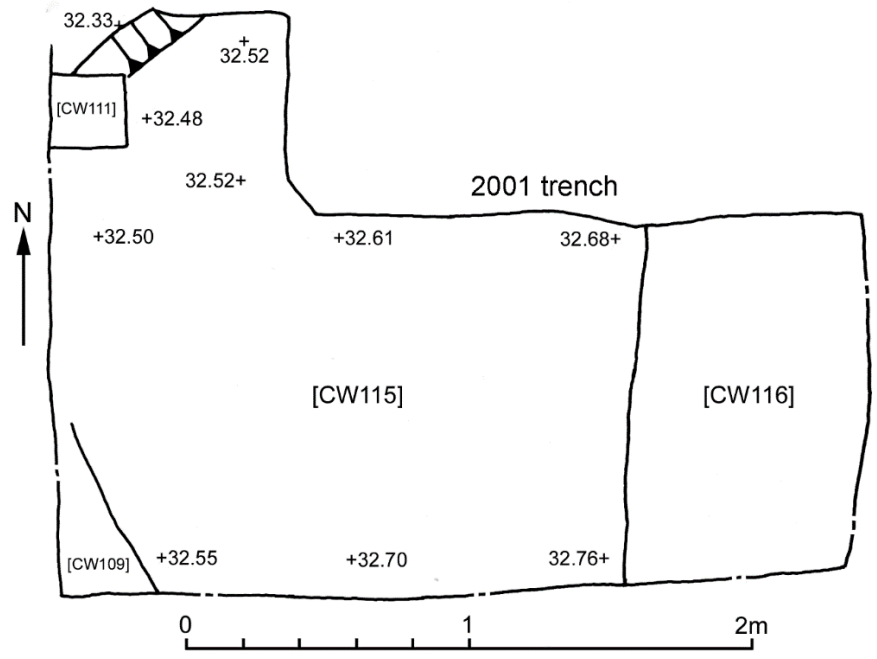


Figure 85. The south end of the 2003 trench with the tops of layers [CW115] and [CW116].

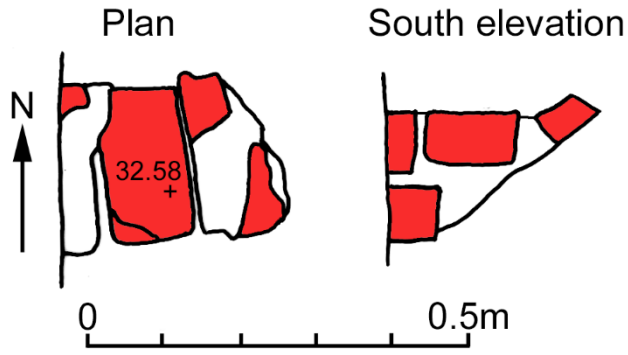


Figure 86. Plan and elevation of wall [CW111].

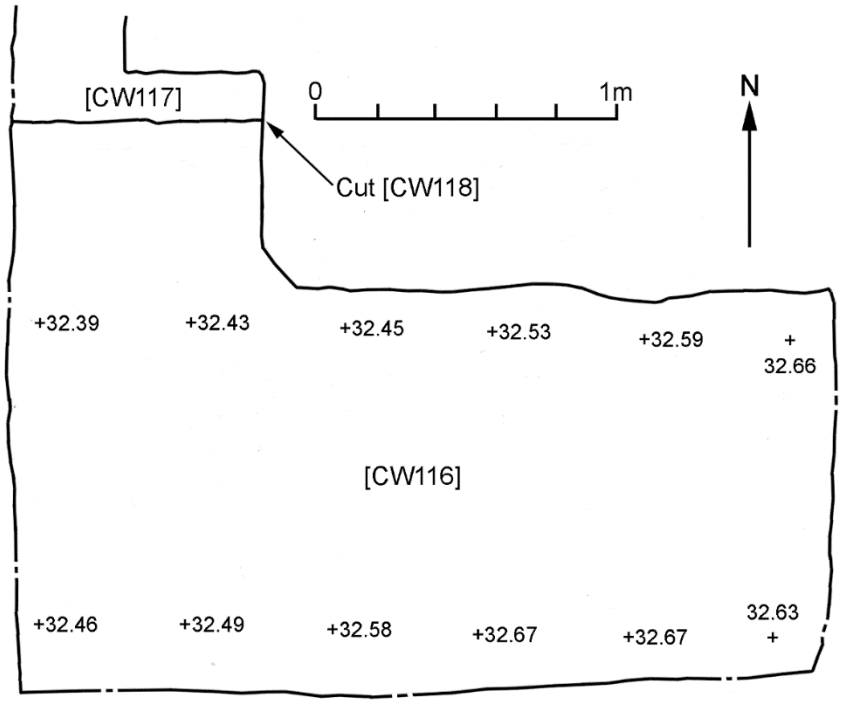


Figure 87. The top of layer [CW116] with layer [CW117] and cut [CW118] in the 2003 trench

Figure 88. The gravel deposit [CW105] / [CW115] looking south east in 2003.

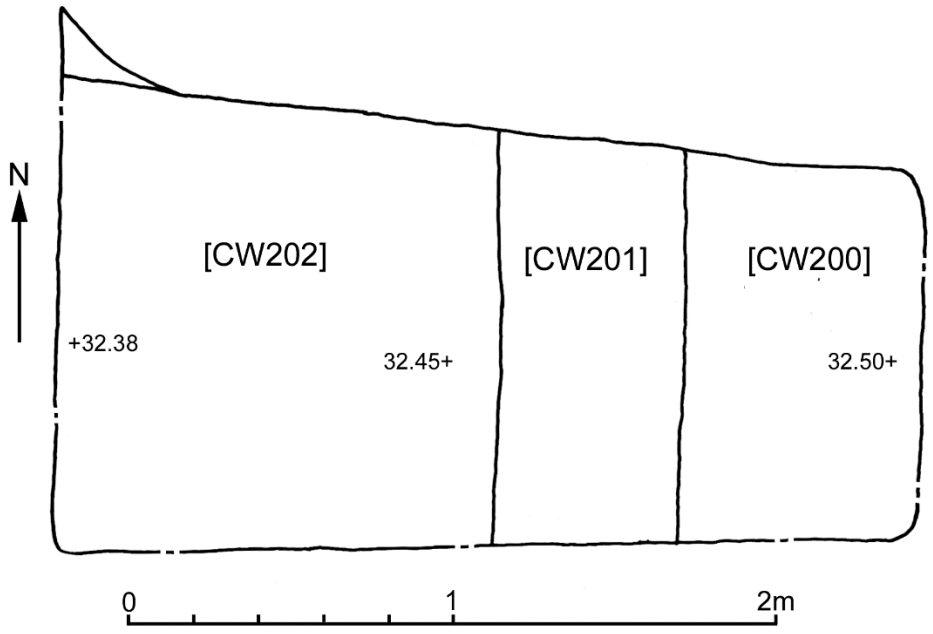


Figure 89. The tops of layers [CW200], [CW201] and [CW202] in the south end of the 2004 trench.

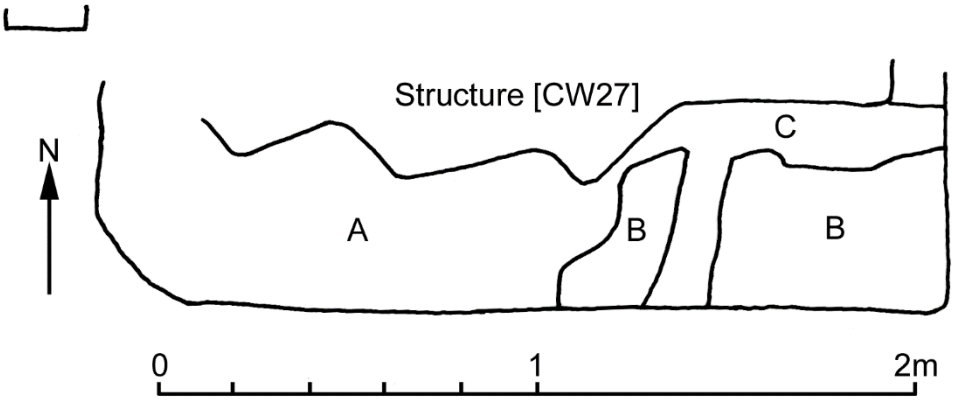


Figure 90. The bottom of the trench on the south side of the ornamental structure [CW27] at the end of excavation in 2004 showing the top of layer [CW233] which consisted of the following:

A Flints in an orange-brown matrix.
B Sandy clay mottled orange and grey.
C Similar to B in feel but medium brown.

Figure 91. The deposits south of the ornamental structure in the state shown in figure 90. East end. North at the top. Top of [CW233].

Figure 92. The deposits south of the ornamental structure in the state shown in figure 90. West end. North at the top. Top of [CW233].

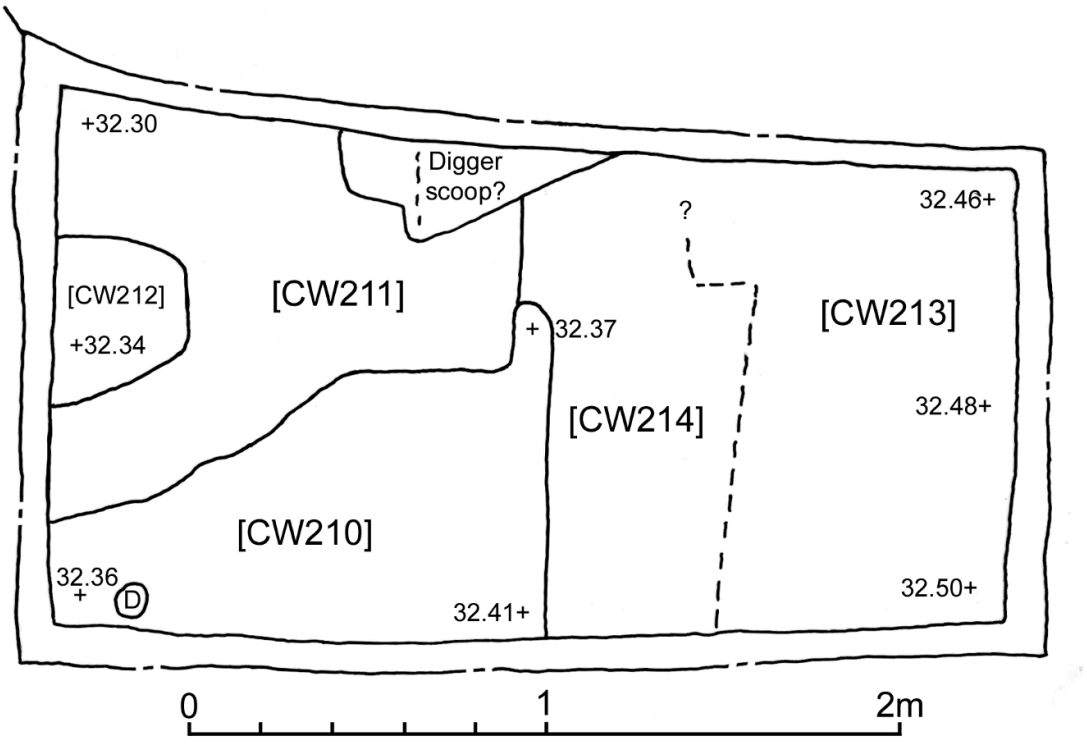


Figure 93. The 2004 trench with the tops of [CW210], [CW211], [CW212], [CW213] and [CW214]. D = patch of dark earth.

Figure 94. The 2004 trench in the state shown on figure 93 looking east.

Figure 95. The 2004 trench in the state shown on figure 93 looking west.

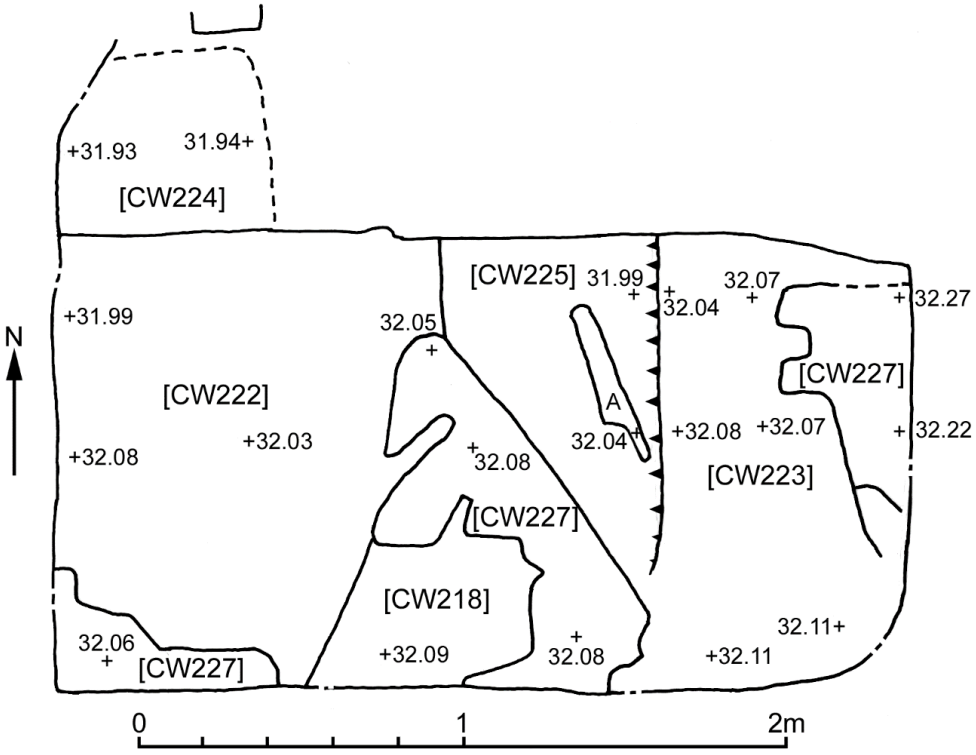


Figure 96. The 2004 trench with layers [CW218], [CW222], [CW223], [CW224], [CW225] and [CW227]. A = [CW227]. The drop between layers [CW223] and [CW225] was an artefact of the digging.

Figure 97. The 2004 trench as shown in figure 96 looking east.

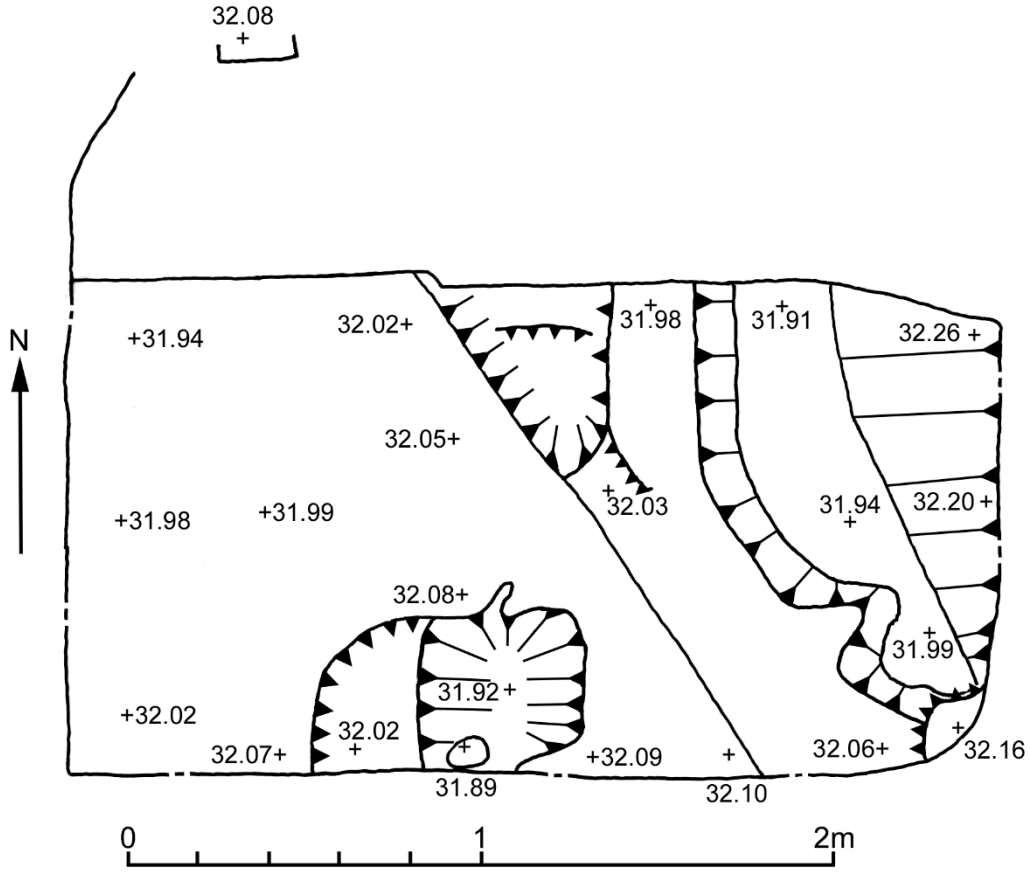


Figure 98. The south end of the 2004 trench at the end of the excavation.

Figure 99. The 2004 trench as shown in figure 98 looking east.

Figure 100. The 2004 trench as shown in figure 98 looking west.

11.4 The deposits at the north end of the trench

This section deals with the deposits in the north end of trench CW to the north of culvert section 2. The topsoil rested on layer [CW16]. This consisted of soft medium brown slightly orange soil. It rested on layers [CW17], [CW18] and [CW19] as shown in figure 101.

Layer [CW17] consisted of flints, mostly sub-angular and of mixed size, in a spotty grey sandy matrix. The top of this was at between 32.58 and 32.68m OD which was lower than the gravel walk exposed on the south side of the trench (layer [CW105]) the top of which was at 32.79 to 32.88m OD. However, it seems likely that layer [CW17] was part of the same feature which had been divided by cut [CW37].

Layer [CW18] consisted of medium brown sandy soil.

Layer [CW19] consisted of orange sandy clay spotted with chalk and containing some flint.

Layer [CW19] rested on [CW25] which consisted of orange-brown sandy clay. This and layers [CW17] and [CW18] rested on layer [CW33] which consisted of brown very compact sandy clay.

Layer [CW33] rested on layers [CW34], [CW35] and [CW36]. The latter consisted of a small patch of Reigate stone rubble in the northwest corner of the trench. It rested on [CW34] and when it had been removed the trench was in the state shown in figure 102 and 103.

Layer [CW35] on the eastern side of the trench consisted of angular chalk with rounded corners in brown soil. There were also two large knobbly flints, a piece of Reigate stone and some peg tile.

Layer [CW35] and part of [CW33] rested on [CW34] which consisted of sub-angular gravel up to 10cm across and smaller mostly rounded pebbles in a mottled matrix of orange and grey sandy clay. There was an area of large flint on the south side of [CW34] which was probably part of the layer but may have been the lower part of the fill of cut [CW37]. It was partly excavated to 31.91m OD without finding the bottom. The deposit was almost certainly natural. In 2004 the western edge of the deposit was excavated as layer [CW232] and was found to overlie green clayey sand layer [CW231] which was interpreted as the Thanet beds.

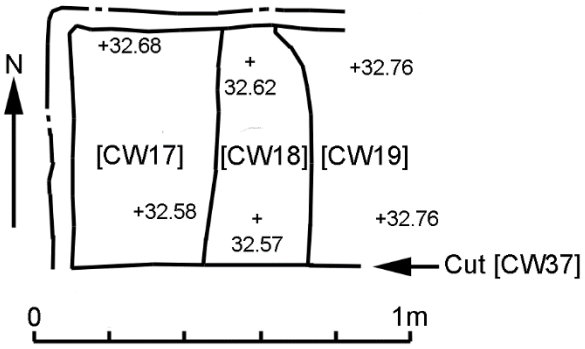


Figure 101. The tops of layers [CW17], [CW18] and [CW19] in the 2001 trench.

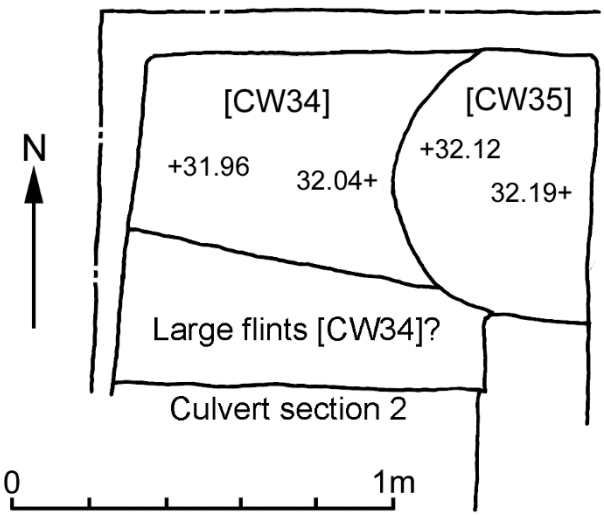


Figure 102. The 2001 trench with the top of layers [CW34] and [CW35].

Figure 103. North end of the trench in the state shown in figure 101. South at the top.

A small area was excavated on the east side of cut [CW37] to the north of culvert section 3. Here the northeast corner of the cut fill [CW3] rested on [CW12] and [CW14] which were separated by cut [CW13] as shown on figure 104 and 105. Layer [CW12] consisted of orange-brown sandy clay with some chalk, flint and brick. Layer [CW14] had a similar matrix but contained much more rubble.

Both deposits rested on [CW15] which consisted of large sub-angular chalk in fairly stiff orange clay which contained some sand. The top of this was at 32.34m OD.

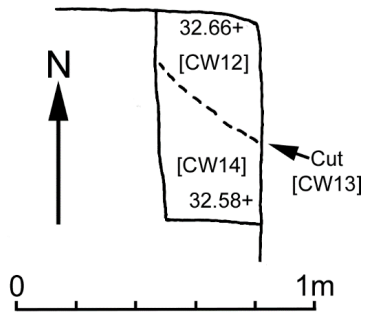


Figure 104. The 2001 trench with the tops of layers [CW12] and [CW14] with cut [CW13].

Figure 105 The NE corner of the trench looking east. As shown in figure 104. Showing the tops of [CW12] and [CW14].

11.5 The deposits at the culvert exit in CU

This area was excavated in trench CU in 1999. The removal of the topsoil [CU1] exposed the top of the culvert exit retaining wall, with layer [CU2] filling the channel to the west of it (figure 75).

Layer [CU2] consisted of brown soil with a scatter of chalk flint and brick. It rested on layers [CU5], [CU10] and [CU11] as shown in figure 106. On excavation the boundary between [CU5] and [CU11] was unclear and the deposits appeared to be patchy dumped material. At the north end of the trench, flint in a yellow matrix was underlain by very soft loose flinty soil. The deposits at the southern end of the trench contained more soil. Both deposits contained much rusty metal and modern items.

Layer [CU10] consisted of dark brown soil which contained several bricks. It appeared to have filled a cut which sloped down towards the culvert exit.[117]

The deposits covered a drain that was crudely made of three lines of bricks laid lengthways on their side supporting two lines of brick which were laid across them (figures 108 to 110). The two channels had a height of about 11cm. The northern one was 14 to 16cm wide while the southern one was 12.5 to 14cm. The floors were gravel in an earth matrix. Most of the bricks were red, but harder than the usual ones on the site. At least two of them had frogs. The beds of the channel had the following heights in metres OD:

	West	Centre	East
North channel	31.81	31.78	31.79
South channel	31.79	31.77	31.76

The drain was in the fill of a water course which flowed from east to west but the levels suggest that it flowed in the opposite direction. It is possible that the drain was laid to take water into the remaining part of the culvert which was reused as a sump, but it is also possible that the levels are misleading and that the drain bed was uneven.

[117] One of the authors (JP) recalls meeting the son of a former caretaker (?) in the 1980s or early 1990s who remembered an underground chamber being found in the general area of the excavation. It seems likely that this cut was associated with that discovery.

There was a randomly dumped deposit of brick on both sides of the drain. The culvert entrance above the drain had been roughly blocked with several pieces of stone.

The drain and the brick around it clearly marked a layer boundary and the shape of the deposit suggests the fill of a circular cut. However, the deposits below it were very similar to those above and the excavation was continued as layers [CU5] and [CU11].

These deposits rested on layer [CU13] which consisted of fine dark brown soil with a scatter of flint, chalk and brick. There was a patch of sand by the centre of the culvert exit.

When [CU13] had been removed, the trench was in the state shown in figure 107. Two brick foundations, [CU17] and [CU15], crossed the trench from east to west. These formed the north and south retaining walls of a channel in which layer [CU16] had been deposited. There were natural deposits outside the channel, to the north and south of the retaining walls.

The deposits in the channel are described in section 16.1.1; the walls in section 14.8 and the natural in section 11.6.

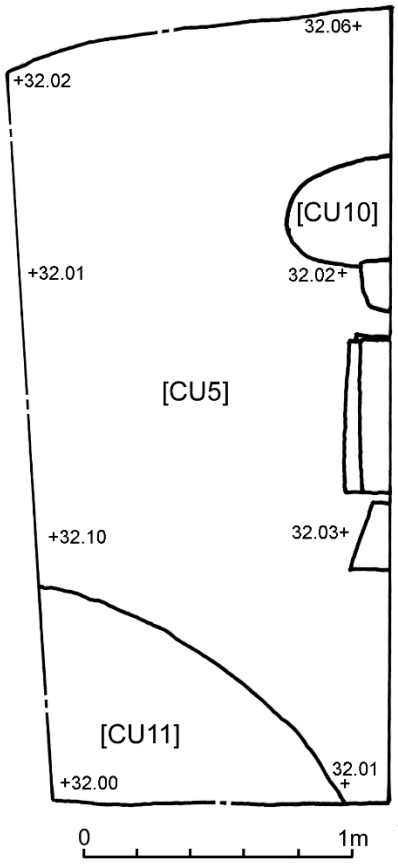


Figure 106. The 1999 trench showing fill of the channel at the culvert exit with the tops of layers [CU5], [CU10] and [CU11].

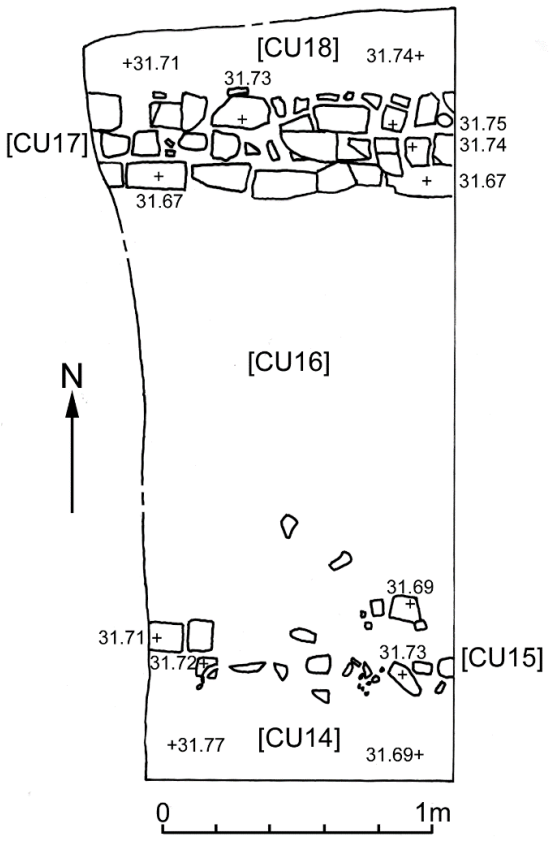


Figure 107. The tops of layers [CU14], [CU16] and [CU18] in the 1999 trench.

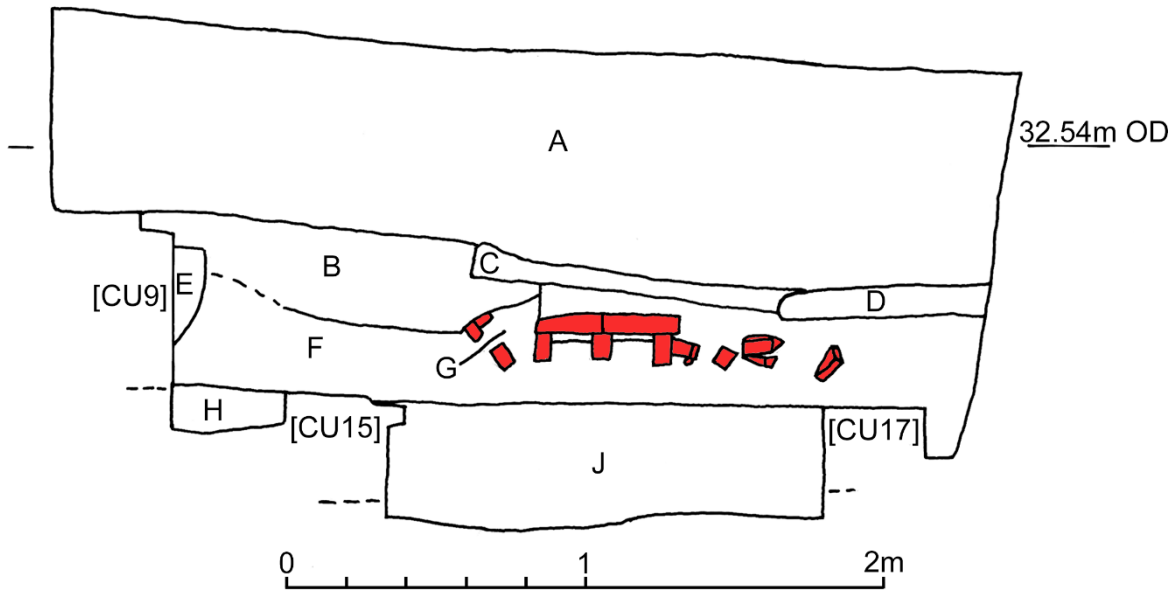


Figure 108. The west side of the trench. Red = brick.

A	Brown top soil with a scatter of chalk flint and brick.
B	Brown sandy soil lighter than A. Rare chalk and flint.
C	20% flint in brownish sand and earth.
D	Coal ash.
E	Loose brown soil.
F	Brown soil – rare chalk and flint.
G	Corroded metal bar with yellow-green patina.
H	Flint in stiff orange sandy matrix.
J	Gravel in sand.
Red	Brick

Figure 109. The drain [CU12] looking east with the culvert exit in the background.

Figure 110. The drain [CU12] after the top had been removed.

11.6 Natural

In trench CU natural was found in the bed of the channel at the culvert entrance and behind the remains of the retaining walls along the sides of the channel. The culvert bed [CU21] consisted of densely packed rounded and sub-angular flint with a scatter of small chalk in a stiff matrix of green sandy clay which was iron stained at the top.[118] The top of this was at 31.30 to 31.37m OD.

Behind the north side of the retaining wall the natural was in three layers. From top to bottom these were:

- [CU18] consisting of dark brown soil with much small rounded and sub-angular flint and occasional chalk. The top of this was at 31.68m OD.
- [CU22] consisting of mottled bright orange and grey-brown sand and angular and sub-angular flint (mostly the latter) up to 5cm but mostly smaller. The top of this was at 31.54 m OD and the west end and 31.59 m OD at the east.
- [CU23] consisting of angular and sub-angular flint smaller than the layer above in a grey sandy matrix. The top of this was at 31.51 m OD at the west end and 31.48m OD at the east. Excavation ended in this layer at 31.40m OD.

On the opposite – southern – side of the channel two deposits were recorded behind the retaining wall. From top to bottom these were:

- [CU14] consisting of brown soil with much tightly-packed angular and sub-angular flint and some chalk. The top was at 31.77m OD at the west end and 31.69m OD at the east.

[118] The top of this layer was slightly under-dug and the finds attributed to it almost certainly belong to the overlying deposit [CU20]. There were no finds in the main part of [CU21].

- [CU24] consisting of tightly packed sub-angular and rounded flint in a matrix of mottled grey and brown sand. The top was between 31.69m OD and 31.70m OD. It was excavated to 31.58m OD and a probe hole then extended down to 31.33m OD without finding the bottom.

In trench CW the natural was seen in the bed of culvert section 2 and in the deposits outside the culvert to both north and south:

- The bed of culvert section 2 (layer [CW231]) consisted of green sandy clay and gravel which was probably the bottom of the Thanet beds. This is described in more detail in section 16.1.2. The top of this was at 31.23 to 31.38m OD with a scour-hole descending to 31.08m OD.
- The northwest corner of the 2001 trench [CW34], where it consisted of sub-angular gravel up to 10cm across, and smaller mostly rounded pebbles in a mottled matrix of orange and grey sandy clay. The top of this was at 31.96 to 32.04m OD.
- The southern end of the 2004 trench where layer [CW227] consisted of orange-brown sandy clay, which was probably natural hill wash. The top of this was at 32.26m OD on the east side of the trench and it sloped down to 31.94m OD on the west side. A cut in the deposit showed that it extended downwards to at least 31.88m OD.

12. THE ORNAMENTAL STRUCTURE: DESCRIPTION

A fragment of the southeast corner of an ornamental structure survived on the south side of the culvert as shown in figures 111 to 126.[119]

12.1 Overall structure

The ornamental structure can be divided into several sections (figure 111):

1. A foundation of green sandy mortar and flint cobbles which underlay the east wall and the east end of the south wall. It projected into the interior where it appeared to have been capped with peg tile and brown mortar. A single brick 52 to 53mm thick was set across the southeast exterior corner at the top of this foundation. The western end of this foundation was quite rough, and it coincided with a marked crack in the south wall. This end looked like a demolition surface, so the foundation may once have extended further west. (Figures 118, 119 and 123). At the southeast corner the base of the foundation was at 31.78m OD. On the south side it had a height of about 0.42m. The top sloped down to the north by about 15cm. The shape of the bottom of the foundation is unknown as the north side was hidden by later mortar.

2. The east and south walls above this foundation. These are much thinner and are made of grey mortar. They include some flint cobble and peg tile with large knobbly flints, ferrous conglomerate, a little siliceous limestone and other decorative materials set into the inner face. The walls had a maximum surviving height of 0.47m. Their thickness was uneven but around 15cm. This section projected about 30mm to 40mm from the foundation suggesting that it had been displaced to the east and south on the line of a marked horizontal crack.

3. The foundation of the south wall to the west of section 1 and 2 was thinner and the inside was largely covered with loose decorative material which was left *in situ*. We do not know whether it was made of grey or green mortar as the inside was largely hidden by the decoration and the outside was probably covered with a thin layer of limescale.

4. The wall above section three appeared to be similar to the section 2. It was fairly thin and the interior was decorated with flint, ferrous conglomerate and a little siliceous limestone. This section of wall ends about 1.06m west of the corner.

5. The west end of the south wall which consisted of lumps of decorative material possibly stacked on the remains of an earlier foundation of green mortar. It was not clear whether the decorative material was mortared together as it was left *in situ*.

6. The lower part of the interior or north side of the structure consists of, or is covered by, brown mortar unlike the other mortars in the structure. This probably covers a surface left by demolition.

The south side of the structure was rough mortar with hollows which appear to mark breaks in the construction (figures 111 and 124). There are no impressions of boards or other formwork and the hollows tend to suggest that it was not built against the side of a cut in

[119] This was initially given two context numbers [CW27] for the east wall and [CW28] for the south. Further excavation showed that it was a single structure, which is treated as [CW27].

soil. If it had been these would probably have been filled.

The rough west side of the foundation 1 looks as if it was left by demolition. (figures 118, 119 and 120). To the west the interior of the structure had a different character – it looked like placed boulders rather than a constructed wall. This change of character is not immediately reflected on the outer (southern) side, as wall section 4 was similar to section 2. It appears that the structure was constructed in two phases. The earliest parts are sections 1, 2, 3 and 4. At some point the western end of the structure was demolished and the west end of the foundation cut back on the inside. Section 5 was then built. The brown mortar (section 6) may be contemporary with this or a latter addition.

The crack and the eastward displacement of section 2 must have happened when the structure was free-standing, as the upper part could not have been moved into a soil bank.

Figure 111. Diagram showing the parts of the interior (left) and exterior (right) of the south wall of the ornamental structure. (see section 12.1 for a key to the numbers). Note that the ground level was lower on the interior. The lower part of the exterior was not excavated.

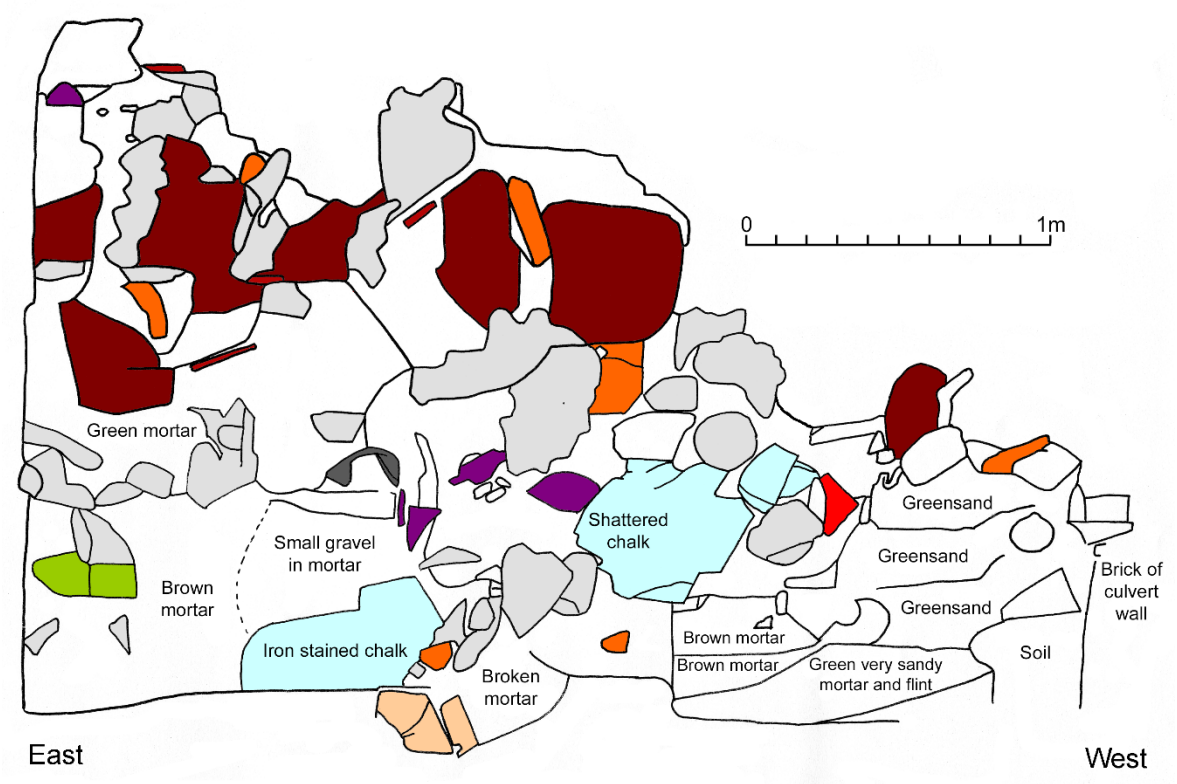


Figure 112. The north (internal) side of the ornamental structure drawn in 2003 and 2004.

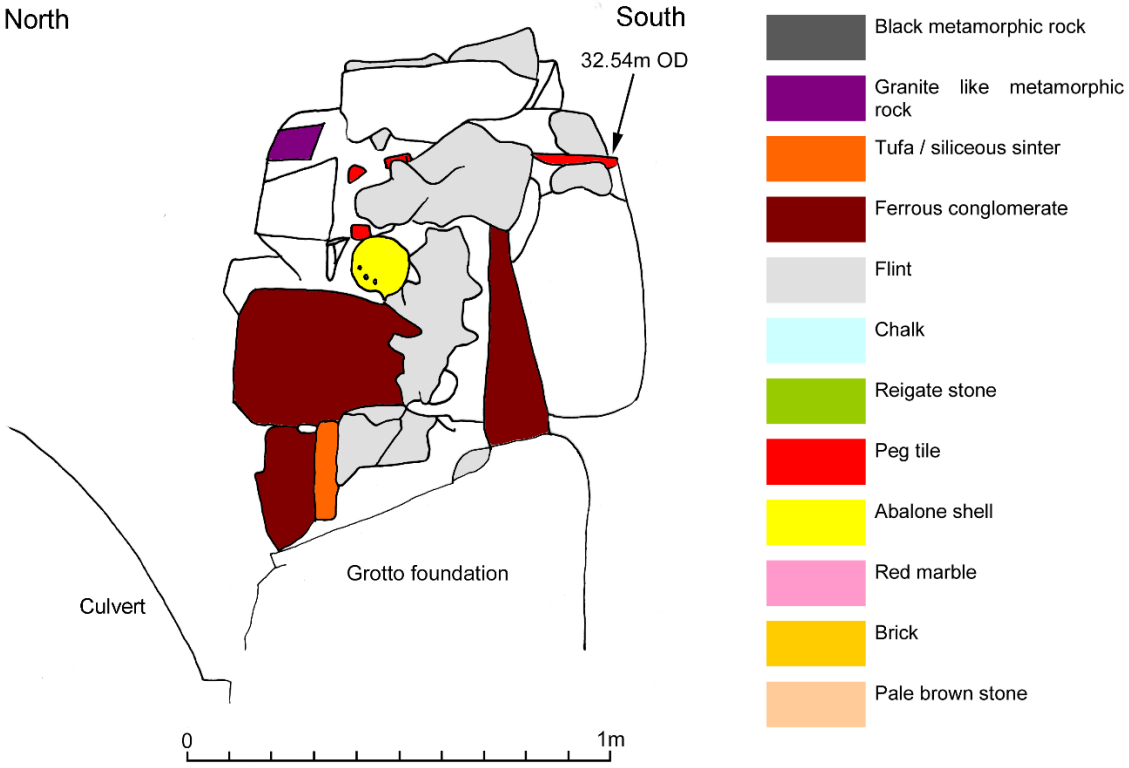


Figure 113. The interior of the east wall of the ornamental structure drawn in 2003.

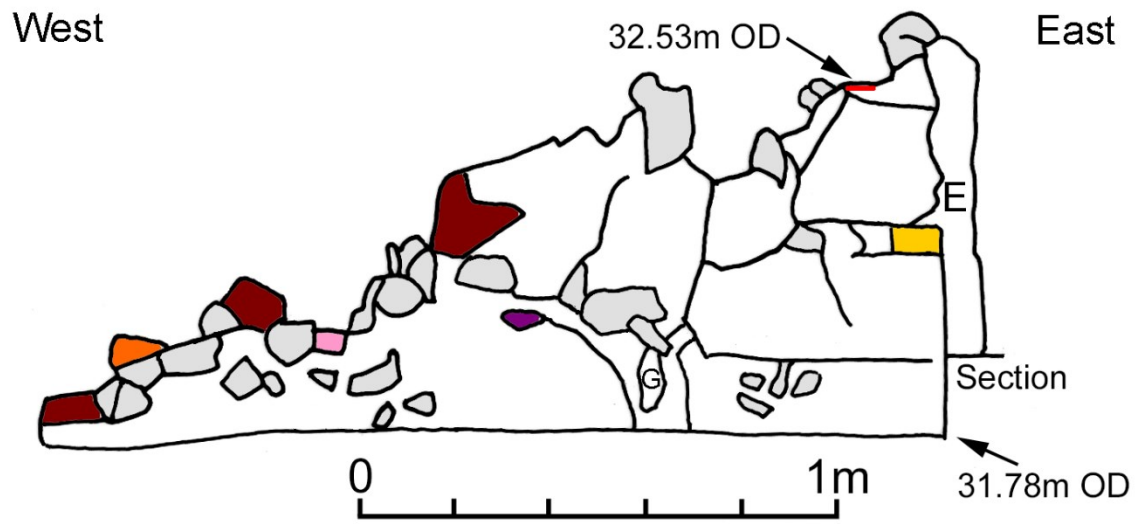


Figure 114. The outside of the south wall of the ornamental structure drawn in in 2004. The key is on the previous page. E = the east wall of the structure.

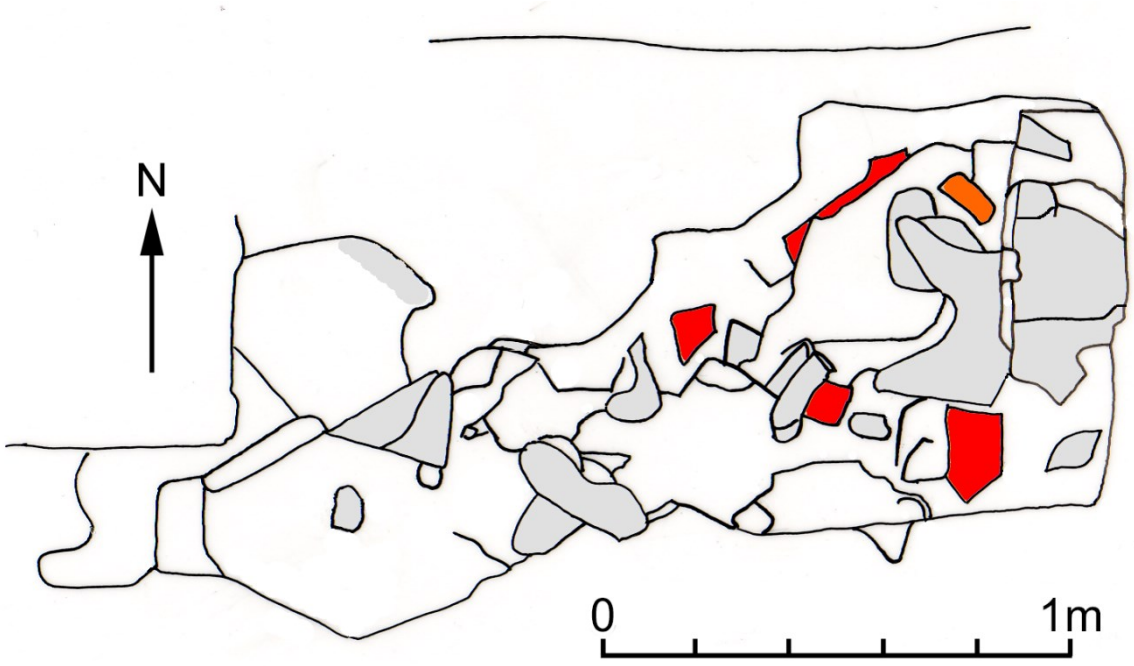


Figure 115. Plan of the ornamental structure drawn in 2001. The key is on the previous page.

Figure 116. The ornamental structure and the south wall of culvert section 2 in 2004.

Figure 117. The ornamental structure looking south in 2004 after the removal of the south wall of the culvert.

Figure 118. The partially excavated structure looking south in 2004.

Figure 119. The foundation looking south east in 2004. Both the north and west sides appear to be rough demolition surfaces.

Figure 120. The eastern end of the structure looking south in 2004.

Figure 121. The east wall looking east in 2004.

Figure 122. The eastern end of the ornamental structure from above in 2004.

Figure 123. The top of the foundation with the bottom of the east wall to the left in 2004.

Figure 124. The exterior of the ornamental structure looking north in 2004.

Figure 125. Exterior looking north in 2004.

Figure 126. The brick embedded in the southeast corner of the structure at the top of the foundation photographed in 2004.

12.2 Detached pieces of the ornamental structure

Several pieces of the upper part of the wall were loose and became detached during the excavation. The most significant of these were:

Find <1082> (figure 127) consisted of grey mortar with one rounded flint cobble, size 70mm. The thickness varied from 18 to 82mm. The outer (south) face was more or less flat and largely covered with grey and white limescale including a few plant casts. The inner (north) side was more uneven and was covered with yellow limescale. There was no sign of stalactite formation on an overhang at the bottom of the piece. There was yellow limescale on the top which is presumably an old fracture. Size 160mm. 1,015g.

Find <1083> (figure 128) consisted of pale grey mortar with fine black spots. One side and parts of the fractures are covered with yellow limescale. The other side has grey and white limescale. In places the white appears to rest on the grey. There is a cast of a root on this side. A few – but not all – of the cavities cut by the fracture have yellow limescale in them. Size 120mm. 211g.

The variations in the colour of the limescale are odd and without obvious explanation.

Figure 127. Find <1082> from [CW27]

Figure 128. Find <1083> find [CW27]

12.3 The in *situ* decoration

The following decorative materials were present in the interior of the structure:

Section 1
The green mortar foundation at the east end. This probably contained no decorative material. The piece of red granite or meta-granite on the west side of the foundation appeared to be set in brown mortar. There is a piece of dark brown calcite-like material and piece of grey granite or meta-granite near it, but it is not clear what they are fixed to.

Sections 2 and 4
These upper walls are mostly decorated with large knobbly flints and ferrous conglomerate. There is a scatter of other materials:

Section 2: east wall
- Siliceous limestone, 3 pieces
- Abalone shell, 1 piece
- Grey granite or meta-granite, 1 piece
- Amphibolite, 1 piece

Section 2: south wall
- Siliceous limestone, 1 piece

Section 4: south wall
- Siliceous limestone, 2 pieces

Sections 3 and 5
The western end of the foundations contains:
- Siliceous limestone, 7 pieces
- Red granite, 3 pieces
- Black amphibolite, 2 pieces
- Red and grey marble, 1 piece
- Ferrous conglomerate, 2 pieces

There was a piece of grey granite or meta-granite visible on the exterior of section 3.

Section 6
The brown mortar
- A spiral shell

There is no glass, coral, tropical shells or marble in sections 1, 2 and 4, which are probably the surviving part of the original structure (see section 12.1).

12.4 Key structural fragments

Many fragments of mortar, tile, flint and decorative material were found in the fill of cut [CW37], and there was further material in other contexts. This material was retained if it appeared structurally significant, had limescale on it or included any of the exotic decorative materials described below. A total of 97 special find numbers were allocated for trench CU and 990 for CW. This did not provide a statistically valid sample of the building rubble as a whole, but it gives a good impression of the material and includes the individually significant pieces.

The surviving part of ornamental structure consisted of a green mortar foundation which supported a fairly thin wall consisting of ornamental material held together with grey mortar. Many of the broken structural fragments from the fill of cut [CW37] and elsewhere show that this was not representative of the original structure as a whole. Green mortar was rare in the rubble. There was also some very large pieces of ornamental material which had grey mortar on them but were far too heavy to have been supported by the thin walls of the surviving structure.

The deposits in cut [CW37] contained many pieces of peg tile, which often had mortar and limescale on them. This was often on both surface and fractures, and it is clear that the tiles had been embedded in a broken state in structure rather than discarded from a roof. In several case the tile was laid in rough courses.[120] Find CW <362> had three tile courses with two pieces of siliceous limestone on the edge of the mass (figure 129). The tile clearly broken before it was put in the mortar.

[120] CW <276>, <354>, <361>, <362>, <367> and possibly <389>. There are other fragments which contain only one piece of tile but have contact surfaces suggesting that they were jointed to other tiles.



Figure 129. Find <362> from [CW3/5] (the 6 pictures above).

Three layers of roughly-laid broken tiles set in a mass of fairly fine pale moderately hard grey mortar with some chalk flecks. The layers of tile are:

1. A single tile with a full width of 156mm and a surviving length of about 235mm, one square peg hole and about ¾ of another. The tile was broken around the edges before it was set in the mortar.
2. Another piece of tile separated from the first by about 35mm of mortar. Parts of 5 broken tiles are visible around the edges of the mass. There is a piece of flat oyster shell between the underside of one of the tiles and the mortar.
3. Another layer consisting of 3 broken pieces of tile sizes 95, 70 and 105mm.

There is also a piece of tile in the mortar between courses 2 and 3.

One edge of the mass has two pieces of siliceous limestone set in the mortar above course 2 and adjacent to course 1. There is also a piece of flint and contact surfaces with 2 or 3 missing flints.

Overall size 370mm. About 5kg.

Figure 130. Find <364> from [CW3/5]
Ferrous conglomerate. A lump of mortar on one side with a curved contact surface from a large knobbly flint. Yellow limescale on the contact surface. Size 300mm. About 9.5kg.
The ferrous conglomerate consists of a mass of ill-sorted pebbles ranging from a few millimetres up to 60mm. Some of the flint is fully rounded pebbles while others are quite angular. It appears that the gravel was deposited suddenly from fast-flowing water.

Figure 131. Find <365> from [CW3/5]
Grey mortar with at least four flints, two of which are sub-angular size 110 and 50mm and two with sharp fractures both size 90mm. A piece of chalk size 70mm. A piece of ferrous conglomerate size 250mm including a large sub-angular flint size 120mm. A more or less rectangular piece of Wealden marble size 75mm. Limescale on the flint and mortar. Overall size 280mm. About 6kg.

Figure 132. Find <1000> from [CW101]
Large knobbly flint with a mass of ferrous conglomerate size 220mm mortared to one side. A piece of red granite with a visible size of 90mm next to the conglomerate. A piece of amphibole size 70mm in the opposite side of the flint to the conglomerate. A second small piece of amphibole near it. Three scraps of abalone (?) shell on the side of the flint near the red granite or meta-granite. A scrap of red ceramic near the ferrous conglomerate. Yellow and grey limescale on the mortar and flint. A ferrous conglomerate cobble and several pebbles have become detached. Overall size 330mm. About 13kg.

Figure 133. Find <366> from [CW3/5] (the four pictures above)

A slab of Wealden marble about 55mm thick with a size of at least 220mm embedded in a mass of greenish and grey mortar with randomly distributed decorative material on both sides. The mortar on one side of the slab includes:

- Piece of brown siliceous limestone size 50mm.
- Piece of red and grey granite-like metamorphic rock size 50mm.
- Three pieces of ferrous conglomerate sizes 130, 35 and 15mm.
- Scrap of amphibole, size 15mm.
- Piece of purple rock with marked cleavage (probably schist) size 45mm.
- Two scraps of ceramic building material.

On the other side:

- Three pieces of amphibole, sizes 50, 30 and 10mm.
- Piece of ferrous conglomerate size 150mm.
- Rounded flint size 140mm.

On both sides the mortar has several rounded and angular contact surfaces, all with limescale on them. Much grey, brown and yellow limescale, which has often formed in cracks. The mortar has several contact surfaces, probably with flint, all with limescale on them. Overall size 350mm. About 12.5kg.

Figure 134. Find <2017> from [CW216]
A brick with rough Tudor-type finish, height 62mmm, width 102mm,. A cockle shell and a piece of black amphibole size 100mm mortared to the top. A sub-angular flint and a piece of siliceous limestone attached to the broken end. Some tufa which probably formed in the culvert and contained a piece of twig – it is not siliceous limestone. Yellow limescale on the brick and mortar. Overall size 210mm. 1,901g.

Figure 135. <256>from [CW7]
Brick, mortar and red siliceous limestone. Most of the mortar is light grey, chalky and unusually coarse and contains several scraps of brick. Some mortar is darker grey and not spotted with chalk. Limescale on the mortar. The brick is soft red with some patches of lighter clay. The dimensions and finish are indeterminate. Size of siliceous limestone 90mm. Total size 140mm. 489g.

13. THE ORNAMENTAL STRUCTURE: DECORATIVE MATERIALS

The fill of the cut [CW37] above culvert section 2 contained many pieces of decorative material. Further material was found in the stream bed, in the deposits south of the ornamental structure and elsewhere.

Every piece of the most exotic materials – the metalwork, Palissy-type ceramics and coral – was retained and given a special find number. The metamorphic rocks, marbles, ferrous conglomerate, siliceous limestone, geodes and other unusual rocks were also retained and given special numbers. A few pieces may have slipped through the net but the catalogue is a complete, or almost complete, record of what was there. The flint was only retained selectively. It has been impossible to fully quantify the material. Counting can be misleading as the pieces are of varying size and some materials, such as amphibolite and ferrous conglomerate, break more easily than others. Accurate weights are equally impossible as may pieces have mortar attached to them and some are in clumps which include several materials.

The finds from trenches CM and CN shows that some demolished materials were dumped in watercourses. Such material might have come from particular parts of the structure – for example the top – which would produce a bias in the excavated finds. Some materials may have been salvaged when the structure was demolished. It is, however, clear that some of the surviving materials were more common than others and the figures given below are indicative rather than exact quantifications.

The full catalogue is a very long document and is not included here. The sections below generally illustrate key pieces and examples. Complete catalogues are only given for the Palissy-type pottery and the metalwork. In these three cases we have included finds from other trenches around Carew Manor to give the fullest possible view of these unusual but very small groups of material.

13.1 Flint

The larger fragments of ornamental structure appeared to contain two distinct groups of flints. The first consists of large and knobbly flints, while the second consists of sub-angular cobbles around 100mm across which must have come from gravel (figure 136). The first group appears to have been essentially decorative: the second served as filler in the mortar.

The large knobbly flints decorated the inside of the surviving structure. There were also many large knobbly flints in the fill of cut [CW37] which had clearly been part of the structure. Their unrounded shape shows that that they had been quarried rather than extracted from river gravel. This material would have been readily available within the local area. The site is at the foot of the dip slope of the North Downs which consists of upper chalk which contains a great deal of flint. The chalk has long been quarried for lime and building material and it would be easy to have the most interestingly shaped flints set aside for use in the garden. The nearest chalk pit was on the south side of Croydon Road only 400m from the site.[121] This may have been the source of the flint, but there were many other pits in the area.

[121] TQ 2950 6492.

Figure 136. Find <339> from [CW3/5]
Knobbly flint with a few missing flakes. Length 348mm. Patch of mortar on one side with a piece of amphibole, size 45mm. The mortar and much of the flint covered with yellow limescale. Some white limescale on the flint. Overall size 348mm. 2,972g.

13.2 Metamorphic rocks

This material falls into three broad groups which can be summarised as:

- Gneiss and meta-granite or granite.
- Black amphibolite.
- Schist.

Some pieces contain both gneiss and amphibolite suggesting that these two types of rock were from the same source. The schist is of varied colour and texture and generally does not overlap with the other two types. Most of it probably came from separate outcrops although they may have been in the same general area. All are products of high intensity metamorphism.

	Pieces	Median size (mm)	Largest (mm)	Total weight (g)
Amphibolite	78	52.5	220	20594
Gneiss & granite	116	57.5	240	28884
Schist	39	45	90	1426
Other	4	52.5	70	227

The material showing the number of pieces of each type, the median size of the largest piece and the total weight. Pieces joined to other materials are not included.

	Weight (g)	
Amphibolite	20594	40%
Gneiss & granite	28884	56%
Schist	1426	3%
Other	227	0.5%

The material by weight with percentages of the total.

	Pieces	Surface	Doubtful surface
Amphibolite	78	0	0
Gneiss & granite	116	21	4
Schist	39	3	0
Other	4	0	1

Pieces with clear and doubtful boulder or pebble surface.

The pieces of gneiss / granite tended to be larger, but this may simply be the result if the relative friability of the rocks.

A number of pieces had areas which were clearly boulder or pebble surface rather than fractures. These were most common on the gneiss / granite with a few examples on the schist and none of the amphibolite. This may, however, simply reflect the relative friability of the different rocks. The natural surface two pieces of granite appear to have been subjected to a significant amount of chemical weathering.[122]

The boulder surfaces are rounded rather than angular, suggesting that they have been tumbled in water in a river or the sea rather than ground down by a glacier. The larger pieces are big enough to suggest a significant water velocity.

The material also seems to have been collected from river or beach deposits rather than freshly quarried, although this is much less certain for the amphibolite. The varied nature of the rock suggests that it came from a wide catchment rather than a single outcrop.

High-grade metamorphic rocks are commonly found in the Scottish Highlands and many parts of mainland Europe. However, they are uncommon in England and Wales, where the only localities are the Start Point area in Devon, the Lizard, Anglesey and north-west Wales. They are also found in Brittany, Spain, Scandinavia, parts of the eastern seaboard of North America and elsewhere. The source of the Beddington rock has not been located.

Figure 137. Find <18> from [CW4]
Pink gneiss with traces of limescale or mortar.
Size 170mm. 2,254g.

[122] Finds CW <180> and CW <2314>.

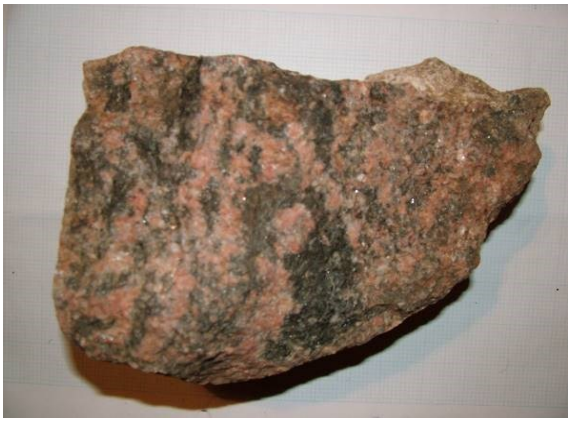


Figure 138. Find <15> from [CW3]
Pink granitic gneiss. Part of a boulder. Mortar and limescale on the surface and one of the two fractures. Size 180mm. 2,079g.

Figure 139. Find <17> from [CW4]
Very coarse meta-granite, possibly largely feldspar, with some dark mica, possibly some quartz, with a mass of mortar which contains a few black grains. There is a small piece of rusty material on the fracture, probably ferrous conglomerate. Some limescale on the mortar. Size of meta-granite 80mm. Overall size 110mm. 405g.

Figure 140. Find <14> from [CW4]
Pink and black granite or gneiss with mortar and limescale. Size 90mm. 375g.

Figure 141. Find <75> from [CW10]
Pink granite or meta-granite. Size 55mm. 61g.

Figure 142. Find <78> from [CW10]
Pink granite. A little mortar. Size 65mm. 82g.

Figure 143. Find <99> from [CW8]
Pink granite. Limescale and possible mortar. Size 100mm. 629g.

Figure 144. Find <131> from [CW30]
Pink meta-granite. Probably metamorphic rather than intrusive. Size 80mm. 133g.

Figure 145. Find <171> from [CW3/5]
Pink granite. One smooth surface probably natural. Scrap of limescale or mortar on the fracture. Size 55mm. 81g.

Figure 146. Find <2186> from [CW215]
Gneiss with bands of black amphibole. Traces of mortar or limescale on the fractures. Size 70mm. 112g.

Figure 147. Find <2171> from [CW230]
Black amphibolite with limescale and a little mortar on the fractures. Size 45mm. 18g.

Figure 148. Find <8> from [CW5]
Schist with mortar and doubtful limescale. Size 85mm. 147g.

Figure 149. Find <32> from [CW7]
Red schist. Mortar on one end and traces of limescale. Size 65mm. 70g.

Figure 150. Find <42> from [CW7]
Red-brown schist. Size 45mm. 27g.

Figure 151. Find <123> from [CW7]
Schist with scraps of mortar or limescale. Size 60mm. 69g.

Figure 152. Find <2056> from [CW215]
Grey schist with some mortar on fracture. Size 75mm. 75g.

Figure 153. Find <2290> from [CW215]
Grey schist. A flat circular pebble. Size 55mm. 44g.

13.3 Other minerals and rocks

The deposits around the decorative structure included several pieces of hard rock which were not metamorphic and not of local origin.

Figure 154. Find <68> from [CW8]
Heavy dark purple sandstone? consisting largely of clear and milky quartz in a red matrix. Scatter of sparkling flakes – probably mica. A scatter of rounded quartz and other pebbles up to 15mm. A little mortar and white calcite on the fractures. Size 50mm. 54g.

Figure 155. Find <88> from [CU20]
Coarse porous ill-sorted water laid sandstone. Lots of rounded quartz grains with pieces of white vein quartz. Dark red matrix. Grey mortar or limescale on one fracture. Size 70mm. 64g.

Figure 156 (left and below). Find <1002> from [CW101]
Angular piece of conglomerate with angular and round stones in a very hard red matrix. Mortar on one side. Size 230mm. About 3.5kg.

Figure 157. Find <1065> from [CW102].
Ferrous sandstone? Very hard dark iron brown sandstone with a scatter of larger quartz to 5mm. Size 45mm. 67g.

13.4 Ferrous conglomerate

This is also known as gravel-stone or ferricrete. It consists of rounded and angular gravel of very mixed size with some sand, all cemented together with a brown rust-like deposit. It was the main component of 158 special finds with a total weight of 96kg, and was also a present in 63 pieces composed of mixed materials. Ferrous conglomerate and flint were the most common decorative materials in the surviving structure, where they appear to have provided the background to the other decorative elements (figures 112, 113 and 121). It was one of the most common decorative materials in the fill of the cut [CW37], and a few pieces were also found in the other deposits around the structure and in the culvert gravel.

The pieces were of very mixed size. The largest weighed about 24kg and had a size of 360mm. Two other pieces weighed over 10kg and a further 10 pieces weighed over 1kg. The stone was fairly friable so many smaller pieces may have been part of larger fragments when in the structure.

Ferrous conglomerate can be found in the outside walls of various medieval buildings in the London basin:

Place	**Grid ref.**	**Source**
Chertsey Abbey barn	TQ043672	Visit.
Cobham church	TQ107597	Visit.
Old Woking church	TQ020568	Visit.
Send Church	TQ018543	Visit.
Thames Ditton, St Nicholas	TQ160672	Visit.
Warlingham church	TQ355589	Visit.
Woking Palace	TQ028570	Poulton 2016.
East Bedfont church	TQ085736	Robinson 1988.
Harlington church	TQ088782	Robinson 1988.
Harmondsworth Great Barn	TQ056778	Robinson 1988, visit.
Harmondsworth church	TQ056778	Robinson 1988, visit.
Horton church	TQ014758	Robinson 1988.
Littleton church	TQ070686	Robinson 1988.
Wrexham Green church	SU992815	Robinson 1988.
Waltham Abbey, walls east of church.	TL381006	Visit
St James Friern, Barnet	TQ272929	Robinson 1988

Most of the material is found on or close to the river gravels along the Thames, Wey and Lee. There is a noticeable gap in central London and the lower and middle Wandle Valley. There is one block of conglomerate in Warlingham church which was heavily restored in the 19th-century replacing much of the old external fabric. Conglomerate, some ferrous, but mostly siliceous, was found on the site of the East Surrey Water Works at Purley.[123] The surviving examples appear to be confined to medieval buildings few of which have survived in and around central London. However, Robinson says that in 1988 ferrous conglomerate was not known from excavations in London so it is possible that the distribution gap is real.[124]

[123] Dewey and Bromhead 1921 p. 63. In the valley bottom west of Purley Station about TQ 3126 6144. Tesco's supermarket is now on the site.
[124] Robinson 1988.

An *in situ* deposit of ferrous conglomerate was seen at Beddington when a flood relief channel was being excavated in 1990. It was about 180m north of Beddington Park at about TQ 2942 6596. The material appeared to be located at the boundary between earlier and later gravel deposits. The full extent of the deposit is unknown.[125] There is no evidence that it was ever quarried.

Figure 158. Find <105> from [CW7].
Ferrous conglomerate with traces of mortar and limescale. Size 120mm. 661g.

13.5 Siliceous limestone

This consists of soft tufa-like limestone with varying amounts of silica in irregular masses. The colour ranges from light grey or pale brown to a dark iron-red or brown. Forty-seven separate pieces weighed 22kg. The rock was also present in 36 finds composed of mixed materials.

The largest piece had a size of 330mm and a weight of about 7kg. The median size of the separate pieces was 90mm.

This type of rock is commonly found around Paris where it is used is used as a course building stone. It was, for example, in the market hall at Versailles and as 'tufa' decoration in the garden of the chateau.

Figure 159. Find <87> from [CU20]
Siliceous limestone with white with mortar on parts of the fracture. Size 90mm. 83g.

[125] Nielsen 1990 p. 13-14 and plans 1, 6 and 7.

Figure 160. Find <2160> from cleaning the ornamental structure [CW27]
Siliceous limestone with a patch of grey charcoal-rich mortar on the fractures. Size 145mm. 2,490g.

13.6 Geodes

The geodes have a hematite-red surface and contain a mixture of quartz and calcite. They are found on the Mendips where they are known as potato stones. There are other possible sources. Similar nodules are found in hematite deposits in carboniferous limestone especially if it was formerly overlaid by red Permian sandstones.

All of this material was retained. There was a total of eight pieces. Five of these had a total weight of 623g. The other three were bonded to a single mass of very hard pale grey mortar.[126] There was none in the surviving ornamental structure. One piece was found in layer [CW25], which was one of several small deposits deep down in the north side of trench CW. These contained some fragments of ornamental material and may have been deposited in the early 18th-century. The other four pieces and the mass of mortar came from the culvert bed and surface deposits. The mortar looks fairly recent and it is possible that they had been reused in the 19th-century summer house described in section 13.10 below.

[126] Find CW <1003>.

Figure 161. Find <54> from [CW8]
Half a geode 50mm in diameter. Exterior covered with thin iron-red layer 1 to 2mm thick. Within this there is a zone of smaller sugar-like crystals. Interior has larger irregularly arranged crystals of milky calcite and clear quartz. There is a patch of mortar on the exterior. 118g.

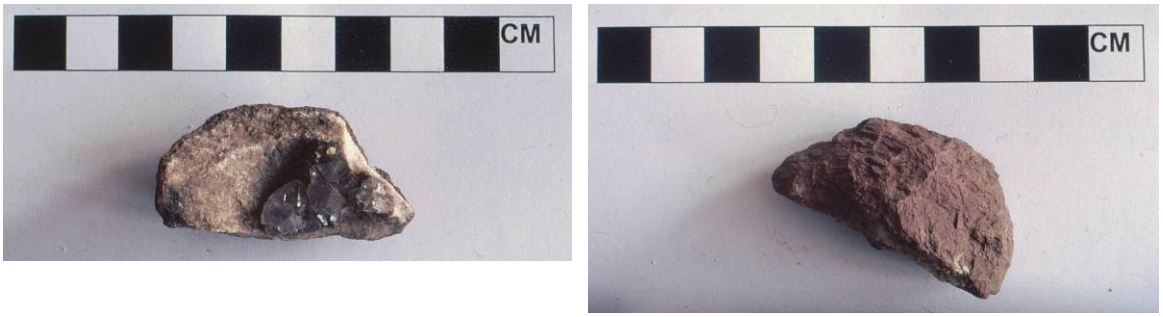


Figure 162. Find <418> from [CW25]
Part of a geode perhaps once about 50mm diameter. Fine fairly soft dark red exterior lined with about 5mm of fine-grained white material – probably quartz. Within this there is a surviving group of larger clear crystals. Size 45mm. 21g.

13.7 Pink, grey and white marble or limestone

This consisted of marble or fine polishable limestone which was generally red or pink, or occasionally red and grey. Most pieces contained white veins. It is similar to the Belgian marbles that were often used in Elizabethan elite tombs. All this material was retained. There were 12 pieces with a total weight of 1,378g. Two of these with a weight of 354g were red and grey.

There was a piece of red and grey marble in sections 3/5 of the ornamental structure (figure 114). Three separate pieces came from contexts of early date which contained other

decorative fragments.[127] The rest were found in later contexts.

Several pieces have a smooth surface with mortar on the surface and fracture which suggests that the stone comes from some demolished structure or perhaps waste from a mason's yard.

Figure 163. Find <19> from [CW4]
Red marble or limestone with thin calcite veins. A curved weathered surface possibly part of a carving. Mortar or limescale on the surface and fractures. Size 70mm. 129g.

Figure 164. Find <128> from [CW33]
Red limestone with patches of grey. One smoothed face. Limescale or mortar on the surface and fractures. Size 55mm. 34g.

Figure 165. Find <493> from [CW7]. Triangular piece of red marble with two smoothed surfaces at an angle of 46 degrees and a third at right angles to them. Much white limescale which overlays yellow limescale on the surface and fracture. Size 105mm. 504g.

[127] Find <128> from [CW33], <262> from [CW20] and <1029> from [CW116].

Figure 166. Find <1029> from [CW116] and [CW117].
Pink marble with thin white calcite veins. Heavily weathered curved surface with a trace of mortar and a thin but widespread deposit of probable yellow limescale. Flat 'base' with white calcite which may be either geological or more recent limescale – we suspect the former. Three main fractures, two largely clean, one on a calcite vein with some limescale. Size 55mm. 94g.

Figure 167. Find <2022> from [CW215]
Mottled red and grey marble cut to form a point. The tip is missing but extrapolation of the sides produces an angle of 23 degrees. Some limescale and sand on the fractures. Size 125mm. 320g.

13.8 Wealden marble

The gravels in the bottom of the culvert contained many pieces of shelly 'marble', probably Paludina limestone from the Weald Clay in Surrey, Sussex or Kent. There were a few pieces in the fill of cut [CW37] and in the early-18th-century deposits to the south of the ornamental structure. The material falls into three groups:

- Thin slabs 17 to 24mm thick with one smooth and one rough side, often with bevelled edges. Three joining pieces could be reconstructed as three quarters of a square slab with sides 300mm long.[128] The smooth surfaces of many of the pieces are partly covered with soft white limescale.

[128] Finds <11>, <12> and <17> from [CU20]

- Thick slabs 63 to 70mm thick with one polished and one flat but rough side. Where the edge is preserved it is a segmental curve and has a polished surface except where the roughness of the side extends onto the edge. The rough surfaces appear to have been worn by water, as the soft areas have been worn more than the hard ones. One piece has a preserved corner (figure 168).
- Pieces of intermediate thickness.

The following separate pieces were found:

	Number	Weight (g)
Thin	11	4091
Thick	8	9839
Intermediate thickness	2	381
Uncertain thickness	14	5147
Total	35	19458

Twenty-nine (82%) of these pieces (95% by weight) came from the silt in the bottom of the culvert in trenches CU and CW.

There were also two pieces of Wealden marble in clumps with other materials.

Three pieces came from below the gravel walk in the south end of the trench.[129]

The thin square paving slab had very soft limescale on about a third of the smooth side and a lesser amount on the edges and fractures. This was different from the harder material found on the walls of the culvert and on many pieces of rubble. The soft limescale is likely to have been deposited rapidly in an environment where there was a significant amount of evaporation although where exactly is unclear.[130]

The external angle on the thick slab CW <2140> (figure 168) is consistent with it having come from steps, a plinth or perhaps a cascade. The simple segmental moulding is unusual. There is nothing to suggest that it was a component of a sequence of mouldings which continued above or below it, so it is not really either gothic or classical. Wealden marble was used in some 16th-century tombs. Jane Lumley's tomb chest, in the Lumley chapel at Cheam, rests on a slab of shelly limestone, and it also forms the base of the tablet which is set on the wall on the top of the tomb. The stone probably also forms the base of John Lord Lumley's tomb and that of his second wife Elizabeth Darcy. The marbling on the columns of the early-17th-century timber staircase at Knole in Kent may also imitate Wealden marble.

[129] Finds CW 1047, 2272 and 2273. Fossiliferous stone slabs were used to floor an open loggia which was added to the south side of the west end of the south wing of the house at some point in the 18th-century. However, an examination of two of the pieces now in Sutton Museum Collection showed that they were different. They were not Wealden marble and did not have a smooth surface. See Phillips and Burnett 2016 vol. 1 p. 107. Stone blocks SB13 and SB15.
[130] Ford and Williams 1989 p. 331.

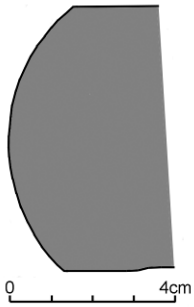


Figure 168. Find <2140> from [CW215] left and below.
Thick fossiliferous marble slab. 68mm thick with two rounded edges meeting at a right-angled corner. Maximum surviving length 285mm, surviving width 155mm. About 4kg.

13.9 The coral

Several pieces of coral were found in trench CW, one in trench CU and two pieces were found in CN on the centre of the east lawn (see section 10.4 above).[131]

Figure 169. Find <41> from [CU20]
Scleractinian Agaricia
Curving sheet-like piece of coral. This is of Caribbean origin. Size 80mm. 71g.

[131] I am very grateful to Dr Brian Rosen for the identification of some of these corals and their habitat.

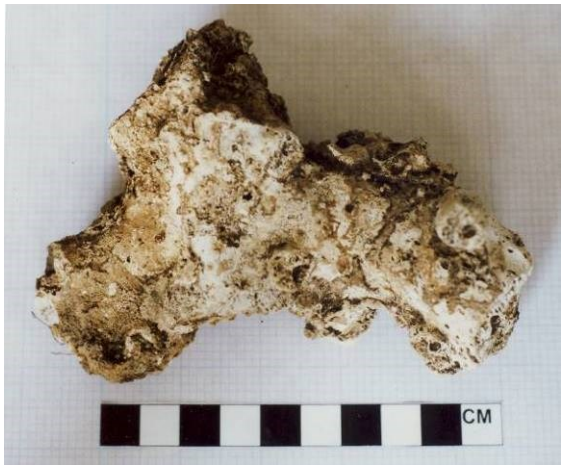


Figure 170. Find <5> from [CW5]
Scleractinian Dendrophylliid
Branch coral with linier pattern on the surface. Much limescale on the surface. Size 120mm. 293g.

Figure 171. Find <29> from [CW7]
Scleractinian indet
Sheet like coral with linear patterns on the surface. Size 40mm. 7g.

Figure 172. Find <77> from [CW10]
Scleractinian Porites
Branch coral with a star-like pattern on the surface. Traces of mortar and probable limescale. Size 100mm. 87g.

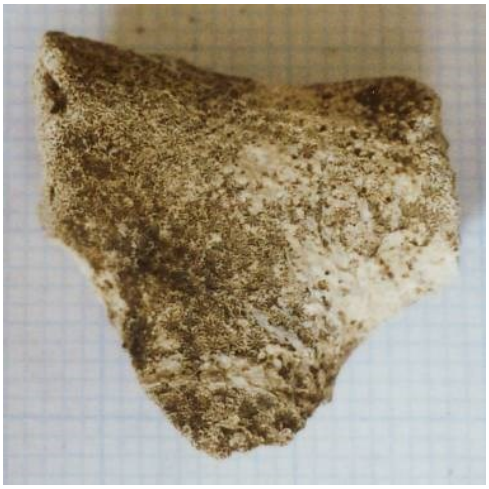


Figure 173. Find <79> from [CW10]
Scleractinian Porites
Branch coral with a star-like surface pattern similar to <77>. Limescale on the surface. Size 45mm. 157g.

Figure 176. Find <452> from [CW8]
Scleractinian
Scrap of branch coral embedded in mortar with many charcoal flecks. Size 20mm. 3g.

Figure 177. Find <1005> probably from cut fill [CW37].
Scleractinian
Branch coral with small bumps of the surface with a hole in the centre like a minute crater. A little white limescale on the surface. Size 58mm. 17g. From the soil under a large flint projecting from the west end of the south wall of the ornamental structure [CW27].

Dr Brian Rosen examined some of this material and commented:

> The corals do not seem to represent an ecological suite. In particular, dendrophylliids usually live in relatively deeper darker water habitats, not necessarily in the tropics. In fact, of the known species of Dendrophyllia recorded from the Atlantic region (including Caribbean), only one relatively rare one occurs in depths of less than 70m or so. Reef corals like Agaricia, on the other hand, live on, or close to, coral reefs in warm shallow tropical waters, generally in depths less than 70m, perhaps 100m at most. This suggests to me that the Carew Manor corals were not necessarily collected all at the same time. More likely, they came from different habitats, and possibly even different geographical locations. The deeper water origin of most dendrophylliids also makes one wonder how, back in 1720 or so, such specimens were recovered. Deeper water dredging and trawling are generally more recent techniques.

The material is therefore highly problematic, especially as the piece of deep-water Dendrophyllia coral CN <11> (figure 67) came from beneath the chalk walk foundation in trench CN, an apparently very secure early 18th-century context. Finds <77>, <79> and <41> came from [CW10] and [CW20] which were 18th-century dump deposits containing some decorative materials from the ornamental structure.

Find <41> is a Caribbean reef coral. There are two known connections between Sir Francis Carew and this area. The first are the voyages of Sir Walter Raleigh who married Sir Francis Carew's niece Bess Throckmorton. The marriage took place in secret probably in November 1591 when Bess was pregnant.[132] It is not known when the relationship started, but it is unlikely to have been before November 1584 when Bess became a member of Queen Elizabeth's privy chamber. Raleigh was a prominent courtier and, in 1587, he became captain of the guard.[133] Raleigh had opportunities to obtain material from tropical sources both before and after his marriage.

Raleigh sponsored the Virginia colonising expedition of 1585 which included the scientist Thomas Harriot and the artist John White who were sent to record the people, landscapes and wildlife encountered. The expedition went out via the Caribbean and visited Puerto Rico. Harriot and White may have collected specimens, but much of their material was lost as they left Virginia.[134]

The second connection is the voyage of Thomas Throckmorton, the son of Sir Francis's sister Ann. On 25 May 1589 Thomas Throckmorton made his will as he was planning to go on a sea voyage with John Chidley.[135] Andrews *Elizabethan Privateering* provides an account of the proceedings:

> Another amateur was John Chidley, a young gentleman of Devon, born in 1565 into an old and well connected family. Like others, Chidley was inspired by Drake's famous circumnavigation to venture by the Magellan Straights into the South Sea and return by the East Indies. He was not driven by poverty or disgrace to undertake this gamble … In financing the voyage he obtained the help of a number of investors, including several merchants, but essentially it remained Chidley's own project, in which he and his chief partner, Francis Manby, held the decisive last shares. Both sold the greater part of their estates for the adventure. Three ships – the *Wildman* (300 tons), the *White Lion* (340 tons) and the *Delight* (alias the *Robin*, 120 tons) – and two pinnaces (one of them called the *Wildman's Club*) made up about 800 tons of shipping – a formidable force for a private venture. Expenses in the fitting out were excessive. The *Robin,* which was acquired from the Bristol shipowner William Walton, was probably worth far less than the £900 bill of adventure that Chidley gave for her; and the 25-ton *Wildman's Club*, which had been Paul Bayning's *Susan's Handmaid*, cost the astounding sum of £600. The *White Lion* alone, fully furnished and victualled, represented a capital outlay of four or five thousand pounds, and if the other vessels were as lavishly provided the whole expedition must have cost well over £10,000.
>
> The fleet left Plymouth on 5 August 1589, Chidley commanding the *Wildman*, Thomas Polwhele the *White Lion* and Andrew Merrick the *Robin*. The last was separated from the fleet somewhere between Cape Blanco and the coast of America. Nevertheless she kept her course to the Magellan Straights and only turned back after

[132] Rowse 1962 p. 160.
[133] Rowse 1962 p. 104 and 144.
[134] Hulton 1984 especially p. 12 and plate 4.
[135] Sutton Archives 25/3/11.

> six weeks of encroaching despair, having lost thirty-eight out of a complement of ninety-one, the remainder threatening mutiny. Finally only six remained alive to bring their ship to the coast of Normandy, where she was wrecked for lack of an anchor. Meanwhile the other ships were faring little better. Disease spread through the force, and in November, off the Guiana coast, Chidley and Polwhele both died. Soon afterwards Benjamin Wood, a notable seaman in his time, brought the *White Lion* home. The *Wildman* and her *Club* then made for Trinidad, where the crews stayed some time recruiting their healths, and here it was that a few of them, led by Abraham Kendall, stole away with the pinnace, sailed it to Barry in Wales and there sold it. The *Wildman* herself returned last, about midsummer 1590, and the disasters of the sea now gave place to salvage operations in the Admiralty Court, where investors set forth their financial claims against the dead man's widow.[136]

The will suggests that Throckmorton had invested £500 in the venture. Rowse says that he disappears about this time and it seems likely that he died on the expedition.[137]

Neither expedition seems a likely source of deep-water corals.

13.10 Shells

A small quantity of shell was found, mostly in trench CW. The most common shells are listed in the table below. This is a slight understatement as some shell was incorporated in pieces with mixed materials so they could not be individually weighed. A few pieces were also misplaced during the finds processing. This may slightly alter the proportions but does not affect on the overall picture.

Shell type	Pieces	Weight (g)
Abalone	41	114
Cockle	52	120
Oyster	59	356
Snail	57	53
Other	31	82

It is unlikely that the snails were part of the ornamental structure: they are more likely to have been inhabitants of the culvert and the garden.

Oyster shells have been found in many of the archaeological trenches around Carew Manor and it is likely that they were brought on site as food.[138] They were also used as packing between other building materials. There appear to be two instances of this within the material from trench CW. One is the shells set upright in the floor of the culvert which may once have been packing between flooring slabs (section 16.1.2 especially figures 228 to 230). The other was a shell set in a course of tile and mortar in find <CW362> (section 12.4). There is no evidence that oyster shells were used decoratively within the ornamental structure.

Cockle shells have also been found in other trenches around the site and they may also have been eaten. However, one had mortar on it and another was cemented to a brick, which is not typical of the surviving sections of the ornamental structure (figure 134).[139] On balance it seems likely that cockles were not part of the decoration of the original structure.

[136] Andrews 1964 p. 67-8.
[137] Rowse 1962 p. 118
[138] See for example Phillips and Burnett 2016 vol. 2, p. 185-6 and Phillips 2016 p. 180.
[139] Finds CW <3> and <2017>.

This leaves the abalone as the only common ornamental shell. There was one on the surviving fragment of ornamental structure, and scraps were present with other decorative materials in find CW <1000> (figure 132). They are found today in Cornwall, the Channel Islands, the Atlantic coast of Southern Europe and elsewhere. They are eaten and the shells are collected and used for various ornamental purposes.

There are a number of other shells which are less common in the deposits. Some are too worn and fragmentary to be readily identifiable.

Blue mussel. Five pieces weighing 7g. They have been found in other excavations around the site and it seems unlikely that they have any specific connection with the ornamental structure.

Barnacle. Layer [CW10] contained three pieces from the sides of a large barnacle while [CW20] produced 6 side pieces and three bases, the total weight being 13g.[140] The two contexts were dumped deposits to the south of the ornamental structure below the gravel walk and of 18th-century date. Both contexts – particularly [CW10] – included other decorative material.

Bolinus brandaris. Three small shells are all broken and worn so the identification is doubtful. One from context [CW3/5] was attached to a mass of mortar, one from context [CW101] was attached to a small slab of mortar and the other from [CU20] was loose but had some mortar on it.[141] Two of these contexts were the fill of the deep cut above culvert section 2, while [CU20] was a water laid-deposit in the bottom of the culvert: all contained 19th-century material. The creature is found in the Mediterranean.

Scallop. There were 11 pieces of scallop shell in [CW10], an 18th-century context which contained other decorative fragments from the ornamental structure.

Whelks. There were four probable whelk shells from three finds. One – possibly a dog whelk – was found in culvert deposit [CW215]. It was attached to a fragment of a slab of mortar which contained scraps of decorative rock. The second find consisted of two whelk shells attached a slab of hard modern-looking cement. These came from topsoil deposit [CW1]. The third find was a single shell also attached to hard modern-looking cement. The third was found in trench CU but was unstratified.[142] Two of these finds were certainly fairly modern and the third came from a recent context.

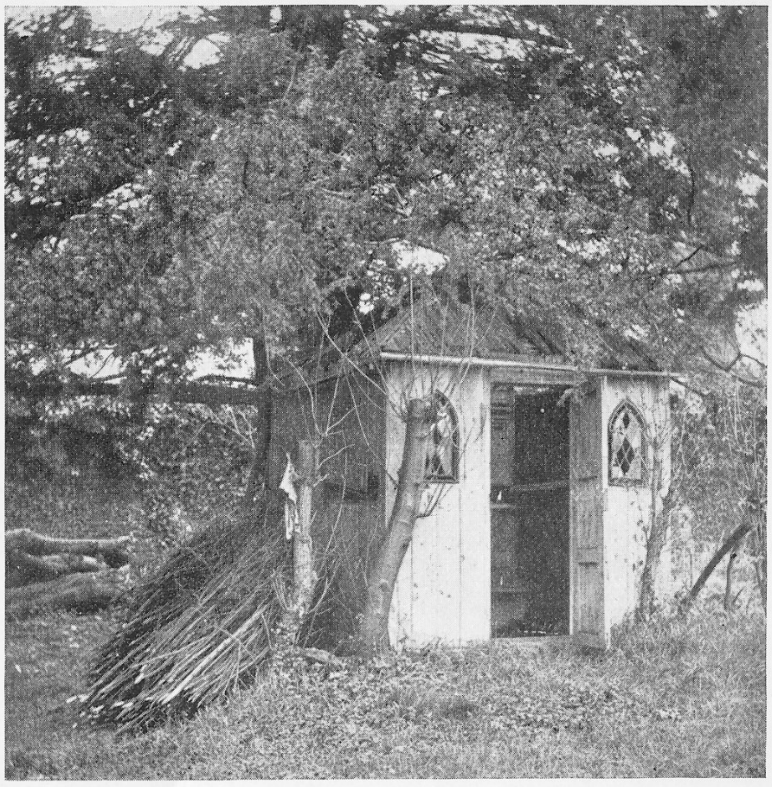
There were several other thin slabs of mortar with pieces of shell and often scraps of other decorative material. Two were found in [CW215] – the deposits in the culvert and two in the fill of the large cut above culvert section two – all recent contexts.[143]

The pieces fixed with modern cement were clearly not part of the ornamental structure and appear to be of relatively recent date. Thomas Bentham's *History of Beddington* published in 1923 says:

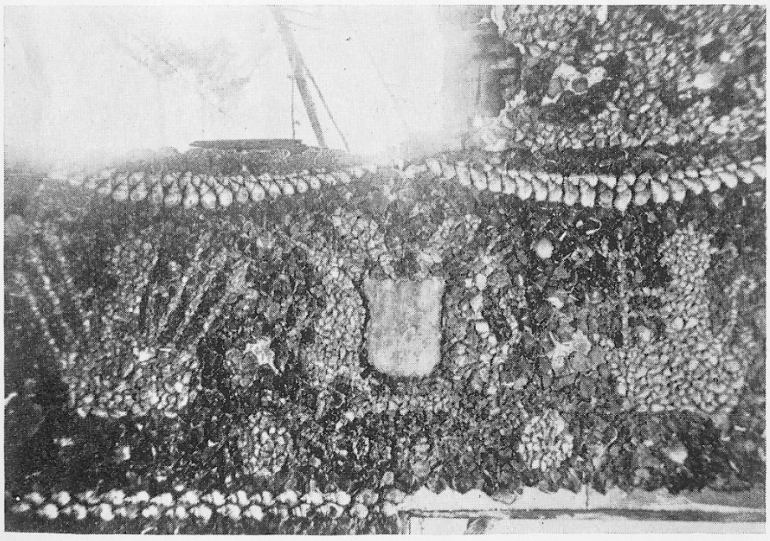
> There was until recently a summer-house there [the garden], lined with a kind of mosaic work in shells, in the panels of which are to be seen the arms of the Carews. It was said to date from Sir Francis Carew's time, but I should not like to vouch for that; at all events it was very old and worth preserving, and should not have been allowed to fall into decay through neglect.[144]

[140] Finds CW <436> and <438>.
[141] Finds <343> from [CW3/5], <1208> from [CW101] and <61> from [CU20].
[142] Finds <2167> from [CW215], <385> from [CW1] and <93> from CU and unstratified.
[143] Finds CW 1208 from [CW101], <2173> from [CW230], <2275> and <2276> from [CW215].
[144] Bentham 1923 p. 15-6.

He includes two photos of the structure which show that it was not Elizabethan (figure 179). The pointed windows would be consistent with a date in the early 19th-century. The view of the interior shows what appear to be lines of whelk shells above the coat of arms. The location of the building is not certainly known. It appears to have a wall behind it but there are various walls around the garden so this is not a major limitation. The building does not appear on the Ordnance Survey maps but may have been considered too small to include.



EXTERIOR OF OLD SUMMER-HOUSE (now gone).



INTERIOR OF OLD SUMMER HOUSE SHOWING SHIELD AND MOTTO OF CAREWS WORKED IN SHELLS.

Figure 179. The summer house from Thomas Bentham *A History of Beddington*, 1923.

13.11 Glass waste

There were a few small pieces of green, black and blue glassy material in the deposits around the ornamental structure. Three pieces have been examined by David Dugworth then of English Heritage. These were:

Sample	Find	Context	Description
1	<33>	[CW7]	Cream-coloured ceramic material with adhering green glass
2	<57>	[CW8]	Pale blue to grey vesicular and brittle vitreous material
3	<117>	[CW20]	Opalescent white to pale green vitreous material

He reported:

> All three samples are fragments of glass-working waste. Sample 1 comprises a glass working crucible which has undergone extensive vitrification and reaction with adhering glass. Samples 2 and 3 are fragments of two different types of glass which have undergone devitrification. Devitrification occurs when glasses are maintained at high temperatures for long periods of time. The types of glass represented were manufactured in Britain from the late 16th-century into the 19th-century. Neither of the two types of glass represented were manufactured in Britain prior to 1567. Sample 2 is a type of glass which was widely used for the manufacture of vessels, bottles and windows. Sample 3 is a type of glass which was used for the manufacture of vessels and window glass. The composition-of sample 2 is typical for late 17th-century and is unlikely to have been manufactured after the early-18th-century. The relatively high alkali content of sample 3 suggests it was manufactured in London rather than a provincial glasshouse. In terms of the glass composition, the closest parallels are the glasshouses at Old Broad Street (early 17th-century) and Vauxhall (late 17th-century).[145]

There was no glass *in situ* in the ornamental structure. Two pieces came from the fill of the cut above culvert section 2 and one piece (CW <117>) from the deposits south of the ornamental structure and below the walk. These appear to be of early 18th-century date. It is, therefore, possible this was additional decoration perhaps added when the cold bath was created in the early 18th-century (see section 17.2).

13.12 Copper work

13.12.1 The leaf

A small heart-shaped, non-symmetrical leaf of thin sheet copper or copper alloy was found in layer [CW10] (find <80> figure 180). The leaf is 20 mm wide, has a length along the spine of 21.5mm and the maximum length of 24mm. The spine of the leaf is formed by a fold in the metal creating a shallow V section. The leaf has veins which were made by punching on one side producing shallow ridges on the other. The edges of the leaf have been cut and the metal bent slightly to produce serrations. The tip of the leaf has been pinched shut and the metal bent slightly. On excavation about two-thirds of the convex side was covered with pale olive-brown limescale, which was in turn partly covered by grey limescale. The concave side was also largely covered with layers of olive-brown and grey limescale. On both sides the limescale had a network of cracks in it which existed when the leaf was excavated.

[145] Dugworth 2006.

The limescale shows that it had been in river water, or sprayed with river water.[146] Cleaning revealed areas of brown patination which is generally the result of corrosion in wet conditions.

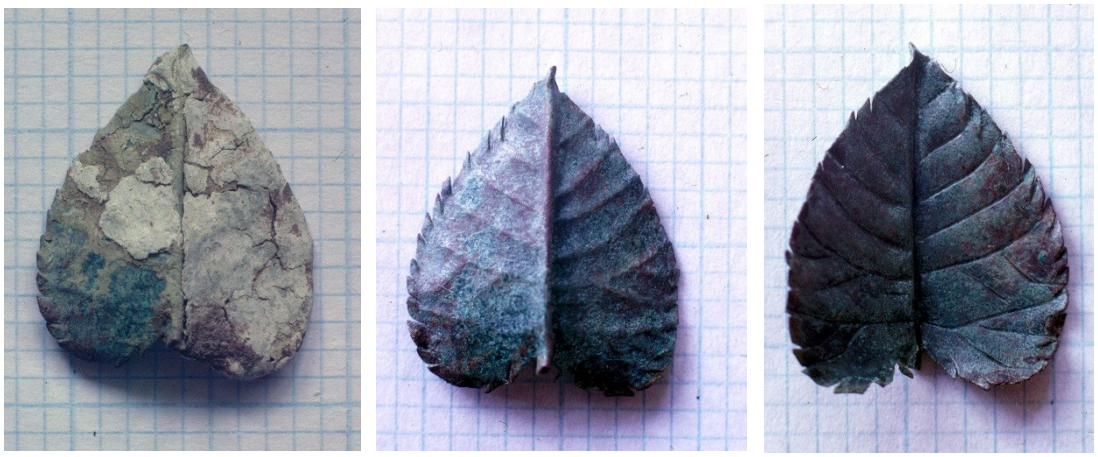


Figure 180. The copper leaf, as found partly covered with limescale and the two sides after cleaning. The graph paper has 2mm squares.

13.12.2 The ring

A tiny copper ring <125> was found in the layer [CW10] to the south of the ornamental structure. It is nearly circular with an internal diameter of 5 to 5.5mm and a thickness of up to 1mm. The ring is not closed and the 'wire' tapers to points leaving a gap of slightly over 1 mm. The outer side of the ring is slightly faceted. It is not clear if this is the original shape or is due to wear or corrosion. It has green and brown patination and traces of a white deposit which might be limescale.

Figure 181. Find <125> from [CW10]. The background is 1mm graph paper.

13.12.3 The fish

A small copper fish (figures 182 to 184) was found in the topsoil to the west of trench CW. This is 50mm long by 25.5mm high and is made from sheet copper, or copper alloy, about 0.25 mm thick. A joint runs from nose to tail along the bottom of the fish and from the back of the head to the tail on the top. The edges are butted together and are presumably soldered,

[146] The Wandle is a chalk stream rich in calcium carbonate. Rainwater does not contain any calcium.

although the job is very fine with no obvious solder on the surface. The fish has a protruding upper lip, a large head and prominent gill covers. The head has some light vertical ribs along the gills. There are two eye sockets, each about 4mm in diameter with 2mm holes at the back probably to secure an eye of glass or some similar reflective material. There is a rectangular opening under the head where the mouth would have been. This was originally 14.5mm wide and 7 mm high. Behind the head the scales are represented by a combination of light diagonal punching and by raised diagonal ribs that were hammered from behind. They run in opposite directions at an interval of about 2.5mm. The punching appears to have been done first on the outside followed by the repousse. The ribs are much more prominent than the punching so that the overall impression is of a fish with protruding ribs rather than scales. A small fin on the top, 9.5mm long and 2mm high, is decorated with light, more or less vertical, punching. There is a 2mm diameter hole in the underside of the fish 22.5mm from the tip of the nose. This corresponds to a small metal bracket, pierced with another hole, inside the fish at the top. This has been distorted by a dent, but the hole in the bracket appears originally to have been located above the hole in the underside of the fish, and presumably fitted onto a pin on which the fish could rotate. When the fish is suspended by a thread through the hole it is very close to balance. The tail is missing and there is no sign of any fixture to attach it. The opening where the tail would have fitted has been somewhat distorted but it appears to have been more or less oval, about 11mm high and 5mm wide. There is no evidence for the form of the tail. If the fish were immersed facing upstream the rectangular mouth would tend to catch the flow and it was presumably intended to oscillate in a current.

Figure 182. Side view of the fish.

Figure 183. Bottom of the fish showing the mouth and the pivot hole.

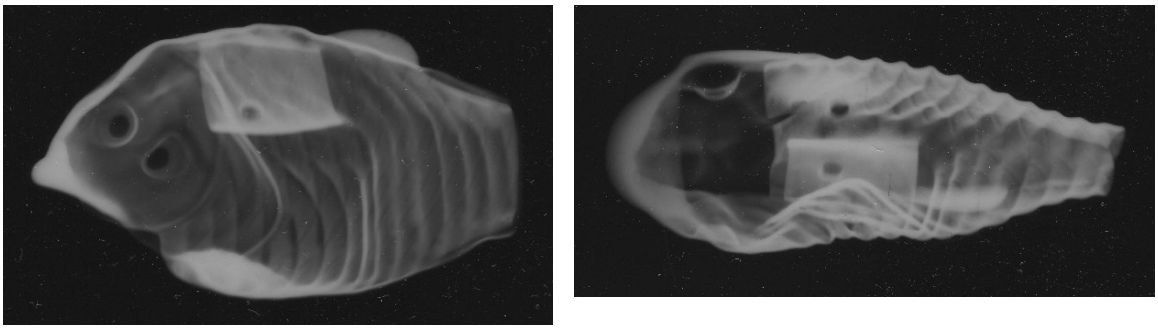


Figure 184. X-rays of the fish showing the bent bracket inside. The shading in a x-ray is a product of the thickness of material that the radiation passed through. This is a negative so the lighter the image the greater the amount of metal.

13.12.4 The strip

In October 2000 contractors dug a dug a trench across the lawn on the east side of the house to lay a new gas main for the school boilers. It started by the tarmac opposite the south side of the north wing of the house. It then ran diagonally across the lawn in a south-westerly direction to the gas intake at the north-west corner of the lawn next to the churchyard and Church Road. It was generally about 0.65m to 0.7m deep. A strip of thin sheet copper or copper alloy was found in the upcast from the trench. It was 17mm wide. One end widens around a hole. It widens by 7mm one side, the other side is broken. The hole was circular about 13mm in diameter. The other end of the strip is also broken. It probably had a round hole through it about 4mm diameter and 58mm from the other hole measured edge to edge. There was some mortar or lime scale on the surface.

Figure 185.
Find DA<1> from the gas main trench on the east lawn. The smallest squares on the graph paper are 1mm.

13.12.5 The context of the metalwork

It seems reasonable to see this metalwork as part of the decorations of a grotto or some other garden structure. The fish obviously recalls the 'very fine fountain with neatly made fishes frogs etc. swimming in the fountain as if they were alive' in the 1611 Hessen description of Beddington. Robert Langham's account of Queen Elizabeth's visit to Kenilworth in 1575 says that the central fountain contained 'Carp, Tench, Bream, and for varietee, Pearch and Eel, fysh fayrlyking all and large'.[147] It seems unlikely that the basin at the foot of the fountain could hold so many real fish, but if they were artificial the nature of them is unclear.

There are engravings of early-17th-century grottos and garden ornaments which show what may well be metal 'plants'. An example is the grotto of Orpheus at St Germain-en-Laye which was constructed by the Italian engineers Tommaso and Alessandro Francini. The grottos contained elaborate automata, but the engravings also show plants within the structure.[148] It seems doubtful if real plants could survive in such dark conditions and they may well be artificial. This would fit perfectly with the spirit of the grotto in which artifice gave the illusion of nature. The formula may also appear in Solomon de Caus's engravings of the early-17th-century garden at Heidelberg. The garden 'rocks' are decorated with odd looking trees which might possibly be metal.[149]

The decorations of the Imperial Room at the Castle of Bučovice in the Czech Republic includes artificial plants with flowers around two figures set above the cornice. These are said to have originally made for Rudolf II's Chateau Neugebaude outside Vienna prior to his decision to move to Prague about 1576-83.

[147] Keay and Watkins 2013 p.172.
[148] Strong 1979 p. 84-6.
[149] De Caus 1981 plates 12 and 16.

The model birds which decorated the upper parts of the grotto in the Medici garden at Castello near Florence were of cast bronze and have a very different character.[150]

The Villa Litta at Lainate, in what is now the north-western suburbs of Milan, has grottoes with some surviving and some restored metalwork. There are several metal plants – possibly lemons – in pots a number of water jets and a restored mill in a grotto. The items are mostly large and cruder than the Beddington leaf which was perhaps used in a small-scale context.

The shape of the leaf is suggestive of a rose. Although the rose was a widely used symbol it was a particularly Elizabethan one. Roy Strong has shown that it was used as a symbol of queen Elizabeth, referring to the Tudor peace created by the union of the houses of York and Lancaster and to her as the virgin queen.[151]

13.13 Palissy style ceramics

13.13.1 The finds from Carew Manor

A fragment of ceramic lizard tail was found in trench CW (figure 186). This appears to have affinities with the work of Bernard Palissy, a Frenchman, who made rustic pottery and ceramic grottoes in second half of the 16th-century. Three other related pieces of ceramic have been found at Carew Manor, one from trench CW; one from CU and one from trench CG which was excavated into the fill of the southeast corner of the moat. They are all included here along with a tile which is less clearly connected to the group.

Find CW <2000> (figure 186) came from [CW207] in the fill of the cut immediately north of the south wall of the ornamental structure. It consists of a short section of green-glazed lizard tail with characteristic mouldings attached to a small area of brown-glazed base. The glaze extends down the sides of the base showing that it was part of a small ornament rather than a fragment of a plate. It is 14mm long, 10mm wide and 6mm high.

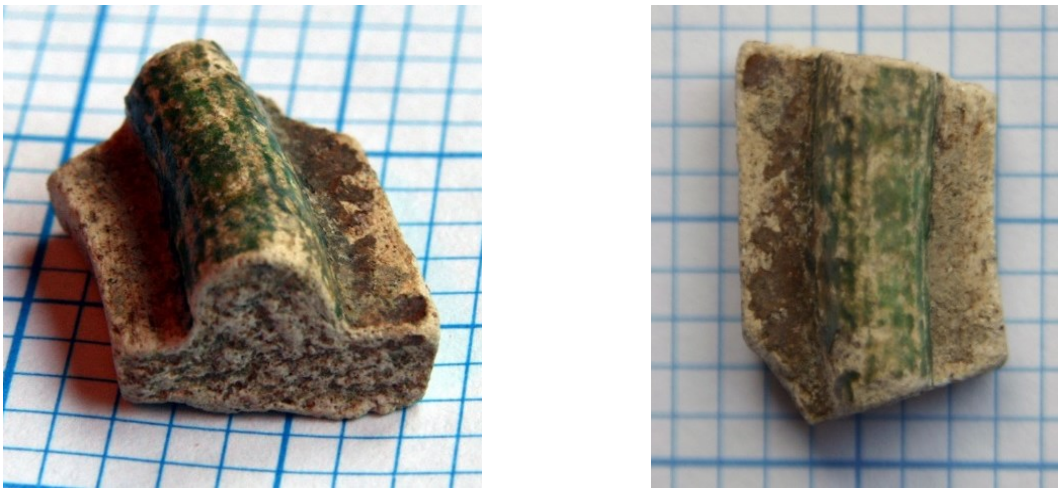


Figure 186. Find <2000> a lizard ware fragment from trench CW. The graph paper has 2mm squares.

[150] They are now in the Bargello, Florence.
[151] Strong 1977 p. 68-73.

Find CU <8> (figure 187) came from [CU20], the gravel at the culvert exit. One side is decorated in high relief with two oval rolls of clay both tapering to a point and lying side by side in opposite directions, and both covered with dark green glaze. To one side of these there is a curved surface covered with thin brown glaze. One edge of this appears to be cut at an angle. On the other side of the oval strips there is a small area of surface with pale blue glaze.

Figure 187. Front and back view of lizard ware fragment <8> from trench CU. The graph paper has 2mm squares.

Find CW <2147> (figure 188) is an enigmatic fragment. It was found in the cut fill close to inner wall of the ornamental structure. It consists of a slab of clay, 15-20mm wide, up to 30mm long and about 6mm thick with a shallow moulding impressed into it. The moulded side is covered with brown glaze. One edge appears to turn through 90 degrees while the other edge is wavy with a rounded cross-section. It may be the base of some small hollow slab-built structure – perhaps a loose decorative item rather than a component of a larger ceramic structure.

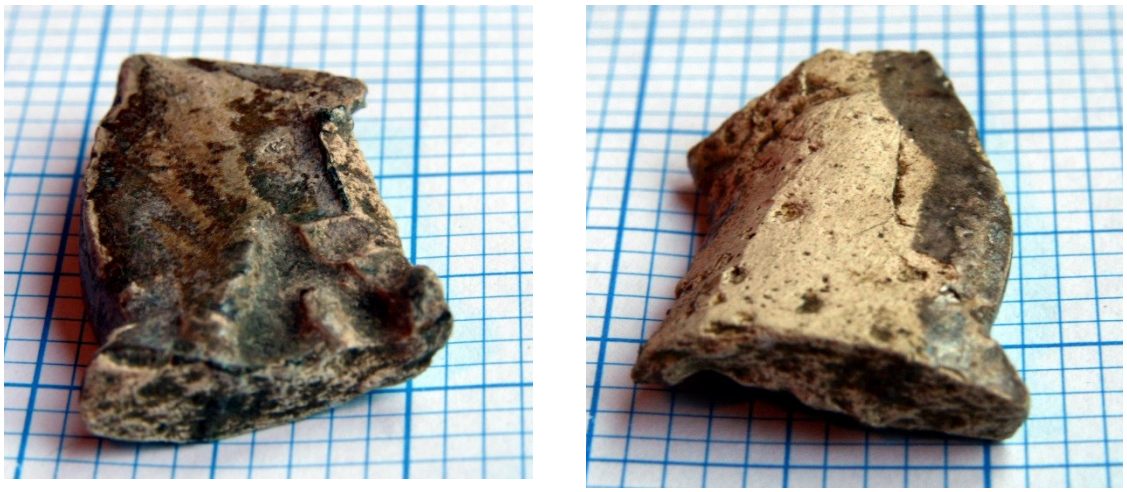


Figure 188. Front and back view of lizard ware fragment <2147> from trench CW. The graph paper has 2mm squares.

Find CG <11> (figure 189) came from [CG13], a layer of rubble dumped in the southwest corner of the moat almost certainly when the house was remodelled about 1710-12.[152] It is 16mm long. The curved shape and the fine details are similar to Palissy ware lizards' tails. The ceramic body is white, the bottom of the piece had been knife cut before firing and the whole covered with a green lead glaze with traces of yellow.

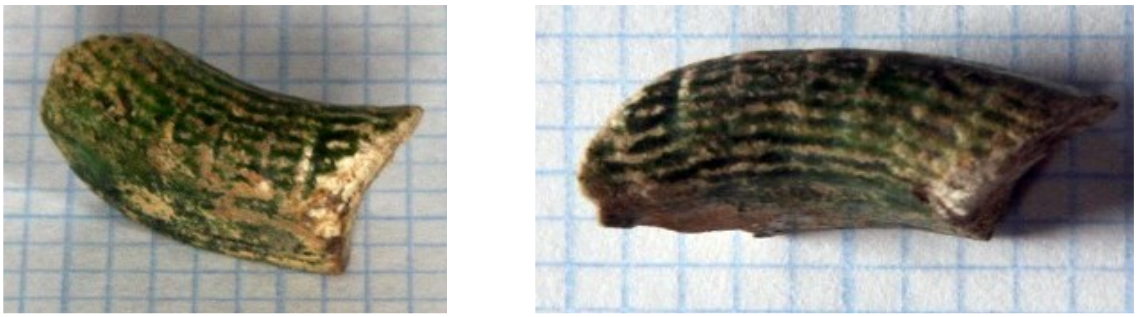


Figure 189. Find CG<11> a lizard ware fragment from trench. The graph paper has 2mm squares.

13.13.2 A glazed high relief tile

A glazed high relief tile was found in the fill of the southeast corner of the moat at the top of the primary fill (figure 190).[153]

The body of the tile was made of red clay superficially similar to the local roof tiles. One side is decorated in high relief, covered with a white slip and then white and blue glaze. The back appears to have wheel-turning marks as if the object was made by pressing the clay into a rotating mould. This seems unlikely and the marks may be the result of trimming off surplus clay. An extra piece of clay was then added to make the edge. The addition has score marks on the back where a finger has been run along to work the edge into place. The surviving edge is straight but the decoration appears to be a roundel. The edge has a slot-like feature 11mm wide and about 2mm deep which appears to have been designed to lock to another tile or some other object.

The white glaze is almost certainly-tin based, but the blue glaze is clear rather than opaque suggesting that it contains little or no tin.

The fragment appears to be some sort of architectural moulding. Palissy sometimes worked with red clay covered with a white slip, but the form of the fragment has no obvious parallel in his work. It may or may not have been produced by the maker of the Beddington lizards' tails.

[152] Phillips and Burnett 2016 vol. 1 p. 28-32 and vol 2 p. 37-8 and 60.
[153] Find <5> from context [CJ13]. See Phillips and Burnett 2016 p. 64 and 124-5.

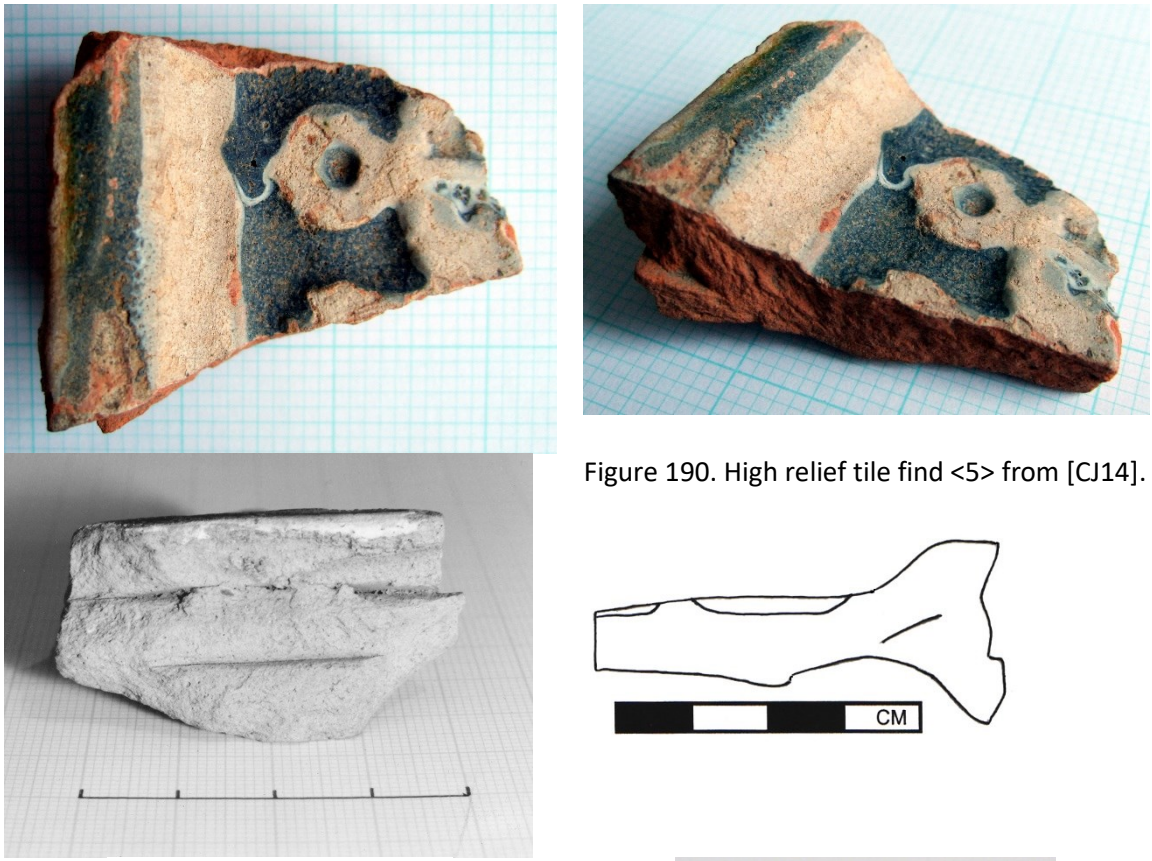


Figure 190. High relief tile find <5> from [CJ14].

13.13.3 The life of Bernard Palissy

Bernard Palissy was born in Agen between Bordeaux and Toulouse, probably about 1510. After some years travelling and working as a glass painter he settled in Saintes, to the north of Bordeaux in the late 1530s. He probably began to experiment with ceramics about the same time. He first made white glaze in 1546 and produced medals and jasper-like pottery from about 1549-50. He seems to have perfected rustic ceramics around 1556 when Anne de Montmorency, a member of the French upper aristocracy, presented him to Henri II. Montmorency commissioned an elaborate ceramic grotto and Palissy worked on this at

Saintes for several years.[154] Palissy was probably a Huguenot from the 1530s and in May 1562 he participated in the Protestant take-over of Saintes. The town was retaken by the Catholics and sacked in October 1562, but Palissy's house and workshop were spared probably because of Montmorency's influence. This protection did not last long. Palissy was arrested and taken to Bordeaux for execution and his workshop was then sacked. He escaped execution and was given provisional liberty on 24 March 1563 and complete freedom on 23 April.[155]

Sometime between 1565 and 1567 he left Saintes for Paris. It is not clear how much of Montmorency's grotto went with him. Palissy wrote a description of it which was published at La Rochelle in 1563. It was prefaced by a letter to Montmorency which had been written from prison on 24 February 1563. In this Palissy claimed that the grotto was being ravaged and he asked that the Montmorency have the contents of his studio inventoried, stored and protected by those imprisoning him.[156] The ceramic components and moulds would be easy to break and, if the studio was sacked, it is unlikely that much would have survived, but Palissy was trying to get out of prison and had an interest in exaggerating the threat. It is possible that Montmorency had the moulds and components taken to safety in Paris or perhaps to his house at Ecouen. If, however, the material was lost either wholly or in part, Palissy would have remake some or all the components so there may have been two grottoes or part grottoes for Montmorency: one made in Saintes and the other in Paris or its environs. Any new work would have gained from his previous experience and may well have been more sophisticated and of a higher standard.

Montmorency died on 12 November 1567. By 1570 he had been replaced as a patron by Catherine de Medici who commissioned a grotto for the Tuileries Palace and garden then under construction. Palissy had a workshop there which was excavated in the 19th-century and in the 1980s. The Tuileries project was abandoned in 1572 although Palissy seems to have kept the workshop until at least the late 1570s. Palissy is recorded in Sedan from 1573 and he may have fled there after the St Bartholomew's day massacre in August 1572. While he was in Sedan there are records of various quarrels with his family. He seems to have returned to Paris in the mid-1570s when he gave a series of lectures there. He was arrested in December 1586 and was eventually ordered to conform to the Edict of Nemours or leave France. He did not obey and in 1588 he was arrested and imprisoned. He died in the Bastille in 1590. Palissy had several sons and daughters, but his family have not been traced after the exile in Sedan.[157]

The partially completed grotto for Montmorency appears to have been made from hollow ceramic blocks which fitted together so that the decorated sides joined to form a continuous glazed surface in the form of a rocky 'cave' decorated with casts of shells, plants and small animals. The lower part of the walls consisted of alternating pillars and niches while the upper part had terms between windows. The overall effect was rustic rather than classical. The end wall of the grotto was decorated with a rock which rose above a terrace and pool. These were populated with casts of various plants and animals including, fishes, crabs and two seals. Water jets running from the mouth of frogs, turtles and other animals splashed into the pool creating the illusion of movement. There is no description of Catherine de Medici's grotto and no evidence that it was ever erected. When Swiss ambassadors visited the Tuileries garden in 1575 they saw

[154] Amico 1996 p. 13-21.
[155] Amico 1996 p. 28-32.
[156] Amico 1996 p. 32 and 53-54.
[157] Amico 1996 p. 34-45 and 59.

> Diverse fountains in the garden, one among which was built in the form of a crag, in which crag were diverse animals modelled in ceramic, such as snakes, snails, turtles, lizards, crabs, frogs, and all kinds of aquatic animals, which animals spewed forth water from their mouths in addition to the water exuded by the crag itself.[158]

The 20th-century excavations at the Tuileries uncovered the remains of a fountain composed of rocks on which there were ceramic frogs with lead pipes to shoot water from their mouths. However, no other ceramic decoration was present and it may not have been the structure seen by the ambassadors.

The finds from the excavations at the Tuileries include pieces which do not fit Palissy's description of the Montmorency grotto but do reflect Catherine de Medici's court iconography. It appears that Palissy had to modify the design to fit her agenda.[159] The use of glazed ceramic components continued, but many of the Medici symbols must have relied on sculpted models rather than casts of natural and existing man-made objects.

The Paris workshop appears to have contained a large number of moulds for the two grotto commissions and very few moulds for the rustic bowls and jugs that Palissy produced. When the family fled to Sedan in 1572 or 1573 there was probably little hope of finding a patron for a major grotto project and the large moulds may have been abandoned, while those for the dishes and other small saleable items were taken. Small individual garden ornaments would fit into the last category and may also have been taken to Sedan.

The stone rather than ceramic rock excavated in the Tuileries may be seen in this context. It could have been assembled for a fraction of the cost of a wholly ceramic structure, and the frogs on it were individual items that could have been made and sold to garden owners or professional gardeners who could arrange their own transport and installation. This simpler approach would extend Palissy's potential clientele from the monarchy and a small group of super-rich aristocrats to the merely wealthy. This would have been necessary when Palissy lost the Catherine de Medici's patronage and had to seek new outlets for his work.

Palissy's garden ornaments and other ceramics would be hard to sell in Sedan, whereas Paris was a centre of the luxury trades with a ready supply of wealthy customers. The excavated rock was perhaps a show piece to coax customers into parting with their money.

13.13.4 The Beddington 'Palissy' ware

The two pieces of lizard-tail from Beddington immediately suggest a connection with Bernard Palissy's ceramics. However, there are also obvious differences so the relationship between the Beddington finds and Palissy's work is not simple. Amico has argued that Palissy's technique developed over time. The surviving firmly attributed material really only belongs to one period of his life and it may be selective as argued above.

The four pieces of white ware from Beddington have between them green, yellow, brown and blue glaze. The glazes are generally thin and clear and do not appear to contain tin. The green glaze is more like Surrey white ware than Palissy's usual rendering of the colour. The dark brown glaze is not paralleled on the pieces shown in Amico, and Thierry Crépin-Leblond of the National Museum of the Renaissance suggested that it is more characteristic of the colour palette used by Palissy's followers working at Avon near Fontainebleau than of Palissy himself. In short, the glazes are not a good match with Palissy's known work. The moulding of the Beddington pieces is much less sharply defined that the material from Paris

[158] Quoted from Amico 1996 p. 70.
[159] Amico 1996 p. 71-78.

and the fabric may also differ.[160] The body of the Beddington pieces is not, on a superficial visual examination, obviously distinguishable from the finer Surrey whitewares but this is not sufficient to provide a firm provenance.[161]

The cut and glazed base of CG <11> suggests that the lizard was originally an individual object rather than part of a dish or piece of grotto structure. The second tail fragment CW <2000> is on a thin base with an original edge again suggestive of an individual object. The Tuilleries excavation has produced some evidence that Palissy was making individual objects for the decoration of garden features and it appears that the maker of the Beddington material was doing the same thing. He may even have been making his moulds from Palissy's glazed objects which would explain the soft modelling. However, the form of the non-lizard pieces from Beddington are not found in Palissy's extant work. If we assume that the material from Beddington is part of the 'men and little animals' that decorated the rock the forms are again atypical of Palissy. The little men would have to be moulded from sculpted masters for which there is no parallel in Palissy's early work.

[160] Items CG <11> and CU <9> were compared with the excavated Tuilleries material kept at Ecoune. We are grateful to Thierry Crépin-Leblond of the National Museum of the Renaissance, Ecouen for showing us examples of the Palissy material from the Tuileries.

[161] A chemical analysis would help trace the provenance but most of the comparative data has been generated by inductively coupled plasma spectrometry which involves the destruction of a small part of the material. We have not done this as the Beddington pieces are small and rare.

14. THE CULVERT STRUCTURES

The culvert was divided into the exit retaining wall and five sections separated by bonding breaks and changes in construction. These are numbered 1 to 5 starting from the exit and moving upstream as shown in figure 191.

In 1999 the whole culvert was crawled and was examined by the light of a torch. The main dimensions were measured and the major features were noted but there was not enough time to make a detailed survey. Working conditions were difficult and many of the bricks were covered with limescale so that it was hard to make accurate measurements of sizes.

In 2004 a detailed record was made of culvert section 2 as it was dismantled. After this had been done culvert sections 3 and 4 were re-examined under better conditions with more light.

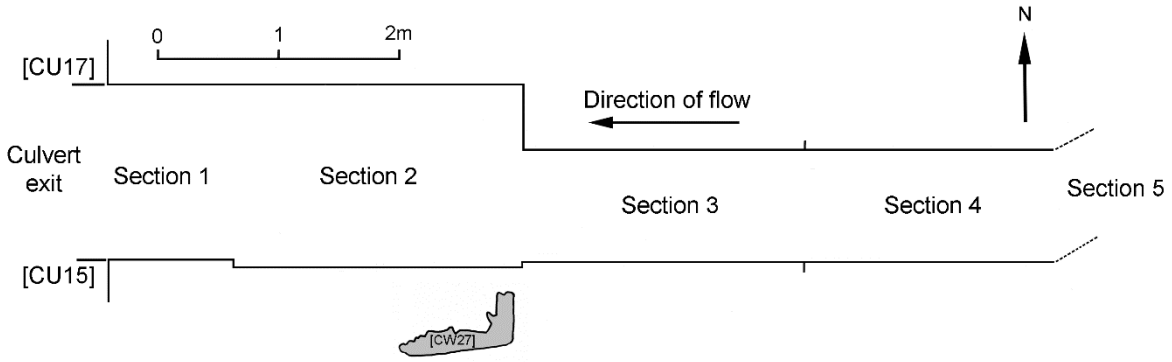


Figure 191. Internal plan of the culvert at the level of the top of the silt. The alignment of section 5 is approximate. The position of the ornamental structure [CW27] is also shown.

14.1 The exit retaining wall

The plan and elevation of this are shown in figures 192 and 193. The exit arch was 1.42m wide and rose 0.4m above the low side walls. The exit retaining wall was aligned at 6 or 7 degrees west of magnetic north in 1999. The original top had been removed and the wall survived to a height of 0.2m above the underside of the arch top. The south side of the wall extended 0.73m from the edge of the culvert and ended in a butt joint against the outer channel side wall [CU9] (section 14.8.2). On the north side, it extended to a maximum of 0.72m from the side of the culvert where it ended in a fracture. The main part of the wall was of hard red bricks. Several had shallow frogs where they were exposed along the top of the wall.

The face of the retaining wall was covered with a white deposit, perhaps whitewash or the remains of rendering.

14.2 Section 1

There was a bonding break across the crown of the arch one stretcher from the exit. This was also visible on the top where the bricks in the retaining wall arch do not exactly align with those in the culvert roof. The bonding break did not extend into the lower parts of the arch or the side walls, which suggests a repair.

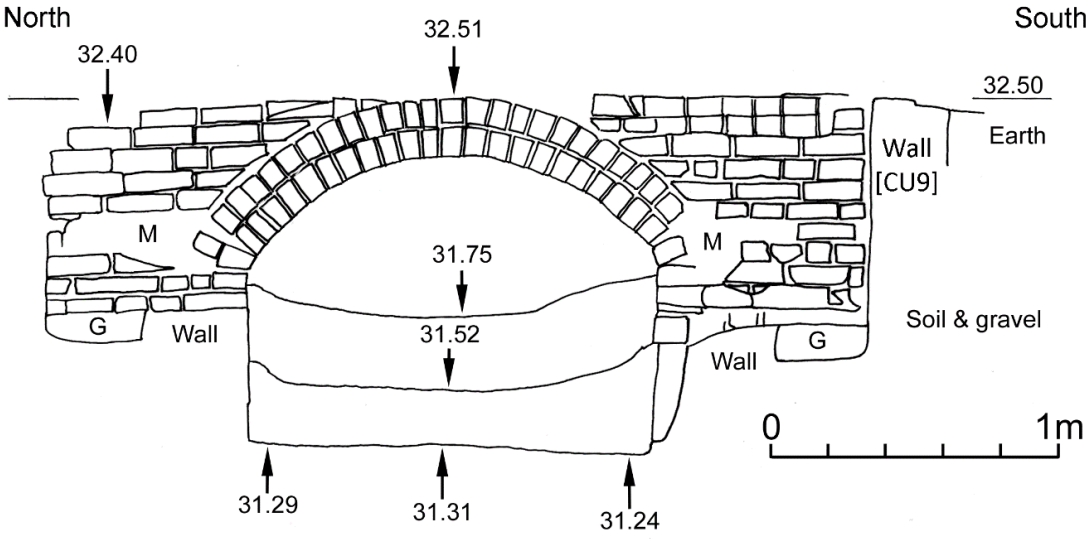


Figure 192. The culvert exit and retaining wall looking east. G = gravel; M = mortar.

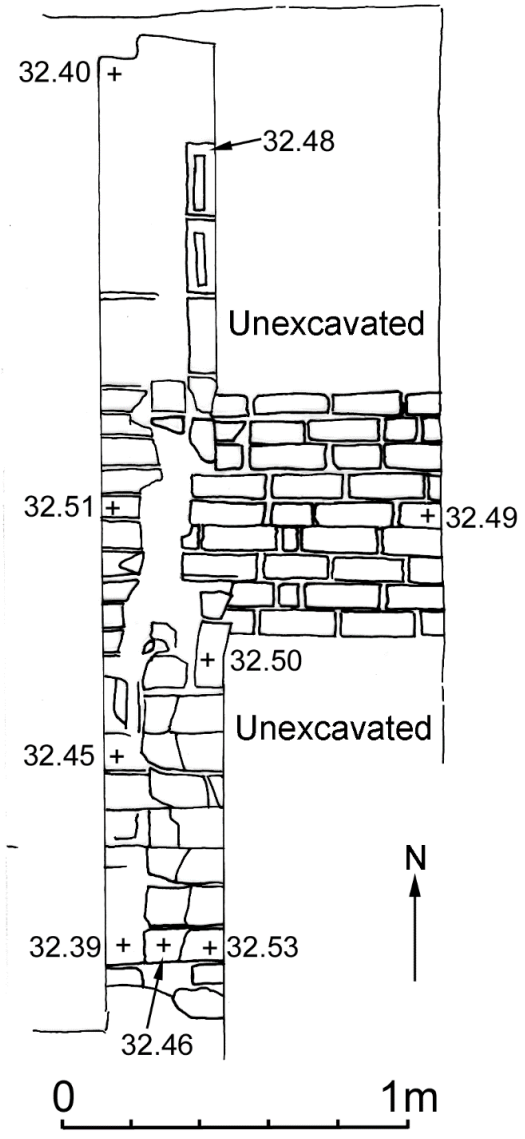


Figure 193. The top of the culvert retaining wall with part of the arch of culvert section 1 to the right.

The culvert arch beyond the bonding brake had the same profile as the exit. The side walls are of soft red brick with at least one diagonal hack mark. The bricks in the arch are different and are probably the same as those in the culvert exit wall. The sides were bonded with dark brown mortar while the arch mortar was grey.

The eastern (upstream) end of the section was paved with brick, and there was a slot in the floor at the start of the section (see 14.3 below). Here the side walls had 4½ courses of brick above the paved floor. The stream had undermined the side walls immediately downstream of the floor. The northern side wall probably had a total of 6 courses of brick. At the east, or upstream, end of section 1 the culvert was 1.35m wide at floor level and had a height of 0.7m.

14.3 The slot in the culvert floor

At the junction of culvert sections 1 and 2 the floor was paved with red bricks as stated above. There was a slot in this at the entrance to section 1 which was 0.1m deep and 0.13 to 0.14m wide as shown in figure 194 and 195. It was lined with brown mortar, possibly Parker's Roman Cement.

The bricks forming the floor on the upstream (east) side of the slot were laid on their face. There was a bonding break across the floor one brick length from the slot. Beyond this there was a rather ragged line of part bricks ending in an irregular edge about 0.4m upstream of the slot. The bricks were partly covered with mortar and may originally have been wholly covered. The bricks on the downstream side of the slot were laid on their side. They ended in an uneven edge about 0.8m from the edge of the slot.

The culvert was 0.7cm high from the floor to the top of the arch.

Figure 194. The slot in the floor at the junction of culvert sections 1 and 2. Looking west.

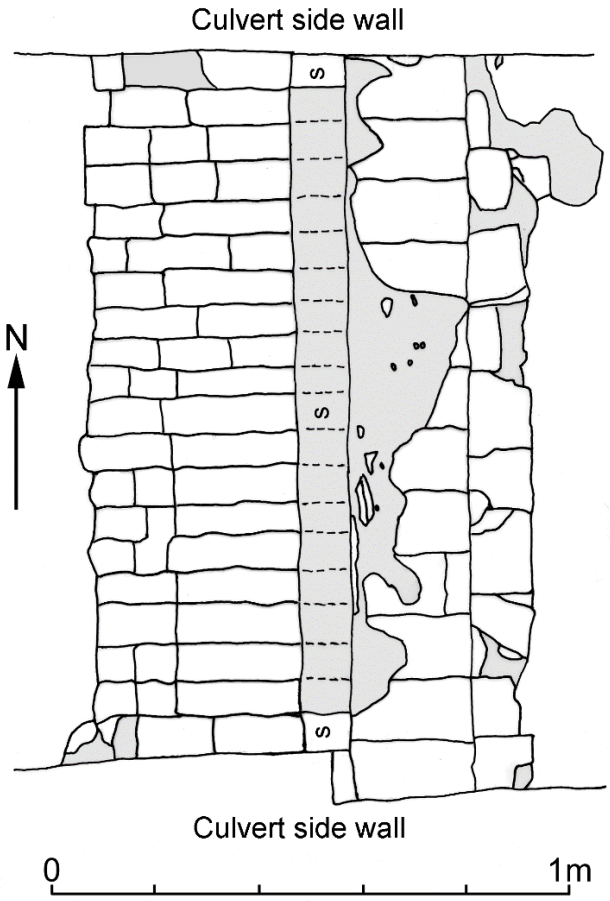


Figure 195. Plan of the slot in the floor of the culvert at the upstream end of section 1. S = Slot.

14.4 Section 2

This started 1.06m from the exit and was separated from section 1 by a bonding break. The culvert widened on the south side by 0.06m.

When culvert section 2 was dismantled on 9 August 2004 the arch was found to consist of two courses of stretchers with a straight mortar joint between them and no cross-bonding. The inner course consisted of hard yellow stock bricks with frogs. About 10% had black over-burnt cores. The upper layer consisted of a mixture of yellow stock and soft red brick. The yellow stocks were common along the top of the arch. The reds were more common lower down especially on the north side where they predominated. A fair number of the soft reds had whitewash on them suggesting that they had been reused. Both courses were bonded with the same grey slightly brown soft mortar.

The southern side wall was divided into two sections by a bonding break 0.52m from the junction with culvert section 1 (figures 201 to 204).

To the west of the bonding break the top of the wall was a soldier course consisting of five yellow bricks laid on their side. Below this the wall was of soft red brick. At the west end two stretchers connected to a southward projecting stub wall. One of these overlay the end of the soldier course as shown figures 201 and 202.

To the east of this break the wall consisted of five courses, largely of yellow stock brick.

Top course: the north, or inner, side of this consisted of yellow stock brick stretchers.

The southern side was yellow and red headers which were cut to fit around the ornamental structure as shown in figures 201 to 204.

2nd course: the culvert face was of headers with one stretcher and a part stretcher. Behind this there was a mixture of red and yellow bricks some broken bits and some stretchers. The mortar was the same right through.

3rd course: the culvert side consisted of stretchers and two part stretchers. Behind this there were headers and part headers mostly yellow stocks with a few red ones.

4th course: the culvert side consisted of headers with one part header. Behind this there were part bricks both red and yellow.

5th course: the west end on the culvert side had three yellow stretchers. The rest of this side were yellow headers apart from a red half brick at the east end. Behind this there was a mixture of yellow stretchers, red and yellow part bricks, chalk and mortar.

The second course from the bottom stepped out by about 10mm.

The northern side wall from west to east

The top course consisted of a line of yellow stock headers. At the east end there was a line of four stretchers against the north side of the wall (figures 205 and 206).

The 2nd course: the channel side consisted of 2 red headers, 6 yellow stretchers, a yellow half brick. There are 4 yellow headers filling the corner between sections 2 and 3 (figure 205).[162] The back row consisted of 2 red half bricks, three red ¾ headers, 8 red headers and a red half brick.

The 3rd course: the front consisted of two-thirds of a red stretcher, a red half, a red stretcher, 4 yellow headers, a red header and 10 yellow headers. The angled section consisted of 1½ yellow stretchers with half a red behind. The back row consisted of a ½ red, a ½ red, chalk, earth, stone, 3 small bits of red brick, mortar, ¾ of a red stretcher and 4 red stretchers.

The 4th course: the front consisted of 4 red stretchers, a ½ red, 2 part laterally split bricks to make up the thickness above a mortar mass [CW234], 7 yellow headers and three roughly-cut red bricks behind the angled section. The latter consisted of 2½ yellow stretchers and a bit. The back row consisted of chalk blocks, a mortar mass [CW234], more chalk, 4½ yellow stretchers and some small bits. There appears to have been a second back row but this was not fully uncovered.

The 5th course: the front consists of 2 red headers, 1 red stretcher, 2 red headers, a ½ red. At this point the brick is interrupted by mortar mass [CW234]. The back row consisted of a red header, a ½ red and chalk. Like the front, it is interrupted by mortar mass [CW234]. To the east of [CW234] the front consisted of 10 yellow headers and the angled piece consisted of 4 roughly shaped yellow bricks. The back row east of [CW234] consisted of 2 yellow stretchers, a red stretcher, a yellow stretcher and ½ a yellow brick.

To the west of mortar mass [CW234] courses 4, 5 and 6 consisted of red bricks and chalk bonded with green sandy mortar. To the east, yellow stock bricks were common and the mortar was grey. This repeats the pattern on the south side of the culvert where the lower part wall west of the bonding break was also of red bricks.

[162] The angled section was numbered [CW217] but it was recorded as part of the north wall.

Figure 196. Culvert section 2 before removal. The bonding break forming the junction with culvert section 1 can be seen in the foreground. Looking east.

Figure 197. The north side of culvert section 2 before removal. The bonding break with section 1 can be seen on the right.

Figure 198. The junction of culvert section 2 and 3 before the removal of the former. Looking southeast.

Figure 199. The south side of culvert section 2 before removal.

Figure 200. Culvert section 2 during demolition. Looking east.

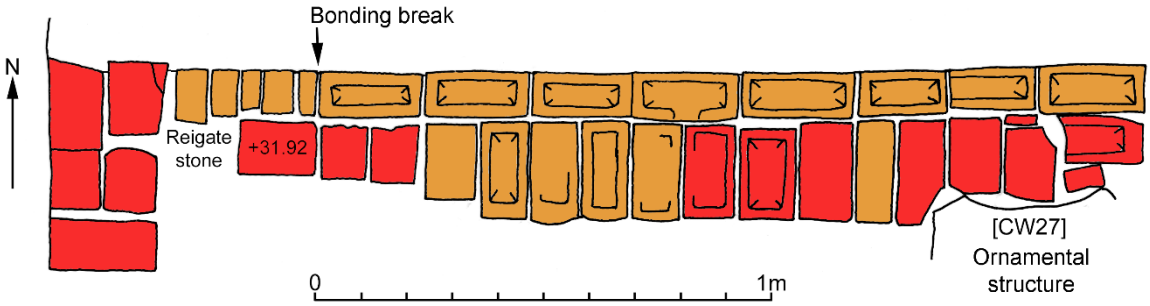


Figure 201. The top of the southern side wall of culvert section 2 showing the red bricks and yellow stock bricks.

Figure 202. The south wall of the culvert with the ornamental structure [CW27]. Looking south.

Figure 203. The south wall of culvert section 2 with the ornamental structure [CW27] looking east.

Figure 204. The south wall of culvert section 2 with the ornamental structure [CW27] looking west.

Figure 205. The south side of the north wall of culvert section 2.

Figure 206. Detail showing the hack mark on one of the red bricks in the older lower part of the north wall of culvert section 2.

14.5 Section 3

This starts 3.45m from the exit arch and was separated from section 2 by a bonding break. The west end of section 3 was quite rough and there was a bodged gap-fill at the crown of the arch which included several yellow stock bricks. At its junction with section 2 the south side widened by 0.07m and the north side by 0.48m. The crown of the arch of section 3 was 0.33m higher than section 2.

In 2004 culvert section 2 was dismantled, and it was possible to examine the western end of section 3. The arch was round. The top appeared to be constructed in two layers. The outer was rough, included several pieces of chalk, and did not extend down to the top of the side walls failing, to fully cover the inner layer. Yellow stock bricks had been used to repair the crown of the inner arch at the western end. The side walls were rather roughly constructed with a Reigate stone block on each side at the bottom. The bottom of the northern block was at 31.37m OD. On the north side the wall stepped inwards immediately above the stone block. It stepped in again on both sides at the bottom of the culvert arch (figures 207 and 208). The channel between the stone blocks was 1.16m wide while the arch was only 0.92m wide, so it appeared that the culvert arch had been added to an earlier, somewhat wider channel.

The culvert had an internal width of 0.87m to 0.91m at the top of the silt. On the north side the brick rested on a line of flint at about silt level. On the south side there were two courses of red brick below the silt top both covered with yellow limescale rather than black deposit. They may rest on tile and possibly on flint.

The first three courses above the silt fill were covered with black deposit which appeared to have formed over bumpy calcite. Some of the bricks above this also had black deposit on them although it was patchy: some bricks had it and some not. The arch was covered with bumpy limescale right up to the top including most of the bricks along the crown. This implies that for at least part of its history the culvert was filled with water to the roof.

There was a crack across the arch in section 3 (figures 210 to 212). On the south side this was about 0.35m short of the start of the flintwork of section 4. On the north side it was 0.16m in the flint which penetrates into the fourth course of brick. This was clearly a fracture rather than a bonding break as several bricks had been split by it. Section 4 appeared to have dropped by about 20mm relative to section 3.

Figure 207. The western end of culvert section 3 in 2004.

Figure 208. The lower part of the western end of culvert section 3 in 2004, showing how the channel widens below the top of the silt.

Figure 209. Culvert section 3 looking east with section 4 in the background in 2004.

Figure 210. Looking from culvert section 3 into culvert section 4 in 2004, showing the crack in the roof.

Figure 211. North side of the culvert in 2004, with the crack at the eastern end of section 3, with section 4 to the right.

Figure 212. The south side of the culvert in 2004 with the crack at the end of section 3.

Figure 213. Looking from section three towards the lower arch of section 2 in 1999.

14.6 Section 4

This starts about 5.78m from the culvert exit. The arch has the same profile as section 3 but the lower parts of the side walls were of mortared flint, sometimes topped with a course of peg tile. On the north side the brick of section 3 is inter-bonded with the flint of section 4. The flint rises 0.28m above the silt on the north side and 0.26m on the south. It is angular and was probably knapped off to make a neat finish.

On the south side of the culvert near the east end the top of the flintwork was at 32.29m OD.

A small hole was dug down the face of the flint wall. It passed through soft silt and encountered gravel at a depth of about 0.3m. It was difficult to see the side of the culvert but there was at least one piece of brick in it. The distance from the gravel to the tile course was 0.52m. It was 0.66m from the top of the silt to the crown of the arch.

The eastern end of the section was a rough break 7.85m from the exit.

Figure 214. The north side of culvert section 4 in 2004.

Figure 215. The south side of culvert section 4 in 2004 with the crack in section 3 on the right.

14.7 Section 5

This section of culvert turned towards the northeast and ended in a collapse after a short distance. There were signs of recent damage to the roof which is likely to have been caused by the machinery used for building of Paddock Court about 1999. The culvert was about 1.2 to 1.25m wide but it was very difficult to measure the width accurately. The bricks looked modern.

Figure 216. The junction between culvert section 4 and 5 in 2004. Section 4 ended in a fracture. Section 5 turned northwards but soon ended at a collapse.

14.8 The channel walls beyond the culvert exit

14.8.1 The inner channel walls [CU15] and [CU17]

This pair of foundations appeared to be the north and south retaining walls of a channel that ran from the western end of the culvert. The channel width was 1.45m – effectively the same as the culvert exit arch.

The southern wall [CU15] is shown in figures 217 to 220. It was fairly roughly constructed of brick and chalk bonded with green sandy mortar. There were five surviving courses on the channel side. The lowest was largely of chalk, the second and third of brick stretchers, while the top two were of chalk with some brick. The side away from the channel was largely chalk. The wall had a maximum surviving height of around 0.32m and a width of around 0.4m.

The northern wall [CU17] was more neatly made (figures 221 to 224). There were five surviving courses bonded with soft green very sandy mortar with chalk flecks. On the channel side the lowest consisted of chalk blocks. Above this there were stretchers with a single header, then a course of headers, and another of stretcher with two headers. The course above was damaged but may have consisted of headers. The maximum surviving height was 0.4m and width of around 0.37m. The bricks on the southern (culvert) side were 90% covered with a white deposit – probably limescale.

Figure 217. Plan of the retaining wall [CU15] on the south side of the channel.
Red = brick, grey = chalk.

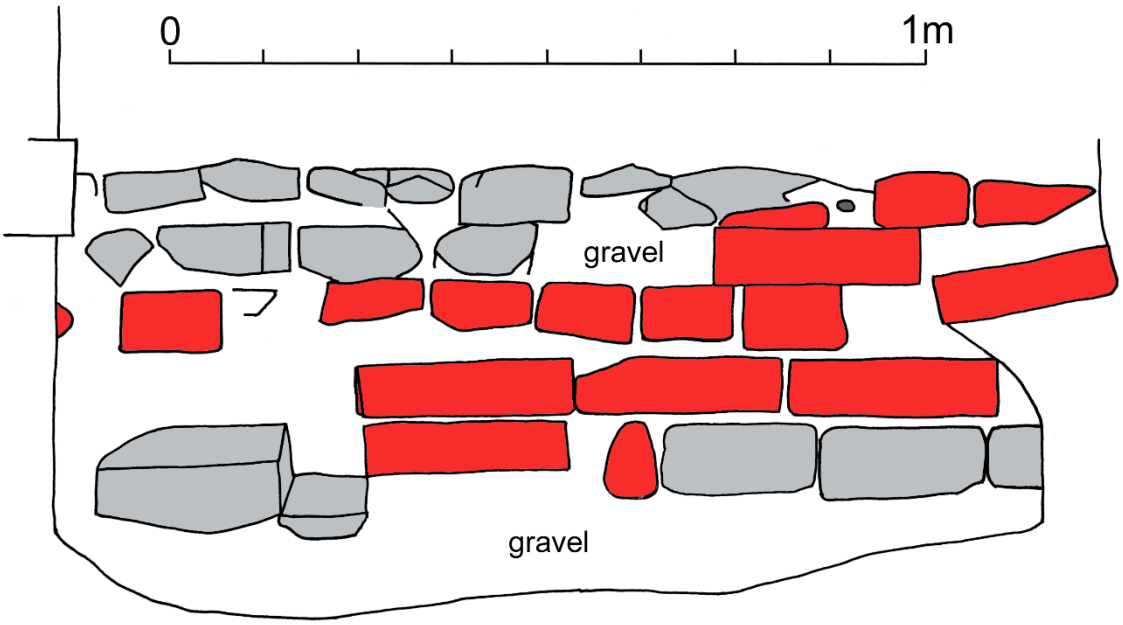


Figure 218. The north face of the retaining [CU15] on the south side of the channel.
Red=brick, light grey=chalk, dark grey=flint.

Figure 219. The south inner retaining wall [CU15] looking south in 1999.

Figure 220. The southern inner retaining wall [CU15] in 1999. South at the top.

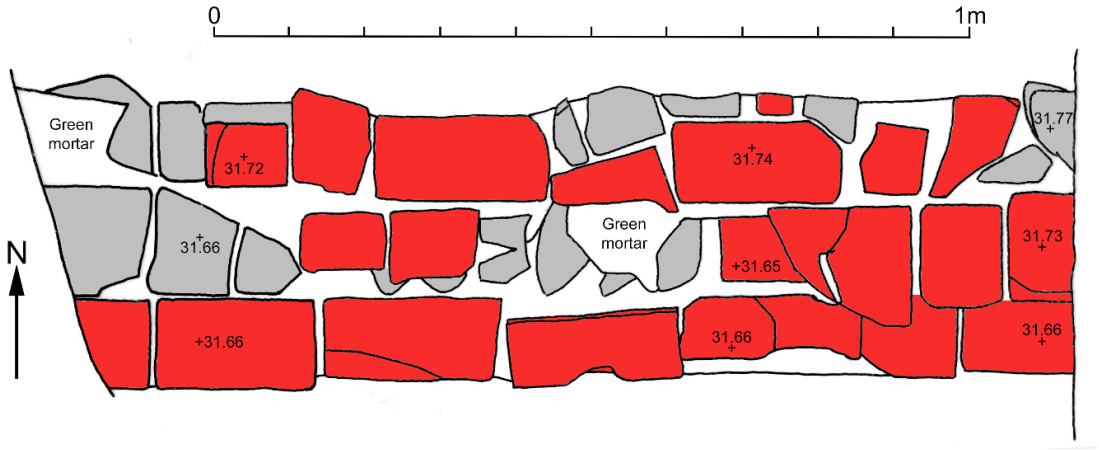


Figure 221. Plan of the retaining wall [CU17] on the north side of the channel.
Red = brick, grey = chalk.

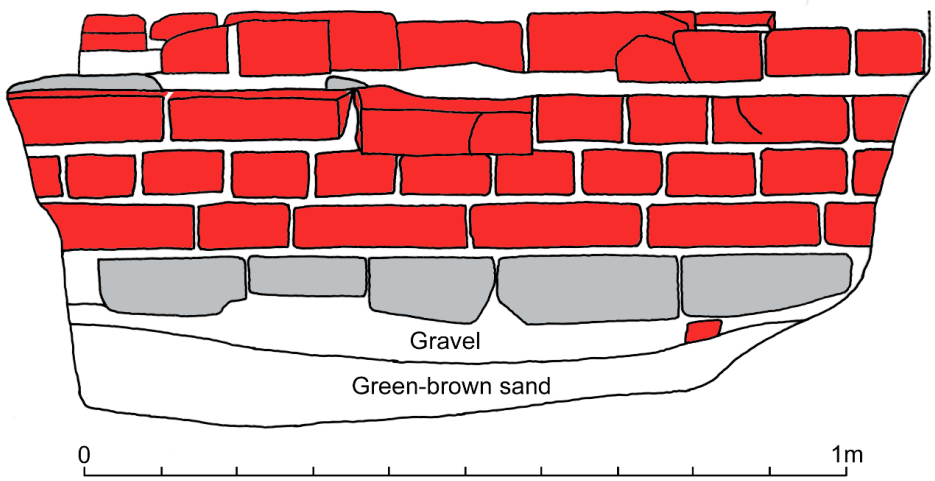


Figure 222. The south face of the retaining wall [CU17] on the north side of the channel.
Red = brick, grey = chalk.

Figure 223. Retaining wall [CU17] on the north side of the channel. Looking north in 1999.

Figure 224. Retaining wall [CU17] on the north side of the channel in 1999. South at the top.

14.8.2

14.8.3 The outer southern retaining wall [CU9]

This was 0.74m south of the north side of the inner retaining wall [CU15] (figure 108 and 225). It was of brick in English bond with alternating courses of headers and stretchers. A total of ten courses or part courses survived with a height of 0.79m. The thickness was 0.23m. The lowest course appeared to rest on [CU14]. The thickness of the bricks ranged from 60 to 70mm with a median of 66mm.

Figure 225. The south side of the channel showing the outer retaining wall [CU9] with the inner retaining wall [CU15] in front of it. Looking south in 1999.

15. THE BRICKS

15.1.1 The bricks from culvert sections 3 and 4

There are two small groups of brick measurements from this structure. Eight heights were measured in the culvert in 1999 in difficult conditions, giving a median height of 54mm. A further seven heights were measured in 2004 in good conditions on the broken western end of culvert section 3. These had a median height of 58mm. Taken as a whole the heights range from 53 to 59mm if one exceptional thick 68mm brick is excluded. This was on the end of culvert end and may have been a repair. The samples are so small that the differences between them are probably random.

At least one brick in culvert section 4 had a diagonal hack mark which, in the local area, is feature of bricks made in or after the late 17th-century.

15.1.2 The bricks from the early side walls in trench CU and culvert section 2

The channel-side brickwork in trench CU was bonded with a distinctive green sandy mortar which was also used in the areas of old brickwork at the western end of the side walls of culvert section 2.

	Median dimensions (mm)			Sample size		
	L	H	W	L	H	W
Culvert section 2 north wall	228.5	61.25	107.5	4	6	6
Culvert section 2 south wall	218	56.5	105	3	6	5
Culvert section 2 both walls	225	59	105.5	7	12	11
Side walls [CU15] and [CU17]	222.5	60	108	4	4	5
All the above combined	223	60	108	11	16	16

The samples are so small that much of the variation between them is probably random, and the bricks could all be of the same period. It is clear that the bricks are much thicker than a group of Tudor bricks found in [CM15], which had a median height of 52mm (section 10.2.2). A median thickness of around 60mm is typical of the brick used at Carew Manor around 1710-12 and of the ones used to build the old Stone Court mansion house, Carshalton, in the 1690s. The bricks used at Carew Manor appear to have become markedly thicker between about 1710 and 1720. The bricks used when the Orangery was built sometime between 1718 and 1721 had a median thickness of 66 to 67mm.[163]

15.1.3 The bricks from layer [CU20]

Layer [CU20] was the gravel deposit at the bottom of the culvert. Eight soft red bricks were recorded with a surviving length, height or width. The median sizes of these were

	L	H	W
Sample size	-	8	2
Median size (mm)	-	56	103

They may therefore have been similar to the bricks used to construct the side walls of the culvert although the sample is too small to be certain.

[163] Phillips 2016 p. 85-88.

15.1.4 Bricks from layer [CW215]

This was the lowest water-laid gravel deposit in culvert section 2. It contained 62 bricks with a complete length, height or width. One of these was a yellow stock brick and two were coarse red bricks both types uncommon on the site before the 19th-century. The surviving dimensions on the remaining 59 soft red bricks had the following median values:

	L	H	W
Sample size	2	34	12
Median size (mm)	230.5	59	106

They may also be similar to the bricks used to construct the side walls of the culvert, although the sample is again too small to be certain.

15.1.5 The brick clumps from a demolished culvert

The fill of cut [CW37] above culvert section 2 contained 13 clumps of mortared brick which often had limescale on them and had clearly come from a demolished culvert, as some of the bricks were set at a low angle to each other.[164] The clumps were recorded as special finds and the bricks were measured with the following result:

	L	H	W
Sample size	33	58	49
Median size (mm)	230	64	109

Figure 226. Brick clump <129> from [CW3/5]. Note the wedge shaped mortar to start the turn of an arch.

15.1.6 The bricks from the fill of cut [CW37]

The fill of cut [CW37] above culvert section 2 contained 440 bricks which had a surviving full length, height or width and for which the fabric was recorded. Of these 399 (90%) were soft reds, 24 (6%) were yellow stocks and 17 (4%) various other fabrics.

[164] Special finds <129> and <420> to <431>.

The heights of the soft red bricks range from 50 to 71mm with clear peaks at 60 and 65mm (figure 227) suggesting that they fall into two groups. The thinner ones with heights centring on 60mm were from the early side channel walls, while the group centring on 65mm are the same as the brick clumps described in section 15.1.5 above.

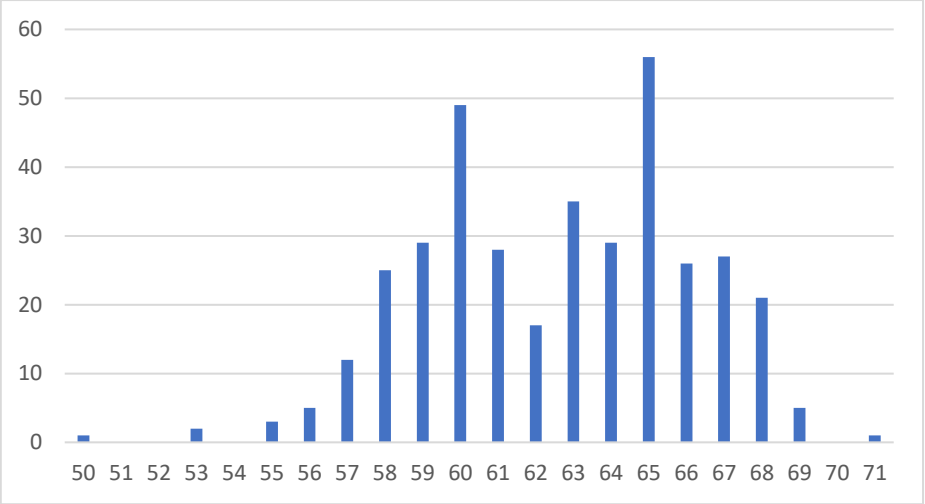


Figure 227. The soft red bricks from the fill of cut [CW37]. Numbers (vertical axis) plotted against heights in mm (horizontal axis).

16. THE CULVERT DEPOSITS AND FLOW REGIME

16.1 Deposits in the culvert

The deposits in the bed of the culvert were excavated in trench CU in 1999 and in culvert section 2 in trench CW in 2004.

16.1.1 Trench CU

The top of the water-laid deposits was excavated as layer [CU16].[165] This consisted of fine dark silt with much flint and some sandy patches. It rested on layer [CU19] which consisted of gritty sand with much sub-angular and rounded flint and a scatter of chalk, brick and tile. The deposit was sandier towards the centre of the channel.

This rested on [CU20] which consisted of rounded and sub-angular gravel in a loose matrix of gritty sand. This deposit appeared to extend under the channel side walls [CU15] and [CU17]. It was not present in the deposits to the south of the channel side wall but was similar to [CU22] behind the north side wall (see section 11.6). However, [CU20] contained numerous finds while there was nothing in [CU22] although the volume excavated was small. The OD height of the tops also differed:

	[CU22]	[CU20] north side
East	31.59	31.50
Centre	31.54	31.54
West	31.54	31.48

It appears that both deposits were water-laid but that [CU20] in the main channel was being reworked at a much later date. Layer [CU22] beneath the north side wall could be a scrap of an ancient terrace of the river Wandle, but it seems far more likely that it is part of a water-course bed which predated the construction of the brick culvert.

Layer [CU20] rested on layer [CU21] which was interpreted as natural. The top of this, and therefore the bottom of the channel deposits, was between 31.30 and 31.37m OD.

16.1.2 Trench CW

The highest water-laid deposits were layers [CW207] and [CW208]. Layer [CW208] occupied a small area in the northeast corner of culvert section 2 immediately down-stream of the culvert widening. It consisted of gravel, sand and dark brown soil and seems to have formed a small bar in a corner where the water speed was lower.

The rest of the culvert floor was covered by layer [CW207] which also lapped over the edge of [CW208]. It consisted of fine brown silty soil with thin pockets of sand and some water-rolled ceramic building material.

Layer [CW207] rested on [CW209] which consisted of gravel in a matrix of brown soil. The deposit contained some brick and pieces of decorative material (see figure 228).

Both layers rested on [CW215] which consisted of very loose sand and gravel. There was some yellow stock brick in the upper part of the deposit, which also contained many pieces of decorative material. At the east end the lower part of the layer was darker and this was

[165] The fill above the water-laid deposits is described in section 11.5.

underlain by sand and small grit. The was a piece of squared wood in the lower part of the deposit resting on the underlying layer. It was aligned east-west. It did not appear to be *in situ* and may have washed downstream.

Layer [CW215] rested on [CW231] which consisted of green clayey sand and was almost certainly the *in situ* base of the Thanet beds. The top was clearly water-worn and there were two significant scour holes, one towards the centre of the deposit and one in the southeast corner (figures 229 and 230). The highest point of the deposit was at 31.36m OD on the north side of the channel. The top dipped southwards. This was more or less the same height as the gravel forming the bottom of the stream bed at the culvert entrance [CU21], which had a top between 31.30 and 31.37m OD.

There was a line of oyster shells set on edge in the top of layer [CW231] as shown in figures 229, 230 and 231. They were aligned north-south and were about 14 to 16cm from the upstream edge of the brickwork around the sluice. Most of the Wealden marble slab was found in the water laid deposits and it is possible that they once covered the floor of the channel. If so, the shells may have been packing between the slabs.

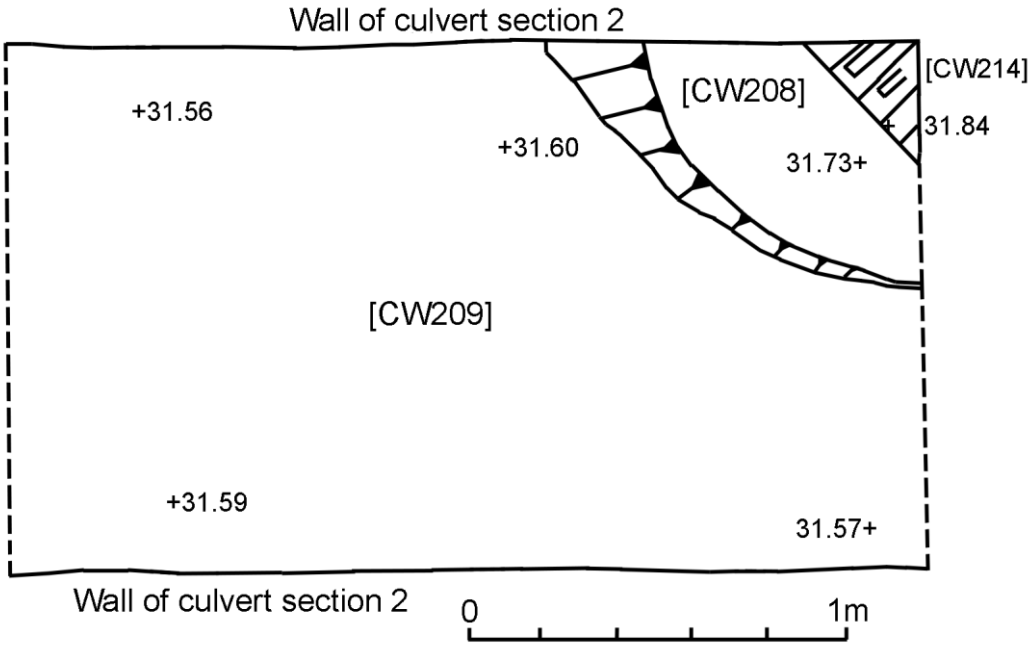


Figure 228. The top of the water-laid deposits in the culvert showing contexts [CW207] and [CW209].

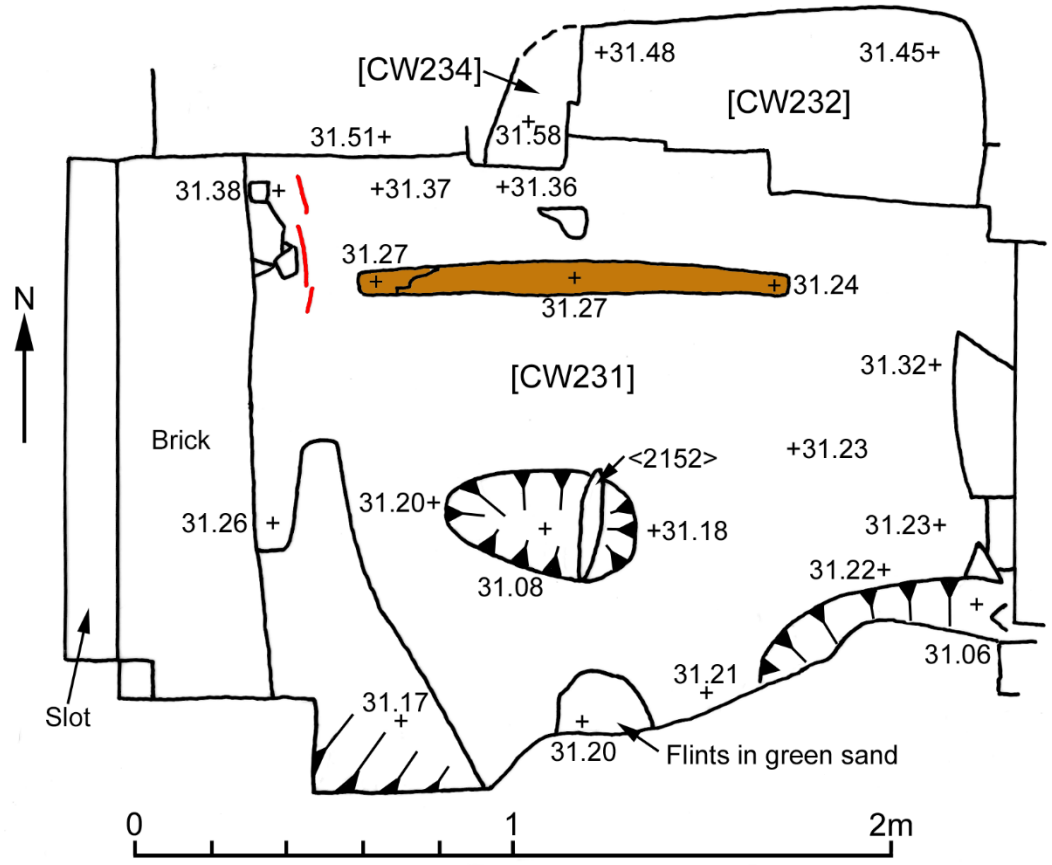


Figure 229. The top of the natural [CW231] below culvert section 2. Red = lines of oyster shells on edge. Brown = wood.

Figure 230. The top of layer [CW231] looking south. Note the scour holes and the line of oyster shells on the bottom right-hand edge of the deposit.

Figure 231. Detail showing the line of oyster shells embedded in [CW231]. West at the top.

16.1.3 Grey calcite in the culvert

The brickwork in the culvert and the fragments of culvert arch found in the fill of the large cut [CW37] were often covered with a thin layer of grey calcite with a bumpy surface (figure 232). In culvert sections 3 and 4 this covered the side walls and the underside of the arch.

There are two ways that this could have been deposited: from water running through the culvert or from the evaporation of spray rising from a sluice or weir: water seeping through the roof would have produced smooth flowstone or stalactites.

If it was caused by spray the deposits above the water line would be different from those below. This was not the case as the deposits on the lower part of the side walls were the same as those on the top. This implies that at some point in the past the culvert flowed full to the top of the arch.

Photos of the culvert show that the calcite was curiously patchy, being absent from some area for no obvious reason. It did not appear to be common on the flint and mortar in the side walls of culvert section 4. This may be because the different surface was less favourable to deposition.

Figure 232. Calcite with a bumpy surface on brick clump <129> from [CW3].

16.1.4 Black deposits

These consist of a thin black film which covered much of the three or four courses of culvert wall immediately above the silt. There were patches higher on the walls, in areas around the culvert into which water has penetrated, and on some finds.

On the walls the black deposit often overlay grey lumpy calcite, suggesting that deposition conditions changed. This is likely to have been caused by water pollution in the 19th-century. At this time the population of Croydon, about 2.5km upstream of the garden, rose rapidly and the centre of the town became very unsanitary with much sewage flowing directly into the Wandle. A Local Board of Health was formed in 1849. They attempted to improve the situation by constructing a sewage works at Pitlake which filtered and deodourised the water before it to flowed into the river. This did not prevent the river becoming polluted to a 'fearful extent; nausea and sickness were the result of its feculent scum, and numerous actions and injunctions against the Board arose from those who had property in the drainage valley below the town'. An act of 1858 allowed them to take the sewage outside the town.[166] Various legal actions forced the board to look for another solution and they constructed a sewage farm on the northern part of the Carew's former deer park. This started working in 1860 and the outflow from it entered the river well below Carew Manor.[167]

16.2 The flow regime and channel gradient

16.2.1 The history of the channel

The Beddington and Bandon Enclosure Award map of 1820 (figure 233) shows a watercourse leaving the Wandle about 80m below Beddington Ford. It ran westwards just south of the boundary wall of the central garden. It divided into two 15m east of the orangery wall. One channel seems to have run northwards into the east lake. The other channel ran southwest. It entered the garden about 38m south of the Orangery wall through the culvert found in the excavations. It passed under a drive running along the inner side of the garden wall and flowed into a channel running west across the garden. The channel in the garden is slightly south of the channel entering the garden under the wall.

The Tithe award map of 1840 and the first edition 25 inch Ordnance Survey of 1868 (figure 234) show similar arrangements, although by 1868 the drive along the wall had disappeared and the entrance and exit channels are aligned. The channels are also shown on the 1897 Ordnance Survey map except that the west end of the watercourse within the garden had been filled or covered over. There is a line across the channel just downstream of the culvert exit which might be the penstock mentioned in the orphanage minute book of 10 July 1873.[168] If so this is a rather odd place for a penstock, as the water would have to back up to the spill way into the east lake. There is a similar line across the channel just before it disappears underground at the western end of the channel.

The channel within the garden is still shown on the 1913 Ordnance Survey map, but the southwest-running water course to the east of the garden had disappeared and had presumably been culverted. The channel within the garden is not shown on the 1933 Ordnance Survey map and had presumably been filled.

[166] Anderson 1882 p. 228-235.
[167] Crimp 1894 p. 168-173.
[168] Sutton Archives D2/2/1.

Figure 233. The channel on the Enclosure Award map, 1820.

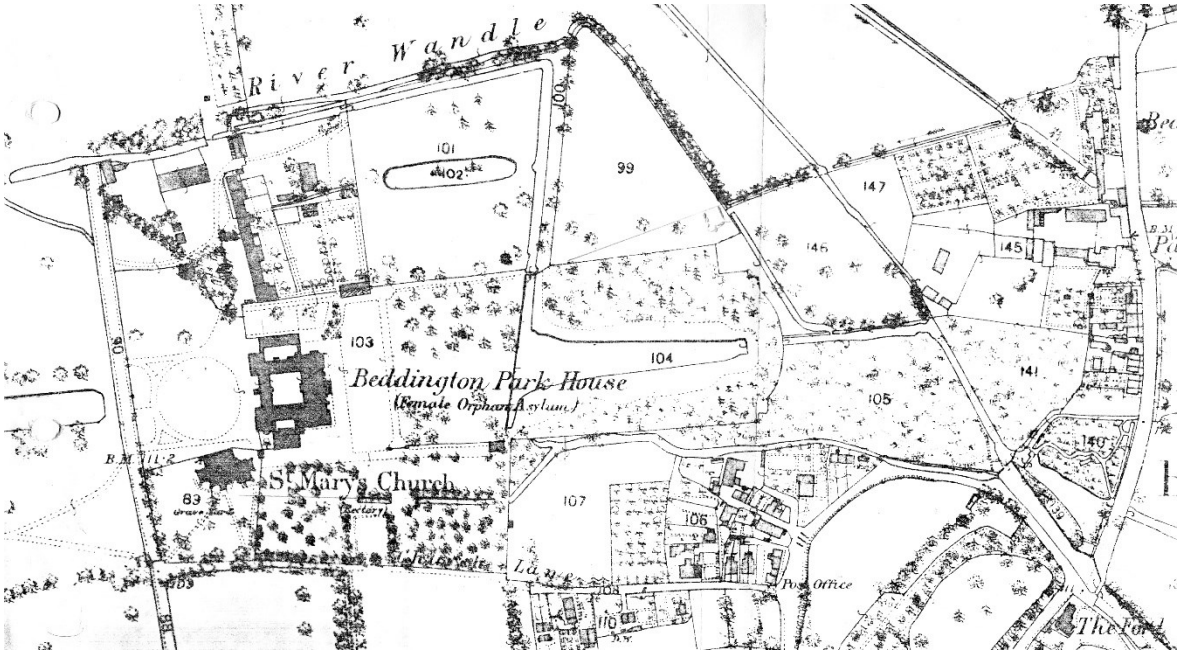


Figure 234. The channel on the first edition on the 25 inch Ordnance Survey map of 1868.

16.2.2 The gradient and flow regime

The river Wandle has been regraded since the 19th-century and there is now no direct evidence for the height of the channel at the point it left the river. However, the first edition 25 inch Ordnance Survey map shows a spot height of 111ft on the road by Beddington Ford. The surveying for this map was related to an Ordnance Survey benchmark in Liverpool while the modern maps are related to a tide gauge at Newlyn in Cornwall. The difference in height

locally is about -1.1ft which means that 111ft would be 109.9ft or 33.5m OD.[169] It was about 397m along the river and the channel from the ford to the garden wall and another 8m from the wall to the culvert exit in trench CU – a total of about 405m to the culvert exit in trench CU.

At the culvert exit in trench CU the centre of the channel bottom was at 31.31m OD, the top of the gravel at 31.52m OD and the top of the silt at 31.75m OD.

If we assume that the water at Beddington Ford was 0.3m deep, then the channel gradients were:

	Drop (m)	Drop (m/km)
Ford floor to CU channel floor	1.89	4.67
Ford floor to top of gravel in culvert	1.68	4.15
Ford floor to top of silt in culvert	1.45	3.58

In 1999 the Museum of London Archaeological Service excavated the site of the then Orchard Works prior to development of Church Paddock Court. They found the filled watercourse in the northeast corner of the site 128m upstream of the culvert entrance in trench CU. This had the following silting sequence:[170]

OD to top.	Thickness (m)	Deposit
32.70	0.5	Dark brown clay silt
32.20	0.25	Fine gravel
31.95	0.25	Dark brown silt with occasional fragments of tile
31.70	0.15	Mid grey clay silt and gravel
31.55		Bottom

If the surveying is correct, the original channel bottom dropped 1.65m in the 277m from Beddington ford to the Museum of London trench and 0.24m in the 128m from the trench to the culvert exit in CU.[171] This suggests that there was initially no significant drop where the stream entered the garden. However, over time 1.15m of silt accumulated in the channel in the Museum of London trench, apparently in four phases with variations in water speed: initially fast enough to move gravel, then slower depositing silt, then faster again and slower. This suggests that some of weir or obstruction had been created downstream possibly on the site of the ornamental structure. Unfortunately, there was no evidence for dating the sequence.

[169] The difference between Liverpool and Newlyn heights varies from place to place. The correction used here is from the Ordnance Survey web site https://www.ordnancesurvey.co.uk/gps/legacy-control-information/liverpool-to-newlyn accessed 8 August 2019. The ford has now been bridged. The 1966 OS has a spot height of 112ft on the road just north of the bridge.

[170] Saxby 1999. Trench 6. The watercourse was 1.4m deep. I have assumed that this is the depth from the surface which was at 32.95m OD.

[171] There is no evidence for the height of water levels in or around the ornamental structure. However, the south east corner of it was at 31.78m OD, about 0.47m above the floor of the culvert. It is therefore likely it was built to a somewhat higher water level which would further reduce the channel gradient.

17. THE HISTORY OF THE STRUCTURES

The ornamental structure consisted of several parts: the section at the eastern end consisted of a foundation made of a mass of green mortar. This supported a structure of grey mortar, flint and decorative materials. The northern side of the foundation ended in a rough break which appeared to be the result of demolition, presumably to make way for the culvert. The inner part of the western side of the structure was also a demolition break. The decorative material to the west of this break had a completely different character and appeared to be a later modification (see section 12.1).

17.1 The original ornamental structure

17.1.1 The form of the ornamental structure

On the east side the green mortar foundation had a thickness of about 0.42m. The top sloped down to the north so it may have become thinner in that direction, but this is uncertain as the north side was hidden behind later brown mortar. The walls above the foundation were uneven but had a thickness of around 15cm. This, combined with the relatively soft mortar, makes it difficult to see how they could have extended upwards for more than a metre or so without additional support. The uneven surface of the outside of the south wall is not consistent with the mortar resting against timber either as form-work during construction or as a permanent support. The structure could have been built against the southern side of a trench or cut but the thin mortar wall would have then then to have withstood the pressures generated by soil creep. The upper part of the structure also seems to have been displaced to the southeast so that it oversteps the foundation by about 3 to 4cm. This probably happened during demolition but it would not have been possible if the walls were backed by an earth bank.

A number of lines on the outside wall suggest it was built up from fairly small irregular masses of mortar and decorative materials. The mortar was presumably dry enough to stand with little support when placed. The structure was presumably built up fairly slowly to allow some hardening before more material was added. The resulting outer surface was neither smooth nor decorative and was clearly not intended to be seen.

An open structure of soft mortar which may well have been wet or even waterlogged would be desperately vulnerable to frost in the hard winters of the 16th and 17th centuries. It is possible that it was covered by some sort of timber structure either permanent or temporary. There are hints of such structures in the Carew accounts. In October 1603 John Sherlocke was paid for the sawing 'of 1j^{c} iij^{xx} foote of oken borde for the dragon howse at ij^{s} the hundred v^{s}iij^{d}'. The boards could be for walls or a wooden roof where they might be overlapped. In the 16th-century timber buildings normally rested on a low wall of brick or stone to separate the ground-sill from the damp earth. No trace of such footings was found.

If there was a permanent roof it could have been covered with peg tiles. The finds retention policy involved the discard of peg tile from the main cut [CW37] unless it had a surviving full length or width, had limescale or some unusual feature. Unmortared peg tile from a roof would therefore have been discarded so we cannot be certain if the structure had a tiled roof. My *impression* is that there was very little unmortared tile. Although roof tile is easily salvaged and reused, it does not need many discarded breakages to make a significant number of finds. I think it probable that the structure did not have a tiled roof. This means that there is currently no evidence for a building over the structure: it was either in the open or the cover was ephemeral, most likely wood.

17.1.2 Stratigraphic setting

The lowest deposits exposed were a green sandy clay – almost certainly part of the Bullhead beds at the base of the Thanet sand. To the south of the structure these were covered with orange silty sand which was probably hill wash.

The deposits to the south of the decorative structure below the foundation of the gravel walk [CW105] and [CW115] contained a significant number of pieces of decorative material including the copper leaf <80> which came from [CW10]. The lower part of the deposit contained an L25 pipe bowl which means that the deposits cannot predate the early 18th-century. The deposits also contained a few pieces of decorative material:

Context	Special	Material
[CW30]	<126>	Spiral shell
[CW30]	<131>	Granite
[CW30]	<132>	Granite
[CW30]	<133>	Amphibole
[CW30]	<130>	Coral?
[CW30]	<134>	Hard pink mortar
[CW30]	<455>	Mortar with trace of ferrous conglomerate
[CW30]	<456>	Brown mortar with mica flakes
[CW212]	<2272>	Wealden marble
[CW212]	<2273>	Wealden marble

There was also a brick 67mm thick in [CW212] which is likely to date from about 1718 or later.[172]

Could the ornamental structure have been built in a cut in the bank in or after the early 18th-century? There are two pieces of evidence against this:

1. The south wall of the structure does not appear to be the cast of a cut.
2. The wall of the structure appears to have been displaced to the south and east as the wall oversteps its foundation. This would be impossible if the wall was against the bank. The pressure of soil behand the wall would be more likely to displace the top in the opposite direction.

If the structure predated the deposits to the south of it, in what context did it stand? There was no sign of a soil level to the south of it or of any significant break in deposition between the top of natural and the gravel track foundation represented by layers [CW105] and [CW115]. It appears that the ornamental structure was placed in the bottom of a large cut which must have extended southwards beyond the edge of trench CW. There were no silt deposits, so the cut could not have been a pond unless it was thoroughly cleared out before it was filled, which seems unlikely.

The gravel deposit [CW34] in the northwest corner of the 2001 trench could be interpreted as part of a pre-structure watercourse bed rather than natural. However, large flints in a clay matrix are not consistent deposition in a small stream or pool, and it seems more likely that the deposit was derived from the underlying Thanet beds.

The gravel deposit behind north side wall of the culvert in trench CU did look like a geologically recent water-laid deposit, and may be the bed of a stream which existed before the culvert was constructed. The lack of finds in it makes it impossible to decide whether it

[172] Phillips 2016 p. 85-88.

existed in the 16th-century or whether it was part of some arrangement which immediately preceded the construction of the culvert.

The deposits have another anomalous feature. The level of top of the gravel walk [CW105] was not much different from existing ground level in the playing field to the west of the trench. On the west side the gravel sloped steeply down rather than ending in a vertical cut, which would be expected at the edge of a construction trench (figures 84 and 88). The slope suggests that the gravel had been either slighted or subsided, which implies a drop and possibly a retaining wall along the west side of it. This would in turn mean that in the 18th-century the soil level to the west of the excavation was significantly lower than today. However, if a retaining wall existed it was demolished leaving no trace.

Taken together, the stratigraphic evidence suggests that the area in and around trenches CU and CW was subjected to a fairly major landscaping in the early 18th-century, which removed any demolition surface. Most of the earlier deposits seem to have been removed and replaced by fill. It is possible that this followed the extraction of green sand for use in the construction of the 18th-century garden.

17.1.3 The ornamental structure – building methods and materials

The surviving fragment of original ornamental structure fell into three parts: a foundation with green mortar which was either covered with a layer of pale brown mortar or supported an upper structure consisting of thin walls bonded with grey mortar.

The green mortar probably owes its colour to the use of Thanet sand which is the underlying natural in the immediate vicinity. Thanet sand is fine, and the lower parts of the deposit are clayey, and it may be that the material was intended to be a waterproof cement. It may be similar to the dark grey mortar used in the cellar walls of the former kitchen within the house, which are likely to date from the first half of the 16th-century.[173]

The pale brown mortar on the foundation top may also have been intended as a waterproof layer. It could be an addition to the structure but was lighter and appeared different from the dark brown mortar used on parts of the demolition surfaces and in culvert section 1.

The grey mortar in the upper structure was the usual material used around the site.

The function of the roof tile is unclear. If it was simply a filler there seems to be little point in laying it in in courses – even rough ones. The coursing may have been seen as a binding agent but if so, it would seem to be better to use whole tiles rather than fragments. The tiles frequently had limescale on them which suggests that they tended to act as a barrier to water trickling through the structure. However, this may not have been a designed feature – it could simply have happened as the structure decayed.

The ornamental structure contained broken peg tile set in both the grey and green mortar which was often not laid flat. In the loose rubble from both CW and the deposits below the chalk path foundation in trenches CM and CN it was usually set in grey mortar. Some of the tile was broken before it was set in the mortar but in a few cases it had been broken while in the wet mortar.

Tile courses are common in Roman masonry and it has been suggested that they were to provide tensile strength. This seems unlikely in the ornamental structure as strength would be better provided by long whole tiles rather than fragments. The bond between lime mortar and tile is in any case weak and unlikely to withstand any significant tensile load. The tile

[173] Phillips and Burnett 2016 page 80 (figures 63 and 64) and page 91.

courses may have been a self-conscious imitation of Roman practice, but this seems unlikely as there is no sign that the material was visible on the outside.

Some material found in the cellar fill in the former Portioner's House in Beddington Park provides an interesting comparison. The material consisted of fairly soft mortar with a great deal of broken glass bottle and some large pieces of broken peg tile, sometimes in courses. The material probably came from a floor and the glass was probably intended to deter burrowing rodents. The most obvious function of the tiles would be to spread the weight of people or objects on the cellar floor to reduce the load on the soft mortar.[174]

The peg tile debris from the ornamental structure may have been used to spread focused loads, possibly underlying a tile or stone slabbed floor. It is possible that the tile courses visible in the side walls of culvert section 4 are the edge of a floor (figure 214). This is however, not consistent with the way that peg tile is used in the surviving piece of structure.

The walls appear to have been built up from mortar, flint, tile and decorative materials. This was presumably done in short sections to allow the mortar to harden and stabilise so that it could support the next layer.

17.1.4 The ornamental structure – decoration

The main decorative materials were ferrous conglomerate and large knobbly flints. Metamorphic rock and siliceous limestone were rather less common, perhaps because supplies were limited. They were brought from a considerable distance: the flint and ferrous conglomerate were more local. These four materials were all present in the surviving structure and were common in the fragments in the fill of the cut above culvert section 2 and in the other excavated deposits. The ferrous conglomerate, most of the metamorphic rock and some of the siliceous limestone would have given parts of the structure a red or brown colour which would have contrasted with the grey flints and black amphibolite.

The only other decorative material in sections 2 and 4 of the original structure was an abalone shell. The date of the other unattached shells is less clear and it is possible that some of them were connected with a 19th-century summer house which was in the garden (see section 13.10).

Some of the fragments of pink and grey marble and coral were found in early-18th-century contexts which contained other decorative materials. These appear to be connected with the demolition of the structure, so it is likely that they were part of the original decoration. Within trenches CU and CW the Palissy-type ceramic was only found in late contexts. It was however found in an early-18th-century context in trench CG and on stylistic grounds it is unlikely to be later than the mid-17th-century: after that it would no longer be fashionable. There were only a few pieces of glass waste and it is likely that this was introduced in the early-18th-century alterations.

The original position of the Wealden marble is unclear. It may have formed the bottom of the pool which was created when the culvert was laid in the early 18th-century. However, a few pieces were found with other ornamental fragments in the deposits south of the ornamental structure, beneath the walk. This suggests that if the material was on the pool floor it was reused. If they were part of the 16th-century structure they may have been used on the floor and edges of a pool, as the floor of a room within the rock or possibly part of a cascade.

[174] Phillips 2020 *Portioner's House* p. 92, find <224>. Most of the glass dated from the late 18th-century.

In surviving 16th and early 17th-century grottoes formal architectural elements are often covered with shells or small stone chips which were light enough to be held in place with plaster. The low proportion of shells and small stone chips suggests that this sort of decoration was not present in the structure – or perhaps in the parts of the structure represented by the surviving fragments and rubble. Many decorative pieces were too heavy to be held on a ceiling or wall. It seems that the structure was essentially rustic.

17.1.5 The date of the ornamental structure

The only datable object in the ornamental structure was a brick mortared into the southeast corner (figure 126). This was 52 to 53mm thick and therefore probably Tudor, but it was not taken out of the structure and could not therefore be fully examined. Bricks are also reused so it cannot be considered a reliable piece of dating evidence. The structure itself was left *in situ*, so there was no excavation beneath it and therefore no stratified finds that could be used for dating. The latest finds in the deposits to the south of it date from the early 18th-century and they rest directly on natural without any intervening or earlier deposits. This means that there is no direct stratigraphic evidence for the date of the structure. There is however some significant indirect evidence:

- The structure had clearly been partly demolished to lay a culvert which appeared from the bricks to date to the early 18th-century (section 15.1.2).
- A mass of rubble from the ornamental structure – or something very similar – had been dumped as fill under the chalk walk foundation excavated in trenches CM and CN. This material was exceptionally securely stratified as the chalk foundation was solid and any cut through it would have been very obvious. The dump included rubble which appeared to have come from the remodelling of the house which is known to have taken place about 1710-12.[175] There were no small finds in the deposit which were inconsistent with this.

It is therefore clear that the greater part of the ornamental structure was demolished at the beginning of the 18th-century, almost certainly by Nicholas Carew, 1st baronet, who owned the house from 1707-27. If Nicholas demolished the structure, which of his predecessors put it up? The obvious suspect if Francis Carew (d.1611) as there is clear documentary evidence to show that there were elaborate ornamental structures in his garden. The subsequent family history does not provide another likely candidate.

Sir Francis Carew died unmarried in May 1611 and his property was left to his nephews, the descendants of his sisters. Beddington and the garden went to Nicholas Throckmorton, who was the son of the ambassador Nicholas Throckmorton and Francis's sister Anne. On inheriting the estate he changed his name to Carew, but he received only part of the lands and would not have been as rich as Francis. He appears to have maintained the garden. In November 1616 there was a request for lemons for 'the prince' and in 1623 a request originating from the king to allow a tour of the garden.[176] Nicholas died in 1643, leaving a son Francis who was financially inept and at one point had to flee abroad to escape his creditors.[177] He was also heavily fined for supporting the Royalist side in the Civil War and by the time of his death in 1649 the family's financial position must have been much weaker than when his father inherited the estate in 1611. In 1650 the house and garden were leased to Robert Rich, 2nd Earl of Warwick (1587-1658) who carried out a series of repairs and

[175] Phillips and Burnett 2016 vol. 1, p. 28-31.
[176] BL, Add MS 29599 fol. 6, fol. 18.
[177] N. Burnett, *Notes on the private life of a Carew*, (unpublished research note to the Carew Manor Group on 26 January 1995).

submitted accounts to reclaim the cost from the trustees of the estate.[178] These give some impression of the state of the garden. Two bricklayers were paid for six days to mend the little house by the 'mount house, and the stones of the mount house'. Laths, lath-nails, hair and tile pins were bought for the Little House by the Mount House which suggests that it was largely made of lath and plaster with a tile roof. There are also payments for men and materials to mend the billiard house. Four men were paid to clean the 'egg pond', bricklayers were employed to mend the sides and a carpenter to mend the penstock. A carpenter also mended the force mill and a Nicholas Constable was paid £60 for making a new orange-house. Money was spent on mending its stoves and then two new ones were bought. A fountain house was also repaired.

The orange-house, egg pond and force mill can fairly obviously be equated with structures in the Elizabethan garden. The 'stones of the mount house' are very suggestive of the rock, and the 'little house by the mount house' may possibly be equated with the building that covered the hydra, which appears to have stood near the rock. The only new building is the billiard house, which could easily have been added to the garden in the forty years since Sir Francis's death. The Earl of Warwick's accounts therefore give an impression of continuity rather than radical change, and they also suggest that the garden had, unsurprisingly, got into a rather poor state during the Civil War.

There is very little information on the house and garden in the third quarter of the 17th-century. Sir Nicholas Carew, who came of age about 1656, was an active Member of Parliament, but we know very little about his activities at Beddington. He died in 1687, leaving a son Francis who died just two years later in 1689. His son, another Nicholas, was only an infant, and a long minority followed when trustees administered the property. Two descriptions from this period suggest that the garden was neglected. The first by a J. Gibson dates from 1691. He says:

> The heir of the family being but about five years of age, the trustees take care of the oranges, and this year they built a new house over them, but they look not well for want of trimming. The rest of the garden is all out of order, the orangery being the gardener's chief care; but it is capable of being made one of the best gardens in England, the soil being very agreeable, and a clear silver stream running through it.[179]

The second appears in John Evelyn's Diary for 20 September 1700. He found the garden,

> decaying with the house its selfe, heretofore adorned with ample Gardens, & the first Orange trees that ever were seene in England, planted in the open ground, & secured in Winter onely by a Tabernacle of boards, & stoves, removable in summer; thus standing 120 yeares large & goodly Trees & laden with fruite, but now in decay as well as the Grotts & other curiosities, cabinets and fountaines in the house & abroade, thro the debauchery & negligence of the Heires, it being now fallen to a child under age, & onely kept by a servant or two from utter delapidation. The Estate & Parke about it also in decay: the negligence of a few years, ruining the elegances of many.

In 1707 Nicholas Carew appears to have inherited a property that was both old-fashioned and in a poor state of repair. He remodelled the house about 1710-12 and it appears from the deposits in trenches CM and CN that he started work on the garden, including the laying of the axial walk running east from the house. He may also have laid the earliest culverts in trench CW around the same time, as the thin bricks used are typical of his earliest work.

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[178] SHC 2152/1

[179] Hamilton 1794 p. 182-3. Discussed in Slater 1978 p. 29-30.

However, his work on the garden seems to have been slow or piecemeal as the wooden orange house and the grotto with the banqueting house with the painted ceiling survived to be seen by Richard Rawlinson in May 1717. The orange house was rebuilt some time between then and 1721. Nicholas Carew also created a lake and cascade at the east end of the garden, which, on the evidence of the brick sizes, is roughly contemporary with the rebuilt orange house.[180]

17.1.6 Can the ornamental structure be equated with a documented garden building?

There are three documented garden buildings which might be equated with the ornamental structure:

- The grotto under the banqueting house which was decorated with 'mineralibus or various kinds of brass'. This was later converted into a cold bath (section 4.4).
- The grotto artificially built with all kinds of shell containing a creature with many heads out of which the water gushed (section 4.6).
- The beautiful square-shaped rock or little hill with a stream of water running from it and 'furnished with all sorts of neatly made animals and little men as though they were alive' (section 4.5).

The upper insides of renaissance grottoes are generally decorated with either shells or stone chips set in plaster or occasionally with fresco as in the Great Grotto of the Bobili garden in Florence. The use of small pieces of rock on ceilings was a practical choice as large fragments would have been hard to hold in place unless they were light materials such as tufa. The two Beddington grottoes seem to have conformed to this general pattern: the one under the banqueting house was decorated with brassy 'mineralibus' – very likely small chips, the other was decorated with shells. Neither seems to fit the surviving fragment of ornamental structure or the finds around it: there was too many large pieces of decorative material in trenches CU and CW, and not enough small chips and shells. Brassy minerals do not fit with the rocks found in the excavations and are more likely to have been iron pyrite.

The fit between the finds and the 'rock' seems better. A rock would also be consistent with larger fragments of material and the scrap of ceramic lizard tail might the remains of one of the little animals. The ornamental structure was almost certainly located at a point where a stream entered the garden. The water flows in several renaissance gardens start with a rock. The most striking is probably Mount Parnassus at Tivoli with large cascades below it. The waterflow at Castello starts with a personification of the Apennines sitting on a small rock in the centre of a pool: at the Boboli, in Florence, there is a rock and pool with Neptune.

Waldstein said that the rock was square-shaped and that the 'stream flows right through it and washes all around'. The tile-capped flint in the sides of culvert section 4 could possibly be the remains of the channel through the rock. There was some evidence of flint work in the lower part of the wall of section 3, but this seems to have been largely below the top of the silt, so our knowledge of its extent is very limited. The flint work contained at least one piece of brick which was below the top of the silt. It was impossible to see if this was a minor repair or was characteristic of the lower part of the structure. The flint work was inter-bonded with the brick at the western end of section 4, but it is impossible to tell whether this was due to the use of different materials a single building campaign or the result of an addition to the end of rather ragged flint work. The crack in the brick culvert arch suggests that section 4, at the eastern end, had subsided by about 20mm but the reason for this is unknown.

[180] Phillips 2016 pages 85-88 and 91-96.

It is possible that culvert sections 3 and 4 were originally a channel through the ornamental rock and that the flint in the side walls is part of the foundations. The surviving fragment of ornamental structure could then be seen as part of the opening where the water flowing through the arch entered a surrounding pool. The two sections of culvert have a length of about 4.4m which would be the length and width of any square rock built around them. This would give it a footprint of about 19m^2 and, if the height was about the same as the length of the sides, a volume of 28m^3 and a surface area around 43m^2. These are obviously only very crude approximations, but they show that it would be a very substantial structure and that the excavated decorative materials would cover only a small part of the surface.

The natural appears to be the green clayey sand which forms the lower part of the Thanet beds which would probably be impervious. The pool may have been floored with the thin Wealden marble slabs resting directly on the Thanet beds. Their removal may have left little trace but it is odd that the rock seems to have been demolished without scattering debris over the then existing surface. It is possible that after demolition, the area was used to extract some green sand for use in the construction of the early-8th-century garden.

17.2 The development of the culvert

At some point the northern side of the ornamental structure was demolished and a culvert was laid through it. The bed of the culvert was around 31.31 to 31.37m OD, significantly lower than the base of the south wall of the ornamental structure at about 31.78m OD.

The oldest extent parts of the culvert appear to be sections 3 and 4, which ended in a rough break where the end of section 3 appears to have been demolished to make way for section 2 and its preceding structures.

The flint-work in the sides of section 4 underlies the brick and may be older as discussed above.

The brick arch of culvert section 3 and 4 is a single structure. The bricks (with one exception) had a height of 53 to 59mm and one had a diagonal hack mark. They are likely to be early-18th-century and, although the sample sizes are small, are not really distinguishable from those in the oldest parts of the side walls of culvert section 2 and the inner channel walls in trench CU. The bricks in the latter areas had a median thickness of around 60mm. Some chalk rubble was used in the back of these side walls and they were bonded with green sandy mortar. The walls defined a channel 1.45m wide in trench CU and 1.42m at the western end of section 2. On the south side of the channel the side walls end in a bonding break about 1.9m from the western end of culvert section 3. The gap was filled by the original part of the ornamental structure and the collection of loose decorative material at its western end.[181] On the north side the channel ended against mortar mass [CW234] 1.38m from the end of section 3. The mortar had a width of about 0.26m leaving a gap of about 1.12m with no obvious lining. The slot at the beginning of culvert section 1, immediately after section 2, was probably for a sluice to retain water in this area.

Twenty-nine pieces of Wealden marble were found in the bed of the culvert. This was 78% of the 37 pieces found in trenches CU and CW. This suggests that the stone was used or reused within the culvert. The material was divided into thick and thin slabs with some intermediate pieces. The thin slabs had a thickness of around 14 to 24mm and one had a full

[181] Section 5 of the ornamental structure. See section 12.1.

surviving width of 300mm.[182] The thin slabs may have been paving on the bottom of the culvert. The line of oyster shells set on edge in the layer [CW231] may have been packing between the slabs. If so, the slabs rested directly on the natural green sandy clay at the bottom of the culvert. The thick slabs were between 63 and 70mm. The worked edges were a segmental curve which suggests that they may have been used as along the edge of a bath, as steps or possibly for the lip of a cascade.

The combination of the sluice, the decorated southern wall of the channel and the Wealden marble slabs are all consistent with the adaption of the grotto and channel to create a cold bath. The limescale on the underside of culvert section 3 showed that it was sometimes full to the crown of the arch at about 32.0m OD. This would give the bath a minimum depth of 0.6m. However, the upper parts of the structure of the bath in culvert section 2 are not easy to understand. There must have been some sort of retaining structure where the channel flowed from culvert section 3, and also banks along the north and south sides of the channel. It seems likely that the early side walls originally rose to a greater height. These structures may have been the source of the 59mm thick bricks found in the fill of cut [CW37].

The brown mortar was used on section 6 of the ornamental structure apparently to protect the original mortar. It was also on the brickwork for the sluice at the beginning of culvert section 1 and was used in the side walls of that section but not the arch. It probably relates to the repair of the cold bath since green mortar was used in the oldest parts of the brickwork.

The excavation created a section at the western end of culvert section 3 (figures 207 and 208). The lowest part of the structure consisted of two Reigate stone blocks, one on each side of the channel. The bottom of the northern block was at 31.37m OD, top at 31.48m OD and the top of the southern one at 31.51m OD. The channel between them had a width of 1.16m and was filled with gravel. The stone blocks supported two short brick side walls. On the north side the brickwork overstepped the stone block while the south side face rose vertically from it. These walls supported the brick culvert arch which overstepped them on both sides of the channel reducing the width to 0.92m. The channel was filled with gravel and then with silt which more or less reached the bottom of the culvert arch.

The top of the Reigate stone blocks were a little above the top of the brickwork sluice sill at the downstream end of culvert section 2 suggesting that the two channels were at more-or-less the same level. The green clayey sand which formed the bottom of culvert section 2 varied from 31.23 to 31.36m OD, if the deepest scour holes are ignored. However, the whole surface appears to have been scoured and may once have been paved, so the original surface could have been somewhat higher. If so the bottom of the proposed cold bath would be at about the same level as the channel bed.

The bath conveys a sense of improvisation using materials to hand. It would have been very vulnerable to frost unless it was kept under water.

At some point, possibly not long after its construction, the bath was abandoned and culvert sections 1 and 2 were arched over. [183] If so the wear on the thicker sections of Wealden marble must have occurred in some other location.

The western edge of the gravel walk foundation [CW105] was west of the junction between

[182] It was found in three pieces CU <11>, <12> and <17>.
[183] The surviving arch over culvert section 1 could not have been contemporary with the bath as it is of different brick and obstructs the sluice.

culvert sections 1 and 2. The gravel extended up to the edge of cut [CW37] and, before that existed, it presumably continued over both the ornamental structure and the culvert. The walk therefore appears to have been created when the cold bath went out of use, although none of the finds below it need be later that the beginning of the 18th-century. The walk is shown on the enclosure award map of 1820 and later surveys.

At some point the arch of culvert section 1 was rebuilt. This is shown by the variations in the brickwork and by the cuts for the trench dug to expose the culvert (sections 14.2 and 11.2.2).

The arch of culvert section 2 which existed at the time of the excavation was different from section 1, as it contained a great deal of yellow stock brick and appeared to be a fairly recent repair. The deep cut [CW37] had clearly been made to construct it, and the fill contained 19th-century pottery. It also contained fragments of an earlier culvert, the bricks of which had a median thickness of 64mm, significantly more than those from the oldest parts of culvert sections 1 and 2 or of sections 3 and 4. Some of the limescale had black deposits showing that the culvert had been flowing in the second half of the 19th-century when the river was heavily polluted. The fragments are likely to have been from an earlier version of culvert section 2 which either collapsed or became unstable. Cut [CW37] was then dug to expose the culvert, it was rebuilt, and then backfilled with the excavated material and the rubble. The gravel deposit [CW4] at the top of the fill of cut [CW37] may have been an attempt to partially reinstate the walk after the cut had been filled.

The bricks in the southern wall of the replacement culvert were cut to fit around the base of the ornamental structure. There was no practical need to do this as the ornamental structure is of soft mortar which could easily be cut away to accommodate the culvert. The only obvious explanation for this is that the ornamental structure was thought to be interesting and worth preserving. No historical reference to this has so far been found. It is not mentioned in Thomas Bentham's *History of Beddington* which was published in 1923. Bentham was born in Ingleton, Yorkshire, about 1857. He became Assistant Master at Whitgift's School, Croydon in 1879. He was curate of St Mary's Beddington from 1888 to 1904. He was curate of St Mildred, Bread Street, London 1904-12, St Mary Magdalen Addiscombe 1914-22 and vicar of St Mildred Addiscombe 1922-1931. He died in 1937.[184] Bentham's interested in Beddington must have continued after 1904 when he ceased to be curate. He seems to have been well connected locally and likely to have known about any discoveries in the grounds of Carew Manor which was then an orphanage. This tends to suggest that the rebuilding of culvert section 2 took place after 1923.[185]

Gravel layers [CW209] and [CW215] in the bed of the channel contained transfer-printed ware, which shows that these deposits were being laid or re-worked by water into at least the 19th-century. At some point thereafter the flow regime changed and silt was deposited. This may have been connected with the construction of a sluice downstream of the culvert which is recorded in the Orphanage minute book for 10 July 1873.[186]

[184] 1901 Census under Croydon and Crockford's Clerical Directory 1932 both via Ancestry. Death date from Shew 2012 p. 97.
[185] A date before 1888 seems less likely as the discovery would probably be remembered. Some of the finds in the cut fill cannot be earlier than the second half of the 19th-century.
[186] 'The Orphanage committee recommended 'that another penstock be placed in the stream running through the southern end of the grounds about 10ft from the brickwork at the east end'. Sutton Archives D2/2/1.

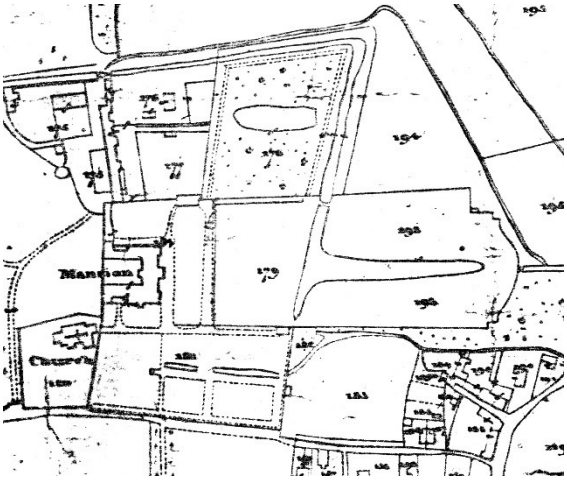
18. THE LAYOUT OF THE GARDEN

18.1 Maps

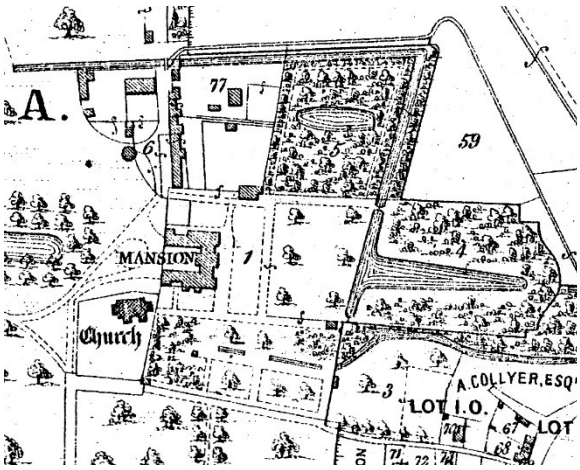
Rocque's map of Surrey dating from about 1760 is the earliest to show any useful detail of the garden. The first surviving large-scale plan was made for the Beddington and Bandon enclosure award of 1820. It was followed by the tithe award map of 1840, a plan made for the sale of the Carew estates in 1859 and then the successive editions of the 25-inch Ordnance Survey maps from 1868 onwards.

Rocque's Surrey, c. 1760.

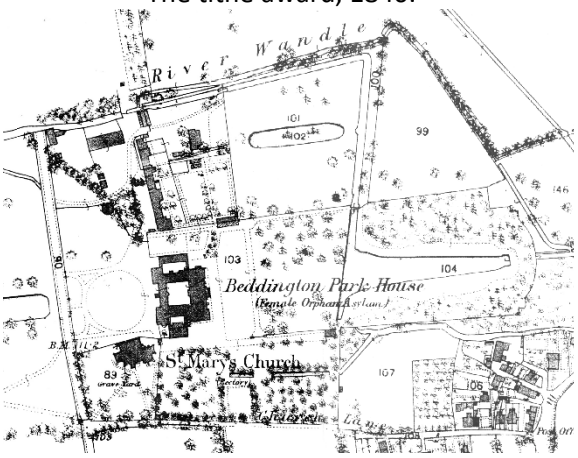
The enclosure award, 1820



The tithe award, 1840.



The Carew sale catalogue, 1859.



Ordnance Survey, 1868.

Figure 235. Maps of the house and garden.

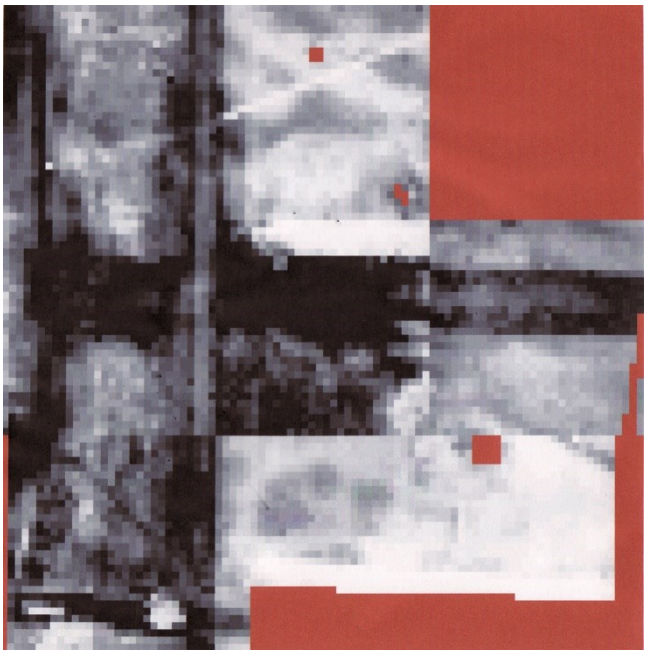
18.2 Lidar

The lidar data on the Environment Agency's web site has been processed using the Relief Visualisation Toolbox produced by the Institute of Anthropological and Spatial Studies which is a Research Centre of the Slovenian Academy of Sciences and Arts.[187] The Environment Agency's data is in effect a table of spot heights at 1m intervals with the buildings levelled. The Toolbox software turns this into a relief image in which the trees and buildings cast no shadow. The altitude and angle of the light can altered to produce the most useful result. The technique is very effective and is able to reveal slight gulleys, banks and other undulations.

Figure 236. Lidar survey of Carew Manor and the east side of Beddington Park (square TQ2965). The lighting is at azimuth 215 degrees, Height 20 degrees, vertical exaggeration 10 times. Various details of this image will be considered below.

[187] https://iaps.zrc-sazu.si/en/rvt#v.

18.3 Resistivity survey



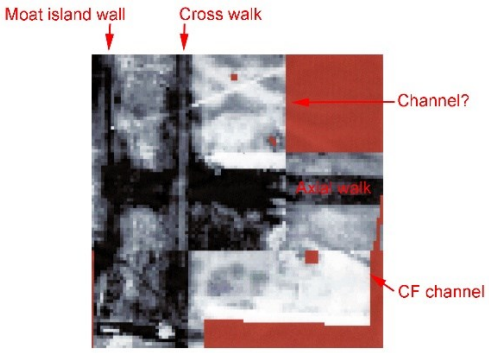


Figure 237. The resistivity survey on the east lawn (left) with interpretation above. The survey area is 90m square. Survey at 1m intervals. The areas in red were not included.

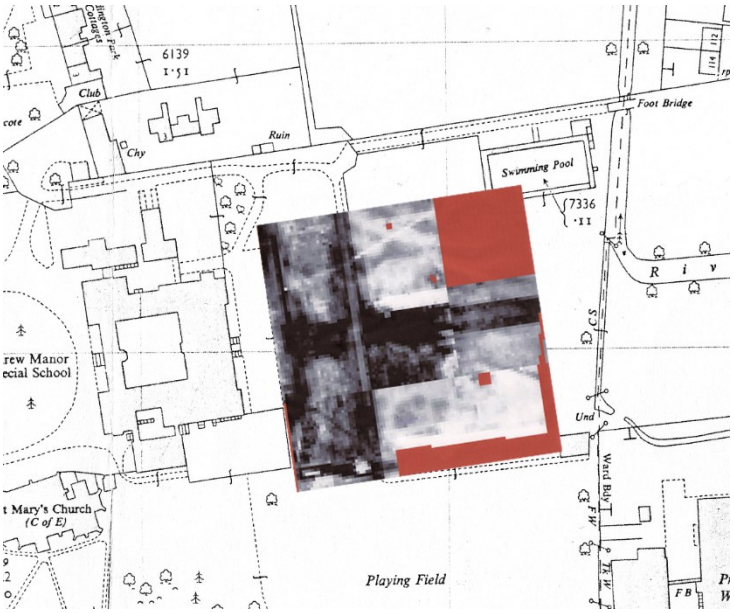


Figure 238. The 1956 Ordnance Survey map with the location of the resistivity survey.

18.4 Some fixed points

The lack of contemporary plans makes the reconstruction of the Elizabethan garden very difficult. The starting point has to be a few key features which existed in the later 16th-century and are still in the modern landscape:

- The house which contains a significant amount of 16th-century structure including the great hall. It stood on a rectangular walled moat island. Excavations have shown that the south end of the west arm of the moat was 14m wide at water level and it

seems likely that the others were similar except for a narrow area where the channel squeezed between the house and the churchyard.[188]

- The churchyard. It is likely that the boundaries of this were stable from the late medieval period until 1994 when the church was extended.
- The southern edge of the garden was almost certainly defined by Church Lane or Church Path as it is today.

The 1748 edition of Defoe's *Tour* shows that the 16th-century orange house was on the site of the 18th-century brick Orangery.[189] The eastern end of the 18th-century orangery wall overlaid a silt-filled pond or channel of uncertain medieval or early post-medieval date. If it was contemporary with the wooden orange house, the eastern end of that building must have been between 7m and 13m west of the end of brick structure.[190] The brick wall is 59.37m long and Gibson's description says that the wooden orange house was above 200 feet long (60.96m). This suggests that the orange house may have been shifted east when it was rebuilt in brick. It would have been able to cover some of the old trees but not all of them.

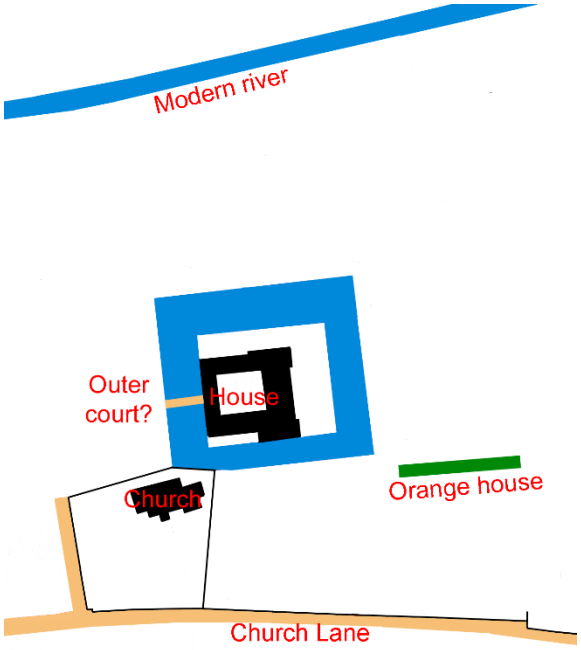


Figure 239. The key fixed points for the reconstruction of the 16th-century garden.

18.5 Garden boundaries

The southern boundary of the site is marked by a much-repaired brick wall along the side of Church Path. The wall probably includes some Tudor brickwork and was almost certainly the garden boundary in the 16th-century. On the western side the garden would have been bounded by the churchyard and the moat around the house. The eastern, northern and north-western boundaries are more problematic.

The 1820 enclosure award map (figure 235) shows a channel running from the eastern end of the former orangery across the end of the former east lake to the north side of the garden where it turned sharply to the west. This cross axis is aligned at about 13 degrees to the back of the house. The alignment was part of the early-18th-century garden, as it is incorporated

[188] Phillips and Burnett 2016 vol. 2.
[189] Defoe 1748 vol 1, p. 255.
[190] Phillips 2013 p. 30.

into the eastern end of the orangery and a pillar in the boundary wall at the northeast corner of the east lawn.[191] Early-18th-century gardens often had canals at right angles to the axis of the house but angled canals are unusual as are canals across the end of a lake. The alignment does not respect any known feature in the landscape and it is doubtful that there would be an unbroken vista down it as the gap between the end of the orangery and the garden boundary wall is narrow. This raises the possibility that the alignment survived from the Elizabethan garden. There is a similar curiously angled alignment in the west wall of the garden at Theobalds. This was at an angle of about 17 or 18 degrees to the back of the house but was aligned in the opposite direction. An angled watercourse also crosses the largest garden area at Quarrendon near Aylesbury. The garden is now reduced to earthworks and the house has been demolished. The angled channel was part of a large garden area set to one side of the axis through the house. It consisted of several channels which form an irregular pattern (figure 240). The garden was created for Sir Henry Lee who as Queen's Champion was a key figure in the organisation of the highly theatrical tournaments which took place on Queen Elizabeth's accession day. The tournaments were rich in allegory and symbolism which may have extended into Lee's garden but, if so, the meaning is elusive.[192]

Figure 240. The garden earthworks at Quarrendon from Environment Agency lidar data. OS grid north at the top. The house stood on the moat on the right hand (east) side. The large garden area to the west of the house consists of moats and banks in an irregular pattern with watercourse running across it at an angle. It is possible that the garden was never completed.

Rocque's mid-18th-century map of Surrey shows garden areas on the east side of the north-south canal to the north of the 18th-century east lake. The area is now covered by the Crispin Crescent housing estate, but an Ordnance Survey air photo taken in 1946, before the estate was built, shows no trace of the garden and there is no other evidence that it ever existed in this location.[193] Very little archaeology has been done to the east of the cross axis but there is no evidence that the Elizabethan garden extended into the area.[194] However, if it was orchard or planted in some other way without major structures it is unlikely that the remains would have been detected.

The north side of the garden may have coincided with line of the present river but this may not have existed in the 16th-century (see section 18.6.7 below).

It would be logical for the garden to extend across the north side of the house where it could be seen from the high-status rooms in the north wing. In the 19th-century this area was divided into four parts:

[191] Phillips 2016 pages 7 and 93-4; Phillips 2013 pages 13 and 21.
[192] For Lee and the tournaments see Strong 1977 chapter 5.
[193] The photo is in the local studies collection in Sutton Central Library.
[194] The archaeological work consists of the excavation of trench CD (figure 2) and the observation of flood alleviation work on the river channel. These are reported in Phillips 2016.

- The Wilderness (now called the Hockey Pitch).
- The kitchen garden.
- A wood yard to the north of the kitchen garden.
- A group of outbuildings to the west of the kitchen garden and wood yard. The eastern side of this area was occupied by a long north-south range now called Beddington Park Cottages.

The 1820 map (figure 233) shows a north-south channel between the kitchen garden and Beddington Park Cottages. A very small section of this was examined in trench CX in 2004.[195] The former western boundary wall of the kitchen garden was found to drop straight down into a deep watercourse which contained several deposits of gravel peat and silt. The deepest deposits may have been ancient natural and the earliest deposit which certainly related to the channel contained an L25 pipe bowl of early-18th-century date. It is possible that the channel was created at this time although it may have simply been cleaned out. The wall forming the east side of the channel consisted of coarse red bricks with shallow frogs which, on this site, are unlikely to be earlier than the 19th-century, although they may have been a refacing of an earlier wall, or a narrowing of the channel.

Beddington Park Cottages to the west of the channel contain parts of a timber frame probably of early-16th-century date. However, there is evidence for it having been moved, and the peaty soil seen in construction trenches in and around the building does not appear to have been cultivated (section 18.7 below). It is therefore possible, but not certain, that the formal part of the Elizabethan garden ended on or close to the north-south watercourse seen in trench CX. It is also possible that the watercourse was originally a garden moat, but this is much less certain.

18.6 Watercourses

The watercourse which passed through trenches CU and CW and then flowed across the south garden has been considered in section 16.2 above. We will here consider the channels to the north of this which flowed across the site of the East Lawn and Hockey Pitch.

18.6.1 The channel in trench CF

The lidar scan shows a shallow gulley on the south side of the east lawn. This runs across the lawn at an angle towards a point on the centreline of the house near the probable outer edge of the moat, but turns south before it gets there (figures 241 to 243). The hollow is clearly visible on the grass. Trench CF showed that the hollow marked the line of a deep watercourse (figures 243 and 244).[196] The banks were sloped with a vertical drop on each side, which may have been the result of recutting although, if so, it was not evident in the fill which was fine pale brown silt consisting of calcium carbonate with a small amount of fine sand. The calcium carbonate must have been precipitated from very slow flowing clean water. The upper part of the silt contained some pieces of tin-glazed pottery, but the latest item in the lower part of the deposit was a piece of a Cheam ware jug dating from the second half of the 14th century. The silt was covered by a thin layer of soft red brick which was clearly waste from cutting and rubbing brick. This was almost certainly left from the construction of the ornamental Orangery wall between 1717 and 1721. There was a gravel bank – probably originally a walk on the northeast side of the channel. The resistivity survey (figure 237) showed that it continued beyond the turn of the watercourse and ended near the edge of the moat on the centreline of the house.

[195] Reported in Phillips and Burnett 2016 vol. 2, p. 79-83.
[196] The full report of this excavation is in Phillips 2016 p. 59-71.

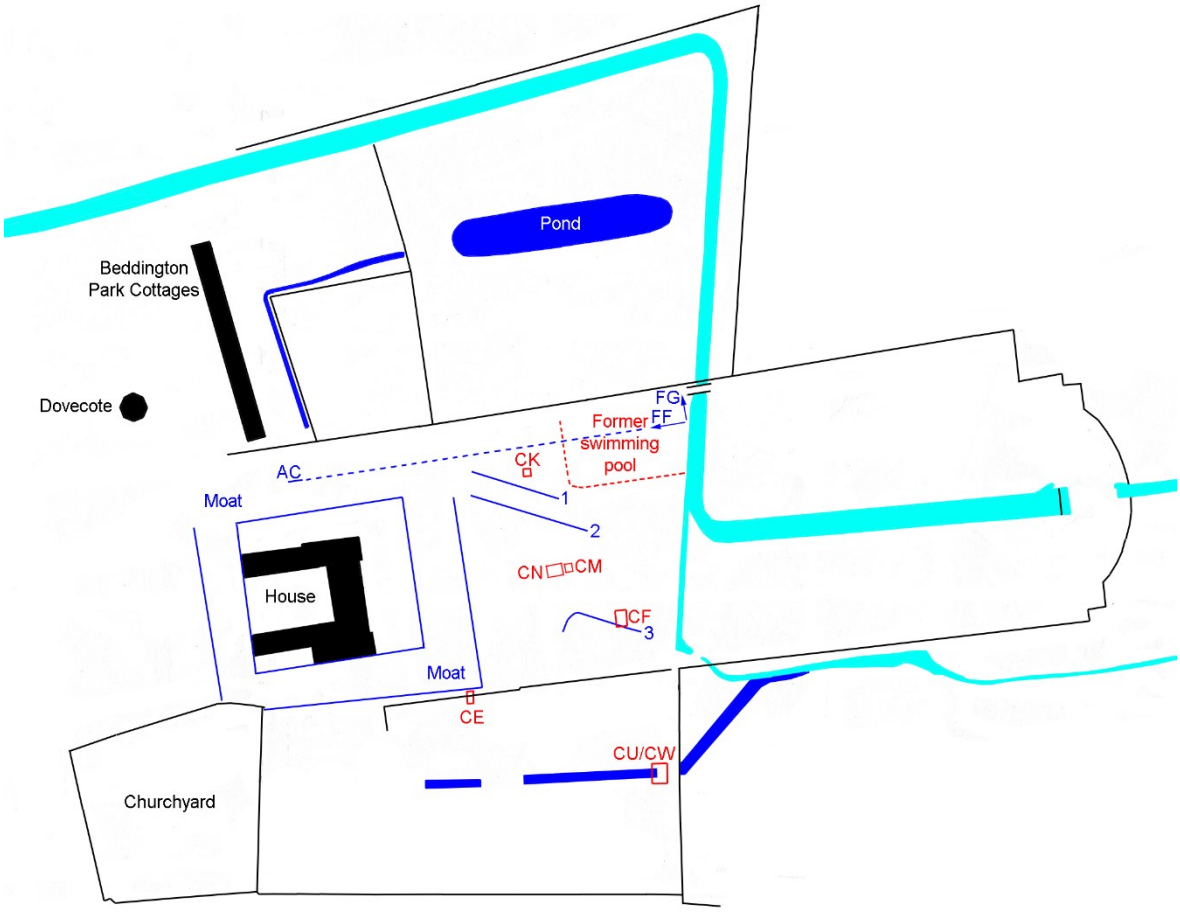


Figure 241. The house with the 18th-century garden boundaries and the watercourses which existed, or may have existed in the Elizabethan period. The position of the outer bank of the moat is mostly indicative rather than certain. The river and stream channel that existed in the mid-1950s is shown in light blue. Key excavations are shown in red with their identifying codes. Beddington Park Cottages and the dovecote may not have been in these locations in the 16th-century.
The blue lines marked 1, 2 and 3 are shallow hollows in the grass which are visible on the ground and on the lidar scan. Feature 3 was cut in trench CF and found to be a former watercourse.
FG and FF are the projected lines of culverts seen in the 1990-1 flood alleviation work. A culvert was also seen in trench AC to the north of the house.

The bottom of the channel was at 30.45m OD which is more or less the same height as the bottom of the moat and it is possible that it was of medieval origin. However, it has clearly survived as a slow-flowing channel until the beginning of the 18th-century, so it must have been present in the Elizabethan garden. The top of the silt was at 31.61m OD, so the water must have been close to garden level in the later part of the channel's existence.

The lidar scan (figure 242) shows another hollow on the north side of the east lawn which could be seen as a diagonal mirror image of the channel excavated in CF. If this was so, the eastern end of the channel should have turned northwards but the relevant area was destroyed by the construction of a swimming pool in 1930s. There is a second hollow parallel to it and a little to north (1 and 2 on figure 241).

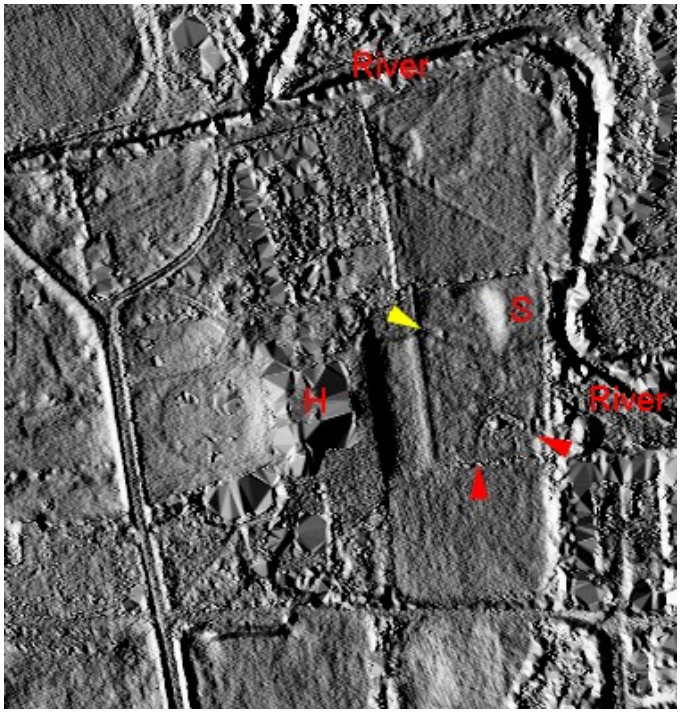


Figure 242. Lidar scan of the east lawn with the CF channel marked with red arrows and the one on the north side of the lawn with yellow.
H = house; S = site of former swimming pool. Note the second hollow to the north of the one marked with the yellow arrow. The lighting is at azimuth 270 degrees, height 20 degrees and the vertical exaggeration is 10 times.

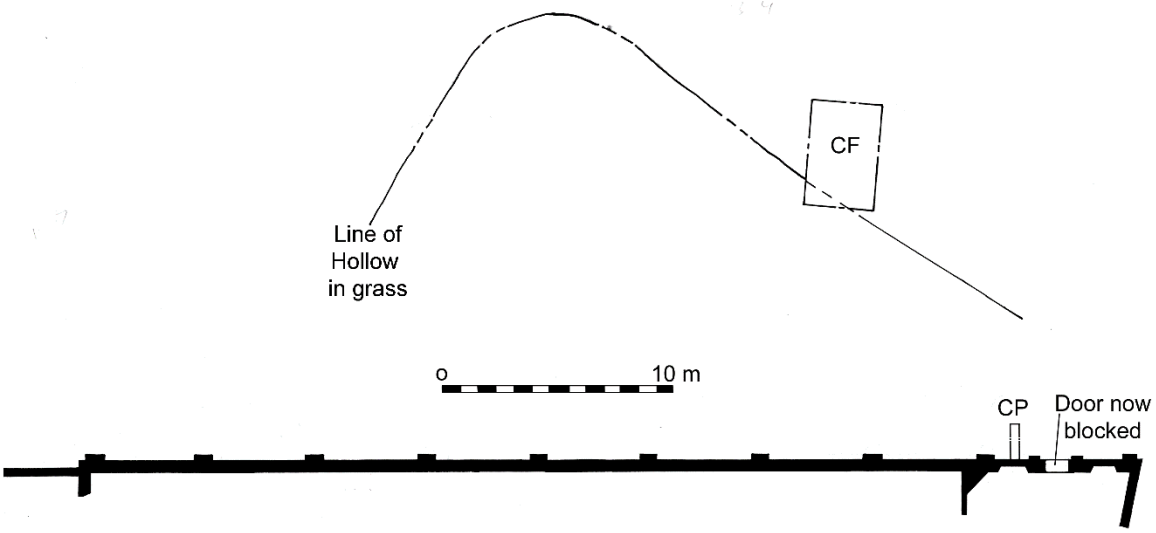


Figure 243. Trench CF and the centre line of the shallow gulley in the lawn in relation to the Orangery wall. Trench CP is also shown.

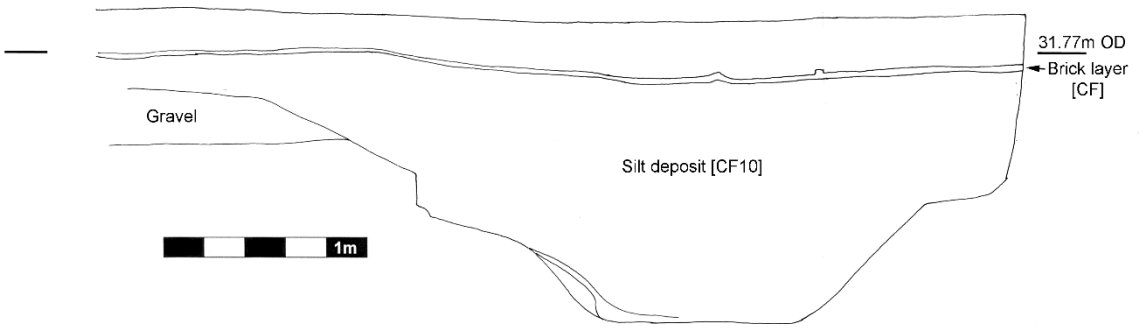


Figure 244. Section through the watercourse at right angles to the channel Looking approximately southeast.

18.6.2 A pond under the east end of the orangery

The eastern end of the orangery overlaid a silt deposit which appears to have been part of a pond of uncertain medieval or early modern date.

The pond deposits were found at the bottom of trench CP on the north side of the north wall of the 18th-century orange house (figure 243). The silt contained mortared flint, a number of pieces of peg tile and Reigate stone, including some worked pieces and some which were burnt and had yellow stain. The silt was also found in an auger hole the south side of the wall.[197]

18.6.3 The channel in trenches CM and CN

The channel bed found at the bottom of trenches CM and CN has been described above (section 9.3). It had a gravel bed which suggests flowing water rather than silt – a view supported by the large piece of Tudor Brown pottery found embedded in it.[198] It is likely to have flowed east to west and to have emptied into the moat. If so, the width was greater than 4m. In trench CN the bed was between 30.86 and 31.04m OD. It appears to have been filled around 1710-12 for the reasons given above (section 10.7).

18.6.4 The channel in trench CK

A watercourse or pond was found in trench CK on the north side of the East Lawn.[199] The earliest deposits were the gravel which was presumably water-laid natural. The deep hollow in the deposit may mark the site of a spring in the stream bed with the fill possibly largely calcium carbonate precipitated from the water.[200] This implies a low water speed – either a pond or a slow flowing channel.

The overlying deposits fall into two groups: lower layers of chalk, flint and soil and upper ones with a matrix of yellowish soil. The finds in the two groups were distinctive and similar. The pottery largely consisted of Earlswood, Kingston and Limpsfield wares, which were current in the local area in the late 13th and early 14th centuries. There was also a significant amount of Reigate stone and peg tile, much of the latter soft and poorly fired. It seems likely that two dump deposits are the result of a single episode which drew slightly different materials from the same general source. Both dump deposits contained a small amount of pottery, which was not very distinctive, but clearly late medieval or Tudor rather than 13th or 14th century. There was also a single piece of clay pipe stem, which cannot be earlier than the late 16th-century and is far more likely to be 17th-century. If the pipe was misplaced during the excavation a filling date in the 15th or 16th-century is possible: otherwise the deposits must have been placed in the 17th or less likely in the very early 18th-century.[201] The channel bed away from the silt-filled hollow was at 31.02m OD.

In 1990-1 a culvert (identified as FF) was seen when the riverbank was cut back during flood alleviation work (figure 241). The projected line of this would have run to the north of trench CK and it may have connected to a culvert in the north fill of the moat.[202] Both sections of culvert were brick: FF appeared to be 18th-century and the one on the moat fill certainly was.

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[197] Phillips 2013 p. 30.
[198] Find <20> from CN.
[199] Full report in Phillips 2016 p. 72-80.
[200] The authors have seen similar spring-created hollows in the garden of the chateau at Chantilly in France.
[201] Early-18th-century and later material is very common on the site, so more finds would be expected in deposits of this date.
[202] For culvert FF see Phillips 2016 p. 24-6. For the north moat culvert see Phillips and Burnett 2016 vol. 2 p. 10-18.

It was not unusual to lay a culvert along a watercourse that was to be filled which might support an early-18th-century date for the filling of the water feature in CK. However, the machine-cut bank in which culvert FF was seen was not cleaned, so it is not known whether the culvert was built in a purpose-made cut or a former water course.

18.6.5 Water flows in the moat

The moat is described in volume 2 of Phillips and Burnett 2016 so this section only includes points relevant to the water flows in the 16th-century garden.

In trench CJ near the south corner (figure 2) the bottom was covered with fine dark silt while the bottom of trench CA at the northeast corner of the moat island was sand. This suggests a significant difference in water speed. However, is documentary evidence for the moat being cleaned out in the mid-17th-century so the silt within it is likely to reflect later water conditions which may or may not have been the same as those in the Elizabethan period.[203]

18.6.6 The oval pond on the Hockey Pitch

The Beddington and Bandon enclosure award map of 1820 shows an oval pond in the Hockey Pitch area. It is possible that this is the successor to the egg-shaped pond mentioned by Waldstein and Coryate (section 4.3). The 1820 map suggests that this was supplied by a feeder from the river channel to the east and that a further channel conveyed the water away westwards. There is, however, another possible feed. In the 1990-1 flood alleviation work a brick culvert was seen running northwards from the river towards the eastern end of the pond (FG on figure 241).[204] The brickwork looked 18th-century. The culvert was exposed in a rough machine-cut section, and it was not clear whether it was in a cut or constructed in the fill of an earlier channel.

18.6.7 The present river

Rocque's mid-18th-century map of Surrey shows the river flowing across the north side of the garden and then continuing westwards across the park. This appears to coincide with the existing river channel north of the house, but the section upstream of the garden has been replaced and the route in the park is somewhat uncertain. The channel's straightness suggests that it is artificial, and this is supported by the fact that it appears to have cut directly into the natural gravel.[205] The natural channel of the Wandle is often surrounded by peaty deposits although this is not invariable.

If this was not the original river channel, where was it? The 1820 map shows a channel running westwards from house along the north side of the long canal-like west lake which was constructed for Nicholas Carew, 1st baronet, in the early 18th-century (figure 247). Two lines of resistivity readings taken across the lake and channel from south to north show that they are in an area of low readings which would be consistent with the peaty deposits around a former natural channel (figure 245). However, this should be seen as suggestive rather than conclusive, so there is considerable doubt as to the original course of the river around the site and no clear evidence as to when the channel north of the house first existed.

[203] Phillips and Burnett 2016 vol. 2 pages 1, 24 and 65.
[204] Phillips 2016 p. 24-6.
[205] As seen in the 1990-1 flood alleviation work. See Phillips 2016 p. 26-7.

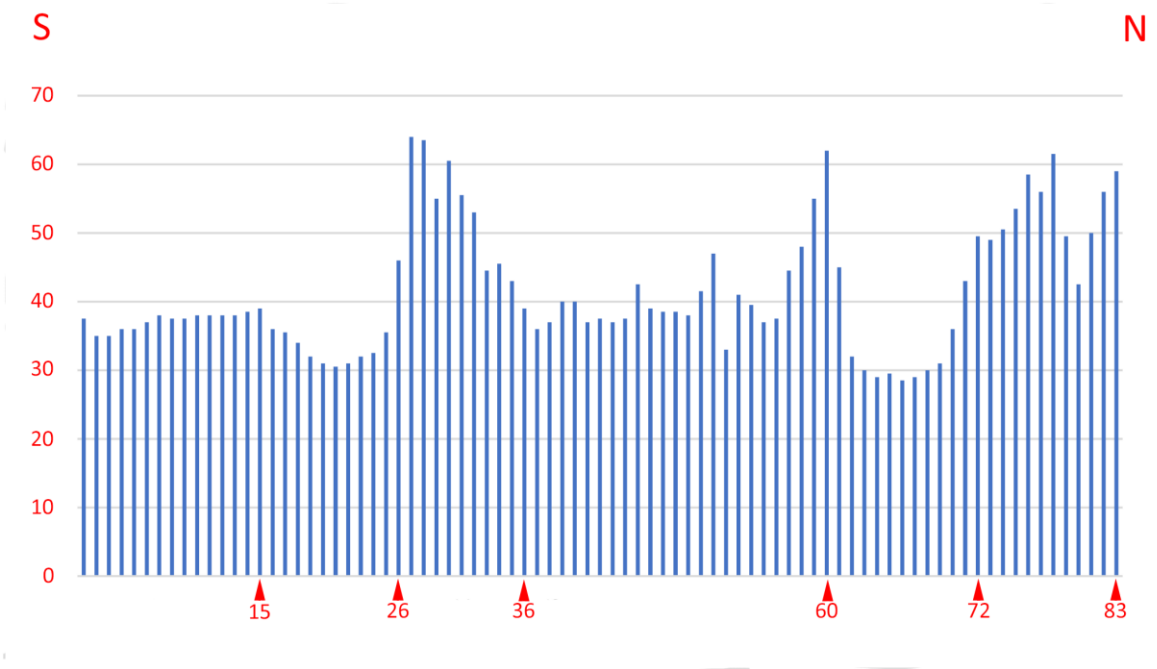

Figure 245. Plot of the average of two lines of resistivity readings taken across the former west lake and the stream on the north side of it. The figures on the bottom axis show the distance from the south end of the line.

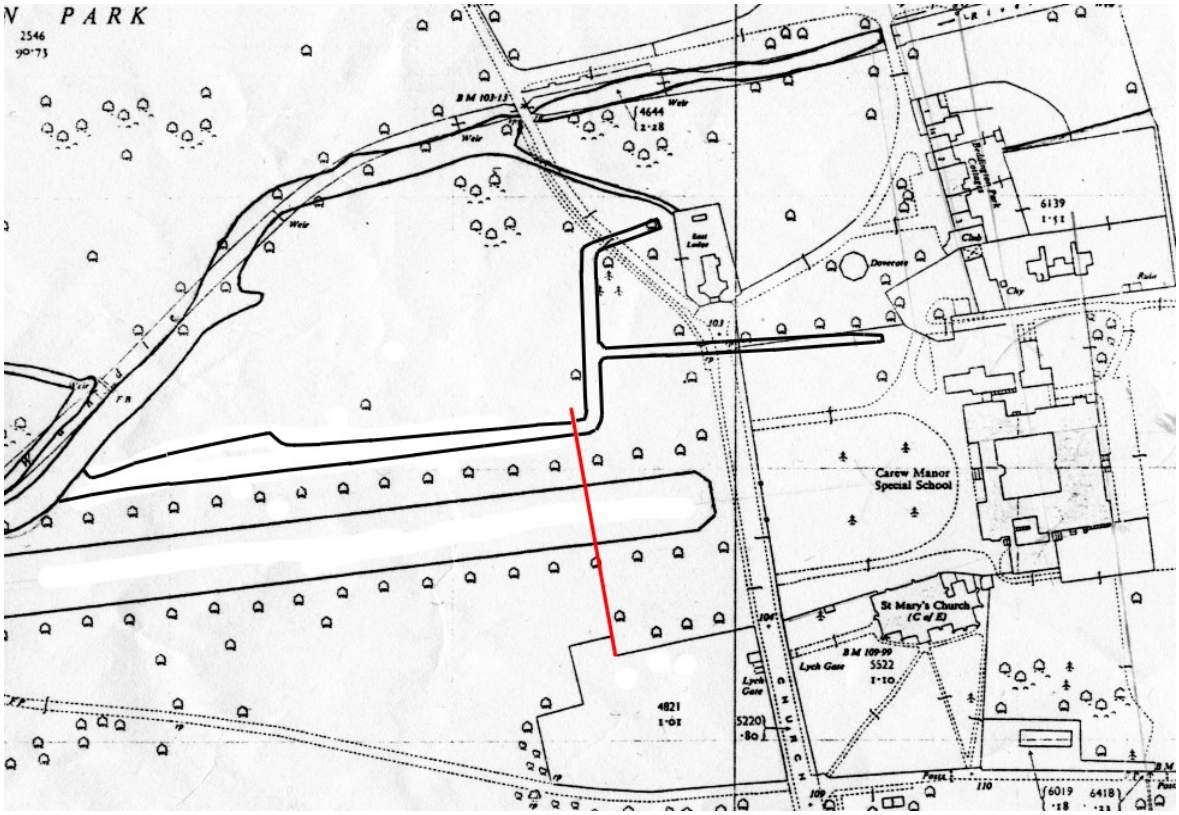

Figure 246. The 1956 Ordnance Survey map with the outline of the watercourses shown on the 1820 map (heavy black lines) and the line of the resistivity survey across the former west lake (red).

18.6.8 Discussion of the channels

The archaeological evidence summarised above suggests that there were several channels, but it is not clear how many were open in the 16th-century.

It is noticeable that in the 1570s the household accountant tends to refer to *the* river as if there just one and no doubt about it.

Baron Waldstein and Coryate both mention the oval pond.

It seems almost certain that there was water flowing through or around the ornamental structure found in trench CW, but it is not clear where it went after that. It is possible that the channel that ran west from the site across the south garden existed in the 16th-century, but there is no evidence for it. The water could have flowed northwards to the pond at the end of the orange house and then perhaps into the channel seen in trench CF. The main difficulty with this interpretation is the channel deposits. The CW stream was moving fast enough to transport gravel, but the deposits under the eastern end of the orange house were fine dark silt. The deposits in CF were fine clean silt suggesting a very slow flow. It is easy to assume that the CF channel was flowing from southeast to northwest, as the general direction of water movement on the site is from east to west, but this need not apply in this particular case. It is possible that some of the water from the rock and the south garden passed under the orange house into the western end of the CF channel and flowed from there into the pond at the end of the orangery. From there it may have flowed northwards possibly following the line of the 18th-century cross axis.

The channel found in trenches CM and CN was almost certainly part of the 16th-century garden as it was clearly filled about 1710-12. Its gravel bed and the piece of Tudor Brown pottery within it suggest that the water was flowing fast enough to wash the sand away and at least occasionally move the gravel. With a width of over 4m it would carry more than the flow of the modern river.

The water feature seen in trench CK on the north side of the East Lawn is particularly problematic. If the tobacco pipe is excluded as contamination it could have been filled before, or at the time, that the Elizabethan garden was created. The lack of other 17th or 18th-century finds in the deposit would be consistent with contamination, but the presence of 18th-century brick culvert FF suggests a channel with a late filling date. The feature had a gravel bottom, but the silt-filled hollow in it suggests a very low water speed, either a pond or a slow-flowing channel. If trench CK and the culvert were both within the fill, the channel would intrude into the linear hollow in the lawn marked by the yellow arrow in figure 242. It is possible that the hollow is later than the filling of CK, but it is perhaps more likely that water feature in CK was not a simple wide channel. It may have been a pond or some other feature.

It is difficult to see how an oval pond could be fitted onto the East Lawn, given the other channels. This leaves two other possibilities: it was in the south garden or it was on the site of the pond shown on the 1820 map. The south garden is underlain by sand, and although it would be possible to construct a pond there it would not be easy and seems needlessly complicated. The 19th-century pond was in an area known as the wilderness. It is interesting that pond was not symmetrically placed in it as might be expected in an 18th-century layout. This, perhaps, suggests that it had survived from an earlier period. A pond would need a modest flow of water to maintain it but need not carry a significant part of the river flow.

The present river channel clearly dates back to the mid-18th-century, and was almost certainly part of the early-18th-century garden. It is almost certainly artificial and was

probably constructed to provide a spill way around the 16th or 18th-century garden or even the medieval moat.

The present river is much smaller than in the past due to the large volume of water that is now pumped from the chalk. In the early 19th-century, the upper Wandle was a chalk stream and the greater part of its flow came from a series of springs along the edge of the North Downs. Most rainwater entered the river after a long passage through the ground, so the flow was fairly stable. If there was an exceptionally wet winter the water table in the chalk would rise and a stream would emerge in the dry valleys to the south of Croydon. This was (and is) called a bourne and it caused the river level to rise substantially, generally in late winter, spring and early summer.

The actual volume of the early 19th-century river is uncertain as there are very few gaugings from this period. In 1833 Thomas Telford made some measurements in connection with a scheme to take water to supply south London from the river close to the present flow gauging weir near Beddington Park Cottages. The gauging at the point of abstraction was 9,180,000 gallons a day or 29m^3 per minute. In 1834 James Mills said, in opposition to Telford's scheme, that the flow of the river was 27 million gallons per day (85m^3/min).[206]

In 1861 Frederick Braithwaite produced a paper *On the rise and fall of the Wandle its springs tributaries and pollution.* It includes two follow gaugings made at Waddon Mill upstream of Beddington. The first was 21,246,770 and the second 21,052,620 gallons a day or 67.08 and 66.46m^3 per minute.[207] These figures seem high – a view shared by several speakers in the discussion following the presentation of the paper.

Telford's gauging of 29m^3/min is probably the best approximation we can make for the Tudor river. This is almost three times the median flow of the present river which is carried in a single channel which is significantly narrower than its 19th-century predecessor.[208] The flow through the pond need not have been large and the fine silt in trench CF suggests a slow flow there. The same may have applied to the answering channel on the north side of the lawn, if it existed. This leaves four channels which could have carried a significant flow:

- The channel seen in trench CW in the south garden.
- The channel in the centre of the East Lawn seen in trenches CM and CN which had a gravel rather than silt bed.
- The water feature seen in trench CK on the north side of the East Lawn which was probably slow flowing.
- The approximate line of the current river which now has a gravel bed.

This seems to be too many, and it seems to support the idea that the channel in CK was some sort of water feature which did not carry a significant flow. The main river channel may therefore have run across the centre of the east lawn and emptied into the eastern arm of the moat. There was probably a second, bypassing, channel around the north side of the garden partly on the line of the present river. It seems likely that either this channel or the outflow from the oval pond ran through the pigeon house meadow and an orchard to the north or north-west of the house.[209] Finally, there was another secondary channel in the south gardens issuing from the ornamental structure found in trench CW. The density of channels on the east lawn suggests that this area was a water garden for a while at least.

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[206] Latham 1917 p. 116.
[207] Braithwaite 1861 p. 196-7.
[208] The modern median or 50th percentile flow is 9.66m^3/min according to the National River Flow Archive. Station 39004 Wandle at Beddington park. https://nrfa.ceh.ac.uk/data/station/meanflow/39004.
[209] There are payments for the alteration of the channels in Pigeon House Meadow in SHC 281/4/10.

18.7 The outer court and the area northwest of the house

The Elizabethan household accounts contain several references to a Court, an Outer Court and a Great Court:

> It pd for mendyng the pale by the heth [?] et the pale
> about the court et makynge the rackes for the kyne
> behynde the barne to ij men for ij days at viij^{d} the
> day ye pece ij viij^{d} [210]

> It pd to woodstocke et martyn for setting of new yals in the
> greate Courte for viij Rodds at iiij d y^{e} Rodde et othe^{r} placesij^{s} viij^{d} [211]

> It pd to the smyrthe for ij hyngs for y^{e} Courte dore viij^{d} [212]

> It pd to hym more for ij newe hynge for ye Courte dore xij^{d}
> It pd to hym more for mendyng of a paire of Loks for ye same gate j^{d} [213]

> It pd to wodestocke et martyn for settyng of pale in the great Courte
> At iiij^{d} y^{e} Rodde xiiij Rodd iiij^{s} viij^{d}
> It pd to y^{e} smyrthe for iij Barrs of Iron weying vj^{li} et a halfe xiij^{d}
> It pd to hym more for A grate for y^{e} synke in y^{e} cou^{r}te weyingvij^{li} xiiij^{d} [214]

> It pd to meddois for moing et making of y^{e} grasse in y^{e} Courte xvj^{d} [215]

> It pd more to hym for caryng et cutyng downe of
> netyls in the outter cowrt ij^{d} [216]

> It pd for mowynge the nettels in the great cowrt next the stable vj^{d} [217]

It is not clear whether the outer court was different from the great court or another name for same place. Both needed to have nettles cut, and even if they were different the overall impression is of fairly informal areas surrounded by ancillary buildings such as the stables. The presence of rails suggests that it, or they, adjoined the park pale.

In the 15th and early 16th centuries courtier-class houses were often approached through a service court. This went out of fashion in the mid-16th-century when the service buildings were moved to the side leaving an open forecourt in front of the house.[218]

At Beddington the house was approached from the west, so the forecourt would probably be on the site of the present west lawn to the north of the church. The house stands on a moat island which is raised significantly above natural ground level. The courtyard in the centre of the house may have been at about 33m OD while the ground in the park to the west of Church Road is at about 30.46m OD.[219] The difference in height is now made by the slope of the west lawn and a drop on the west side of Church Road. This means that the west lawn probably has a considerable depth of made ground. This view is supported by observations

[210] SHC 281/4/1 p. 1 Nov – Dec 1560.
[211] SHC 281/4/9, May 1570.
[212] SHC 281/4/10, May – June 1570.
[213] SHC 281/4/13, June 1570.
[214] SHC 281/4/19 30 July - 6 August 1570.
[215] SHC 281/4/20r August 1570.
[216] SHC 281/4/25 p. 6, May unknown year.
[217] SHC 281/4/25 p. 7, May unknown year.
[218] Henderson 2005 p. 13-18.
[219] Phillips and Burnett 2016 vol 2, p. 102.

made in October 2000 when a gas pipe was laid across the lawn. This showed that much of the area was covered by about 0.65m of soil which, in many places rested on rubble of uncertain depth. This means that if there was a 16th-century service court in the area, any remains are likely to be deeply buried.

The 1820 map (figure 233) shows a group of service buildings to the northwest of the house. The main structures were:

- A long north-south range now called Beddington Park Cottages
- A large barn to the west of the cottages and parallel to the river
- An octagonal brick dovecote to the west of the cottages
- Some smaller structures to the east which were part of a wood yard.

A service court in this area, away from the front of the house, would be entirely consistent with fashions in the second half of the 16th-century. However, the evidence for the origin of the court is ambiguous. The north end of Beddington Park Cottages, which line the east side of the area, contain the remains of a well-made single-storey building with a crown-post roof which is likely to predate 1550. However, there is evidence that the cottages have been moved. When they were surveyed in the 1980s, prior to their conversion into modern houses, it was found that the carpenters' marks on the roof rafters were jumbled suggesting that that the roof had been taken apart and reassembled at an uncertain date.[220]

The excavation of the foundations of the long building on the north side of the area parallel to the river showed that it was a barn. It was probably no older than the mid-18th-century although the building could have been an older structure relocated at that time.[221]

The octagonal brick Dovecote in the centre of the area is generally thought to date from the early 18th-century and was probably created for Nicholas Carew, 1st baronet, who owned the house 1707-27.[222] There are, however, hints that it may be a rebuilding of an earlier structure. The brick walls rest on a wide flint foundation which projects out above ground level. This arrangement is not found on other early-18th-century structures at Beddington and also seems impractical as water would easily get into the top of the mortar binding the flints causing the structure to disintegrate. It was covered with tar, and later concrete, presumably to prevent this. Why create the problematic arrangement in the first place? It would make sense if the foundation was reused from an earlier building. This would be consistent with the presence of a small amount of stonework in the lower part of the present inside walls. Some roof timbers which have scratched carpenter's marks might also have been reused from an earlier structure. Octagonal dovecotes became popular in the 17th and 18th centuries but earlier examples are known in both brick and stone.[223] It is easy to imagine the flintwork as a foundation a building largely of chalk or Reigate stone. Neither weathers well, so a replacement might have been necessary, but on the present evidence this is uncertain. There are, however, documentary references to a pigeon house in the 16th-century.[224]

There is therefore no evidence of a 16th-century service court to the northwest of the house. The contractor's trenches dug during building work in the 1980s shows that the subsoil was

[220] Phillips 2015 p. 81.
[221] Phillips 2018 p. 22-5.
[222] The Dovecote is described in Phillips 2020.
[223] Hansell 1988 p. 145-162.
[224] Phillips 2020 p. 35.

dark, peaty with flint pebbles. There was no sign of cultivation, which suggests that it had not been in the Elizabethan garden.[225]

The location of the Elizabethan outer court is therefore very uncertain. A location in front of the house would probably be acceptable in the lifetime of Nicholas Carew KG, who was executed by Henry VIII in 1539. The house was then in the hands of the crown and various short-term owners who are not known to have made significant changes. Courtyard approaches were becoming unfashionable in 1554 when Francis regained the house, and they had become desperately so long before he died in 1611.[226] Francis' garden was at the leading edge of English fashion and his probate inventory shows that house contained many pieces of exotic furniture.[227] Yet there are hints that the house itself was not in line with trends. When John Evelyn visited in September 1658 he called it a 'scambling house'. This means rambling or irregular which suggests multiple courtyards but is not conclusive. A building contract in 1710 refers to the 'inward court' implying that there was still an outer one. It may not have been swept away until the 1st Baronet's remodelling of 1710-12 but this remains uncertain.[228]

18.8 The orchards and the park

The household accounts contain a number of payments for the orchard and old orchard which may in fact be the same. There was also a three-acre new orchard 'in the park' which was referred to in the manor court rolls in 1545 (see section 4.2.3).

The household accounts for 1566-7 contain a useful scrap of topographical information:

> It pd to woodstocke et martin for making cleane ye Ryver w[I]thin
> the olde orcharde for xvi daies a pese et a halfe at viiid ye daie xxijs
> It pd more to them for settyng [ ] newe Rayles over
> ye Ryver between ye olde orcharde et ye parrocke at ij daies A pese
> Ay viijd ye daie ijs viiijd[229]

It appears that the parrock and the old orchard were adjacent and that the river ran from one into the other through a set of rails – a fence which allowed the water to pass but not animals. A parrock was a long tapering enclosure within a park which was used for driving the deer for hunting.[230] The outline of the Beddington parrock can be seen in the field boundaries shown on the 1820 enclosure map (figure 247). The lidar scan (figure 248) shows that the eastern boundary of the parrock extended southwards into the present park and must have reached the river. Unfortunately, the position of the 16th-century river is unclear: it could have been on the line of the present river flowing southwest across the park or it could have been further south on or near the long canal-like east lake.

The Old Orchard was a considerable size as the household accounts for June 1570 include payments for 20 days work mowing, haymaking and cleaning the river there.[231]

The purple lines in figure 249 define a three-acre square between the present river and a channel shown to the south of it on the 1820 enclosure award map. This was the size of the New Orchard in 1545 and it also more or less fits with Old Orchard being next to the parrock.

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[225] Phillips 2015 p. 67-72.
[226] Henderson 2005 p. 13-18.
[227] SHC 2163/7/3.
[228] BL Add MS 29599 f. 104.
[229] Sutton accession 72/17 f. 2r.
[230] Lasdun 1991 p. 24.
[231] SHC 281/4/11, 12, 13.

It seems that the New Orchard of 1545 might have become the Elizabethan Old Orchard or part of it. This could easily happen if another orchard was created somewhere around the gardens.

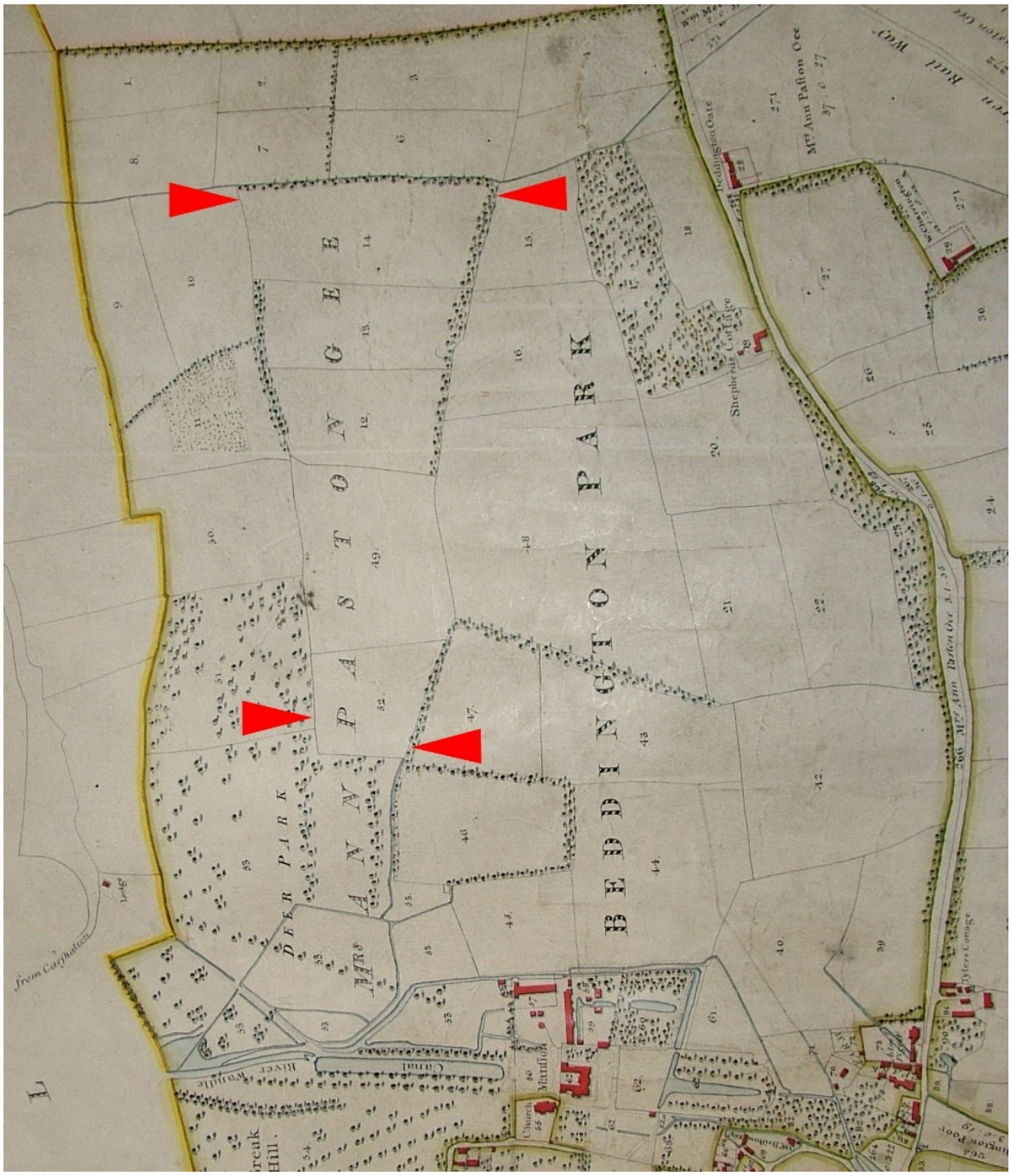

Figure 247. The 1820 enclosure map with the boundaries of the parrock identified by the red arrows.

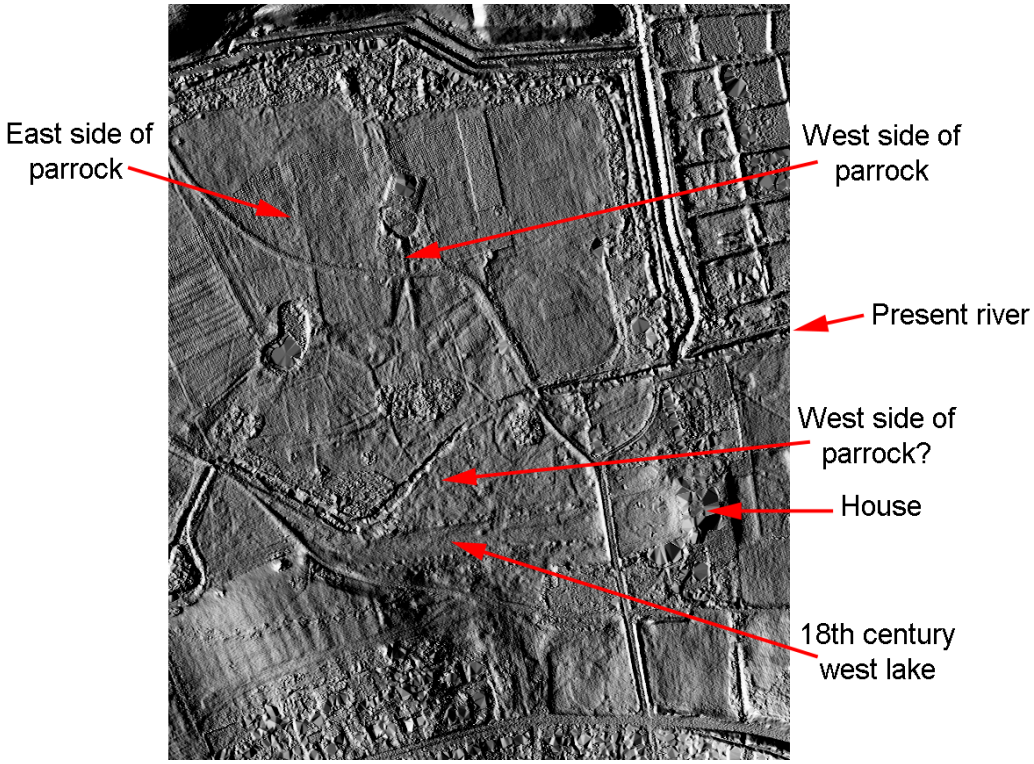

Figure 248. Lidar scan of the park showing the eastern edge of the parrock and its southward continuation.

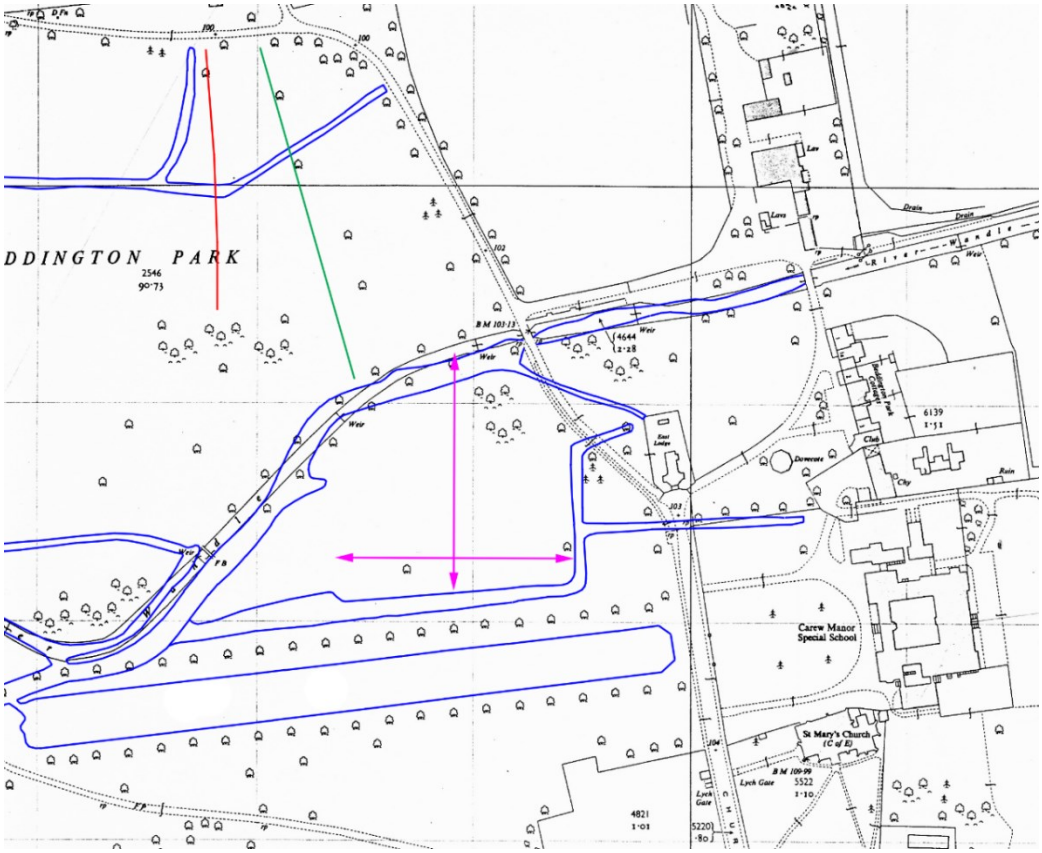

Figure 249. The 1956 Ordnance Survey map with the water courses shown on the 1820 enclosure award map added in blue. The red line shows the position of a bank which is most likely the eastern side of the parrock. The green line is an alternative less likely earthwork. The purple lines are 110m long and they define a square of 3 acres.

19. FRANCIS CAREW IN PARIS 1561-2

19.1 The visit

One of Sir Francis Carew's sisters, Anne, married Sir Nicholas Throckmorton, who became the English ambassador in Paris in May 1559. By March 1561 Throckmorton was ill and he was writing to Cecil asking him to arrange for a passport so that his wife, her brother Mr Francis Carew, and his cousin Mr. Francis Peyto could come to Paris.[232] The queen had granted a passport to Nicholas Throckmorton's wife by 19 April. Francis Carew had arrived in Paris and had been presented by Throckmorton to Mary Queen of Scots, by 23 June.[233] Thomas Cecil, the son of Elizabeth's minister William, was also in Paris at this time accompanied by his tutor Thomas Windebank. On 27 August 1561 William Cecil wrote to his son asking him to send anything 'meet for his garden'. This was the first of a series of letters on the subject.[234] On the 25 March 1562 Cecil wrote to Windebank and in a postscript added:

> When this messengar was redy to depart my Ld Throckm[orton]
> gave me a Le^{t} fro Tho. Cecill wherin maketh metion
> that M^{r} Caroo meaneth to send home certen orege
> pomgranat lymo and myrt trees. I have alredy a orrege
> tree and if y^{e} price be ont much I pray you
> procure for me a lymo, a pomegranat, and a myrt
> tree and help that they may be sent home to Lodo
> w^{t} M^{r} Caroos trees and before hand find me in
> wryting a perfect declaratio how they ought to be
> used kept and ordered...[235]

Windebank replied on the 8 April 1562:

> Sir
> According to yo^{r} commandement I have sent unto yo^{u} by M^{r} Curo's man w^{h} his m^{rs} trees a Lymmon tree, and ij myrte trees in ij pottes. w^{h} cost me bothe a crowne, and the Lymmon tree xv . ^ . wherin S^{r} yf I have bestowed more than phaps yo^{u} will at the first like, yet is it th^{e} best chepe th^{t} we could get it. and better chepe than other noble men in France have bought of the same man, having paid for vi trees 1cxx ^ . ^ To have writtin to yo^{u} of the pric^{e} & attended yo^{r} pleasou^{r}, I shuld have taryed to long & lost the comoditie of the cariage. well I think this good may ensue the price. Th^{t} yf the tree prosperre I am assurid by him th^{t} solde it unto me th^{t} it shall beare fruite this yeare yo^{u} will not think yo^{r} money lost yf it doo not prosperre, it shall take awaye yo^{r} desire of loesing any more monny in like sorte. my lord & Mr Caroo weare the choosers of it for th^{e} Ordering of it this have I learned As sonne as yo^{u} shall have it there, the Tub wherein the lymmon tree is must be filled almost up to th^{e} top or ij ynches higher than it is w^{t} good dong y^{t} must be well wett, & so put upo^{n} th^{t} earthe th^{t} is in the tub allready. it must be placed out of the colde of th^{e} northe & northe est wyndes & set toward the southe so as it may be very warme for by warmth it proffitith moste. Every viij daies it must be watered twise or oftener yf the drought be greate. In Sept. it must be taken out of the

[232] CSP Foreign 1561-2, item 206.
[233] CSP Foreign 1561-2 p. 150-4.
[234] CSP Domestic 1547-80, XIX, 35; CSP Foreign 1561-2, item 491; CSP Foreign 1561-2, item 615; CSP Foreign 1561-2, item 513.
[235] TNA SP 12/22 printed number 42.

> garden & set in th^e house for all the wynter, watred likewise once or twise in a fortnight [unreadable] may be seene In Aprill [illegible word] eyther in th^e middest or at th^e end (as the colde or heate shall be) it must be placed agayne in the garden. as before & for the better spreading of the tree, (for th^t is compted th^e beauetye & not the height) the toppes of some of th^e branches must be cut awaye by small twigges w^h may be don by tymes as the branches doo increase & growe, in Aprill, May & June, for so they doo heere. It shall not neede to be changed out of that tubb nor earth wherein it is nowe this ij or iij yeere, so heede be takin that the hoopes fall not awaye & th^t th^e earth shed not. It hathe beene twise graftid & is of iiij years growthe as this man tellith us & this year he would look for s^o [?] frute of it. This is all that I can learne for th^e ordring of it. The myrte trees must be likewise kept very warme & watred so as it suffer no drought. The potte must be fylled up w^t earthe as th^e Lymon tree & in wynter retyrd^d out of the colde. As for a pomegranate tree th^e season of the yeare is to farre paste to remove them so th^t it was no sending of anye. I have givin to Mr Caro's man th^t hathe th^e charge of yo^r trees, our [or a number?] pistoles And yf he bring it well to yo^r house yo^u may consyder him w^h a croune or two more for th^e transportation, of them shall cost you nothing because yo^r trees go w^h M^r Caro's trees. And this is all th^t I have bene hable to doo in this your matter for trees w^ch[?] I wish well to prosperre in fruite. And so must humbly take my leave. From Paris the Viij^th of Aprill 1562.[236]

Francis probably left Paris around 9 July when Throckmorton wrote a letter of introduction to Cecil. This was probably to facilitate Francis's lobbying for Throckmorton's recall.[237] The journey may have been difficult as France was drifting towards a civil war between the Catholics and the Protestant Huguenots. However, Francis reached England safely some time before 20 September, when a postscript to a letter from Lady Throckmorton to her husband says that 'her brother Carew is sent for to Court'.[238]

These scraps of information suggest that Francis already had a reputation as a plantsman and that he was looking for garden materials. It seems very likely that he would have explored the gardens around Paris. There would also have been time for him to have travelled further afield, perhaps into the Loire valley, although there is currently no evidence for this.

19.2 French gardens in the 1560s

Renaissance Paris had many wealthy inhabitants, and it must have contained a number of significant town gardens but little or nothing has survived. This fundamental problem also applies to most of the chateau and gardens in the surrounding countryside: they have either been either destroyed or transformed.

Francis certainly visited the Chateau St Germain en Laye, as it was there that Nicholas Throckmorton introduced him to Mary Queen of Scots. The chateau itself had been remodelled for Francis I, and there was also a smaller pavilion by the Seine which was started for Henry II 1557 and was possibly still under construction in the early 1560s. Du Cerceau shows a large area of formal garden to the north of the chateau. In the early 17th-century the chateau became famous for its terraced gardens and grottoes, but at the time of Francis's visit these were far in the future. In short there seems to have been nothing which might have inspired the Beddington garden.

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[236] TNA SP 12/22 printed number 83. We have deleted and incorporated numerous crossings out and interlinings.
[237] CSP Foreign 1562 item 293.
[238] CSP Foreign 1562 item 660.

Charles Guise, Cardinal of Lorraine, created an elaborate garden at Meudon which is now in the southwestern suburbs of Paris. It contained a large grotto set into a terrace which housed the Cardinal's collection of antique sculpture and also included water tricks. It was built 1556-7 by the sculptor Jean le Roux.[239]

Fontainebleau, about 56km south and east of Paris, was a favourite chateau of Francis 1 who carried out extensive building works from about 1528. He also laid out a garden and created the Grotte des Pins which still survives although the interior decoration has gone. It was designed by the Italian artist Primaticcio and built into a wing of the chateau beneath the end of a gallery and facing the Jardin des Pins (the Pine Garden). The grotto is entered through three arched openings made of large rusticated stone blocks, and four figures emerge from the walls by them. Primaticcio had worked with Guilio Romano in Mantua, so there is a direct connection with Italian mannerism. In the 1560s the garden was more or less in the state shown by du Cerceau. There were formal gardens on the west side of the pond and a large, more informal looking garden area to the west. The Diana garden to the north of the chateau was also formal. There are no obvious signs of elaborate fountains, rocks or water works until the garden was radically modernised for Henry IV around 1600.[240] If Francis Carew saw Fontainebleau its influence is not obvious in the evidence that we have for Beddington.

The Hotel de Ferrara in Fontainebleau is of particular interest as it was built for Ippolito d' Este who went on to create the the great garden at Tivoli. Ippolito was the brother of Ercole d' Este, the ruler of Ferrara. The Hotel was designed by Serlio and built about 1542-6. Very little seems to be known about the garden. A plan by Serlio shows the garden adjacent to the house with two squares divided by cross walks – presumably a parterre. An elevation of the garden façade shows five arches opening into a space beneath the steps to first floor. This would be consistent with a grotto in the basement in the centre of the garden elevation, but we know of no other evidence for its existence.[241]

The Chateau of Gaillon on the west side of the Seine between Paris and Rouen had a great terraced garden constructed by Cardinal Georges II d'Amboise who died in 1550. His successor, Cardinal Charles de Bourbon was a member of the upper aristocracy who became the Catholic claimant to the French crown. He made a career in the church becoming bishop of Nevers (1540–1545), bishop of Saintes (1545–1550), archbishop of Rouen (1550–1590), bishop of Nantes (1550–1554), Papal legate in Avignon (1565–1590) and bishop of Beauvais (1569–1575). He acquired Gaillon in 1550 when he became archbishop of Rouen. At some point in the following decade or so he created a detached garden in the park, which has not survived and is mostly known from an engraving by du Cerceau (figure 250). This centered on a canal with a pool at one end in which stood the Maison Blanche, a large classical structure which contained a formal grotto and a banqueting house. At the other end of the canal there was a detached square or trapezoidal pond containing a rock which is described as a hermitage.[242] There was a chapel near the rock and also a small enclosed formal garden. The rock is sometimes said to represent Mount Parnasus – the home of the Muses – but du Cerceau calls it a hermitage, which seems consistent with the adjacent chapel and the private

[239] Miller 1982 p. 54-5; Carroll 2011 p. 132 and plate 15.
[240] Samoyault 1994 p. 5-12; Miller 1982 p. 52-3.
[241] Thomson 1984 p. 105-113 especially figures 76 and 77.
[242] Du Cerceau's plan and elevation do not agree about the shape of the pond. On the plan the angle between the side of the pool and the canal is about 75 degrees. This is curiously close to the angle between the end of the east lake at Beddington and the axis of the garden which is about 77 degrees. This alignment was present in the early 18th-century garden at Beddington but there is no evidence that it existed in the 16th or 17th-century. For the Beddington alignment see Phillips 2016 p. 93.

garden: it appears to be a complex for religious meditation. There is a set of steps descending to the pool which suggests that it could be used for cold bathing. One of du Cerceau's two views of the interior of the banqueting house shows three statues in grotto-like niches. The central one appears to be the good shepherd carrying a lamb – perhaps suggesting that Cardinal Archbishop Bourbon was such. The figure to the left with a lion was probably St Jerome. This saint is often portrayed with a lion in rocky landscapes in 15th and 16th-century painting, which fits with the hermitage and wilderness. The third figure to the right may be St Peter with his key although this is less clear. In the context of the Catholic - Protestant religious conflicts in mid-16th-century Europe this can be seen as an assertion of Catholic supremacy:

> You are Peter, the Rock; and on this rock I will build my church, and the powers of death shall never conquer it. I give you the keys of the kingdom of Heaven; what you forbid on earth shall be forbidden in heaven, and what you allow on earth shall be allowed in heaven'.[243]

The second view shows a wall with pagan decoration and seat-like niches which are somewhat reminiscent of a chapter house. The Maison sits in a pool which has three sets of semi-circular curves in its outer wall and there are three arbours in the formal garden next to the rock. Both of these could refer to the Trinity. Although the Maison Blanc was a classical building, the detached garden and canal seem to be rooted more in Christianity than in pagan mythology. This must have been appropriate for a cardinal who became the Catholic claimant to French crown on the death of Henry III.

If this is so, it did not prevent the Maison Blanc being used to stage a pastoral masque to entertain the Queen Mother Catherine de Medici in 1566.[244]

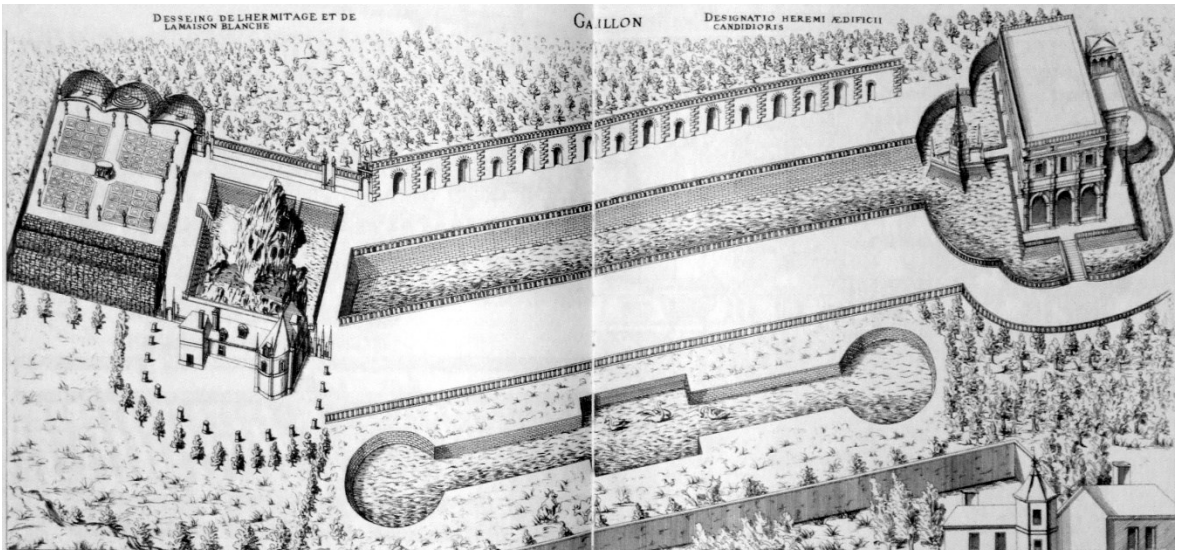

Figure 250. Rocher and banqueting house at Gaillon created for Cardinal Charles de Bourbon from Androuet du Cerceau *Les Plus Excellents Bastiments de France*.

[243] *The New English Bible*. OUP, 1970. Matthew 16: 18-19.
[244] Adams 1979 p. 26.

Gaillon is about 80km from Paris and it would obviously have been possible for Francis to have travelled there during the year he was in the city. It could also be visited on a detour from the routes between Paris and the Channel coast, especially if the channel crossing was from Rye to Dieppe rather than Dover to Calais.[245]

If he did visit Rouen he could have seen Roulant Le Roux's fountain de Lisieux which was built in 1518. It stood on a street corner and was used to supply water. The steep and narrow, almost column-like rock was decorated with Apollo, Pegasus, the Muses, figure with three heads representing logic, physics and metaphysics, some trees and some sheep. The fountain got into a poor state and was destroyed in the Second World War.[246]

Anne Duc de Montmorency is of particular interest as he was a patron of the potter and grotto maker Bernard Palissy, whose work appears to have affinities with the scraps of lizard tail and related ceramics from Beddington (section 13.13). Montmorency was Constable of France and very much a member of the upper aristocracy. As such he would have been in regular contact with the ambassadors accredited to the French court, and it is likely that a visiting member of an ambassador's family would have been introduced to him. Montmorency had also known Francis's father who had served as an ambassador to the French court on several occasions.[247] In 1561-2 Palissy was in Saintes in southwest France, 400km from Paris. In May 1562 he was involved in a protestant takeover of the town and it seems very unlikely that he met Francis. It is, however, quite likely that Montmorency had some of his ceramics in Paris so Francis might have seen them there.

Montmorency had two major out-of-town chateaus, Ecoyen and Chantilly. It is thought that Palissy's ceramic grotto was to be installed at Ecoyen, although there does not seem to be any firm evidence for this and the site is on a hill where it would be difficult to get a running water supply. Chantilly was illustrated in du Cerceau *Les Plus Excellents Bastiments de France.* The site was, like Beddington, well-watered with a moat and gently flowing streams and canals. There were areas of formal garden but du Cerceau shows nothing suggestive of the ornaments at Beddington or Palissy's grotto.

19.3 Ippolito d' Este, Tivoli and Italy

Ippolito d' Este, who created the great renaissance garden at Tivoli, was at the French court at the same time as Francis Carew. Ippolito was the younger brother of Ercole who was the ruler of Ferrara. His family decided that he would pursue a career in the church, and he was made the archbishop of Milan at the age of nine. He went to France as an ambassador in 1536 and quickly found favour with the French king Francis I. He became a cardinal in 1539 but returned to the French court as a representative of the pope. Francis I gave him several lucrative ecclesiastical offices, and he remained close to him and to his successor Henry II. In May 1549 Ippolito went to Rome as Cardinal Protector of France.[248] In 1561 he returned to France as papal legate to the Colloquy of Poissy, which was intended to settle the religious disputes that were tearing France apart. Ippolito and Nicholas Throckmorton put out

[245] Nicholas Throckmorton suggested that Thomas Cecil took the Rye, Dieppe, Rouen route, which he appears to have followed. CSP Foreign 1561-2 items 198 and 261.

[246] From ROUEN 1900 L'histoire de Rouen à travers les Cartes Postales Anciennes http://rouen1900.unblog.fr/2015/03/26/fontaine-de-lisieux/

[247] Nicholas Carew was an ardent Francophile who spoke French and served as ambassador to the country on several occasions. In March 1530 Sir Gregorio da Casale told Montmorency of his efforts to have Carew return as French ambassador. Later that year Carew was sent on an embassy to Italy and he stopped in Paris en route and is recorded as playing tennis with Montmorency. See Knecht 1959 p. 18-9 and the diary entry for 23 October 1530.

[248] Hollingsworth 2004 p. 264-5.

tentative diplomatic feelers, but it is clear that neither side was willing to have an ambassadorial level meeting.[249] Although Francis Carew is not mentioned in the diplomatic correspondence listed in *Calendar of State Papers Foreign* it is possible that he met Ippolito and they may even have talked about gardens. It was the time when Ippolito had regained his governorship of Tivoli and was starting major work on the garden. His ideas – even at the level of discussion – might have been something of a revelation to Francis. There are a few common themes: much of the water at Tivoli entered the garden below the Parnassus rock and, in the Rometa, Tivoli had a miniature landscape. Ippolito was on friendly terms with Montmorency, who, as we have seen, was almost certainly acquainted with Francis providing a possible channel of introduction.[250]

Whatever happened in Paris, Francis had other ways of obtaining ideas from Italy. Nicholas Throckmorton, the eldest son of the ambassador and Francis's sister Anne was in Italy in the summer of 1588 when money was forwarded to him in Lucca. He was still there in 1590 when he matriculated at the University of Padua, returning to England later that year.[251] He would have a very strong interest in keeping Francis happy; by that date it was clear that Francis was likely to die childless and Throckmorton would be the principle heir. A elder brother – Arthur – was in Italy in 1581 and soon after his return to England he paid a week-long visit to Beddington.[252]

19.4 Later French connections

The household accounts for May and June 1570 contain four references to French gardeners:

> It pd to John norrs for gathering of rodds for y^{e} frenche gardyn^{r}s ij daies x^{d} [253]
>
> It pd to norrs for one daies gathering of Rodds for y^{e} frenche gardyno^{r}s xx^{d} [254]
>
> It pd to norrs for gathering of pols for v daies for y^{e} french gardyo^{r} iij^{s} iiij^{d} [255]
>
> It pd to ye smyrthe for a paring Iron for ye frenche gardyners xvj^{d} [256]

It seems likely that the rods were for constructing trellis work to form an arbour or similar structure. Unfortunately the French gardeners are not named in the accounts.

The Beddington parish register contains several entries relating to a Robert Fallisse and his family:

> 1565-6 Jan 19 Robert Fallisse and Joan Weethers marry
> 1567 April 15 John Fallois Baptised (checked register)
> 1570/1 March 11 Robert Falloise buried
> 1571 July 4 James Faloise buried (probably 4 July but could be 21)
> 1572 June 1 James Falios baptised
> 1573 Oct 25 Henry Leigh & Joan Fallisse marry

The name does not sound English and it is possible that Fallise was the French gardener – the dates certainly fit.

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[249] CSP Foreign 1561-2 items 713, 730 (5), 731-4, 867, 880, 924 (13) and 1073 (7).
[250] On Ippolito and Montmorency see Hollingsworth 2004.
[251] Rowse 1962 pages 118 and 122-3; Sutton Archives 25/3/13.
[252] Rowse 1962 pages 89-93 and 96.
[253] SHC 281/4/6.
[254] SHC 281/4/7.
[255] SHC 281/4/9
[256] SHC 281/4/11

It seems likely that the French gardeners were Huguenots. Many French Protestants fled to England in the 1560s to escape from persecution and the turmoil caused by the start of a civil war in the late summer of 1562. Francis may have recruited the gardeners while he was in Paris in 1561-2. Their absence from the surviving household accounts, which run from the 5 November 1565 to 15 April 1566; from the 4 April to the 12 September 1568; and from the 7 June to 2 October 1569, may simply be because they were included in separate garden accounts or may suggest they were not yet working at Beddington.[257] Francis almost certainly had opportunities to recruit them later. One such was via his brother-in-law Sir Nicholas Throckmorton, who as we have seen, was English ambassador in Paris when Francis visited. He was an ardent supporter of the Huguenot cause and an active intriguer on its behalf. He appears to have been friendly with Gaspard de Coligny who was Admiral of France and a key Huguenot leader.[258] In September 1568 the Admiral's brother Odet de Coligny, Cardinal Chatillon, fled from France to England. The Cardinal, who continued to use his title after he converted to Protestantism, was favourably received by Queen Elizabeth, who lodged him at Shene near Richmond, Surrey. Shortly after his arrival the Earl of Leicester wrote to Nicholas Throckmorton asking him to give friendly advice to Chatillon to prevent him embarrassing Elizabeth by too openly aiding the French rebels. The mission was obviously of some delicacy as Leicester made it clear that he did not wish Chatillon to be offended. It seems likely that Throckmorton was selected because he was a personal friend of the Cardinal. A few days later Throckmorton wrote to Leicester, Pembroke and Cecil saying that he had dined with Chatillon and had carried out their instructions.[259] Throckmorton had a house in Carshalton, close to Beddington, and must have been in frequent contact with Francis. Throckmorton's daughter Elizabeth, who later married Sir Walter Ralegh, was baptised at Beddington on the 15 April 1565.

If Throckmorton did not introduce Sir Francis to Chatillon, they must have become friendly by some other route, for the Beddington household accounts for the period 25 June to 2 July 1570 include a payment to a servant for taking trout to 'my lord Cardinal', presumably as a present.[260] While Chatillon was in England he acted as an unofficial ambassador for the Huguenots, carried out lobbying on their behalf, and helped those in difficulties with the English authorities. Both Throckmorton and Cardinal Chatillon were in an excellent position to help Francis recruit his gardeners, although there is no direct evidence that either was involved.

[257] SHC 281/4/2, 281/4/3, 281/4/4.
[258] TNA, *CSP Foreign 1561-2*, It. 151.
[259] TNA, *CSP Domestic Addenda 1566-79,* XIV It. 29. *CSP Foreign 1566-8*, It. 2583.
[260] SHC 281/4/14.

20. SOME KEY ENGLISH GARDENS

Some of the features in Sir Francis Carew's garden were commonly found in other great Elizabethan gardens. Numerous 16th-century mounts and banqueting houses survive or are known from documents. Ponds, streams and fountains were also common.[261] The use of marble and the painted ceiling in the Beddington banqueting may be exceptional, but it is difficult to be certain as the surviving interiors are mostly poorly preserved. There were certainly other examples of very elaborate decoration, as shown by the tapestry which once decorated a banqueting house belonging to the Earl of Leicester.[262] Other features found at Beddington, such as the grottoes and rocks, seem to have been very rare before 1600, although they became much more common in the early 17th-century. In the Elizabethan period there were three English gardens which definitely had elaborate decorations of this type, Beddington, Nonsuch and Theobalds.[263]

Nonsuch Palace was only 7km west of Beddington. The garden had been started as part of Henry VIII's palace and had probably been further developed by Henry Fitzalan, 12th Earl of Arundel, who acquired the property in 1556. It was however, extensively modified and embellished by Arundel's son-in-law and heir John Lord Lumley who inherited in 1580. He modified the privy garden and added a series of ornaments including a fountain topped by a figure of Diana. It is possible that he added the wilderness which lay to the west of the privy garden and was certainly responsible for the creation of the Grove of Diana.[264] The central feature of this was a tableau of Diana and Actaeon. This is described by Anthony Watson, an associate of Lumley's, who wrote a long description of Nonsuch and its garden. Of the Grove of Diana he says:

> Now the divine virgin enjoys the pleasures of the rock wall in peace, washes her limbs in the icy liquid, regards the absurd shade of her foe, and listens to the wily hounds pursuing with pleasing barks the new stag through all the wood. Whether the rock is more of an imbellishment to the well, or the well to the rock, is a problem full of hazards, and the case is still before the court. Of no matter what art, Nature, or divinity it may be, who is there who does not admire in this hardest rock, the skilful arrangement of stones, the plentiful variety of blossoms and fruits, but especially how the rush of spraying water now subsides with gentle murmur, now bubbles up on high in full force? [265]

The Grove was also seen by Baron Waldstein who visited Nonsuch in 1600:

> This Grove is approached by a gentle slope leading down from the garden by a path half hidden in the shade of trees. Before you approach the actual Fountain of Diana you will pass a small stone building where there is a table made from a rectangular piece of black marble… After seeing this summerhouse we were taken along the path which leads to the Fountain of Diana itself. This spring rises in a secluded glade at the foot of a little cliff. The source was from a number of pipes hidden in the rock, and from them a gentle flow of water bathed Diana and her two nymphs Actaeon had approached; and was leaning against a nearby tree to hide himself and gazing

[261] Henderson 2005 p. 127-137 and 155-164. Whitaker 2019 chapter 3.
[262] Henderson 2005 p. 160 and 162.
[263] Henderson 2005 p. 164-7.
[264] The most significant study of the Nonsuch garden is Biddle 1999. This considers the sources, features and dating.
[265] From the translation in Biddle 1999.

> lecherously at Diana; she, with a slight gesture of her hand towards him, was slowly changing his head to that of a stag; his three hounds were in close pursuit.[266]

It appears that Diana and her nymphs were in a pool or well which seems more naturalistic than the marble basins which appear in some 16th and 17th-century prints and in the decorations around the wall top in the High Great Chamber at Hardwick, Derbyshire. The Nonsuch figures were repainted in the early 17th-century, which would suggest stone or perhaps more likely wood, but not glazed ceramic.[267] There were other figures in the wilderness, which was adjacent to the Grove of Diana:

> To what end the flute players are gathered together in the corners I cannot guess. Perhaps they arrive unbidden and, dispirited at the sight of the wild animals, they rush to their flutes as though to arms and drown the loud calls of the woodland creatures with their discordant noise. For indeed the wilderness is from time to time shattered by the terrifying roar of lions or now resounds with the savage grunt of the foaming bear. Here a bear falls killed by a shot from a gun; there a deer struck by a foresters spear breaths its last breath. Here the single horned Indian-ass steps assuredly with firm hooves. Here the mute crocodile armed with sharp claws, peruses those that flee and flees from his pursuers, pours out tears at the sight of a man but snaps him up when he comes near. On the one hand the poisonous snake hisses as he glides, the panther threatens everyone with his gaping jaws, the wolf because of his hunger is little removed from madness, the fierce tigers rend their unhappy lamenting prey; on the other hand cunning dogs fill the whole pace with baying, and are urged through the whole wilderness in a swift hunt.[268]

It seems likely that the animals were statues or figures of wood and that they may have been animated and possibly made sounds. Watson says that streams of water ran down the Wilderness and it is possible that they provided the power to animate the figures.[269]

The cliff-like setting for Diana's bath could be seen as having a general affinity to the Beddington rock, and this would be particularly so if it was built against a free-standing mount rather than a bank. The marble table in the adjacent banqueting house is reminiscent of Beddington. The wilderness contained pipers in the corners and also included all kinds of animals although Watson's description suggests that they were perhaps more fierce than enchanted, or did they become tame when the pipes played?

Beddington and Nonsuch appear to have some similarities of construction and theme.

The other garden, Theobalds, created for William Cecil, had some striking similarities with Beddington. When Baron Waldstein visited in 1600 he saw

> a fountain in the centre of the garden: the water spouts out from a number of concealed pipes and sprays unwary passers-by. Quite a large obelisk of alabaster surmounted by a figure of Christ stands in the garden; nearby is an alabaster sundial, and the royal arms of England are displayed here surrounded by the garter in gold.

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[266] Waldstein 1981 p. 161.
[267] Biddle 1999 p. 157.
[268] Anthony Watson's description of the garden translated in Biddle 1999 p. 175.
[269] Watson translated in Biddle 1999 p. 177. The water supply to the fountains came from a conduit head at about TQ 23058 62490 close to and south of the present railway line between Cheam and Ewell East stations (Dent 1981 p. and the 1932 six-inch Ordnance Survey map sheet XIX NW). This fed a pipeline which connected to a cistern in the southwest tower of the palace. The conduit head appears to have drawn water from an area of Thanet sand resting on the top of chalk. It is likely that the water yield was very limited. However, there are also Thanet sand outcrops at a lower level closer to the palace and it may have been possible to create horizontal wells by excavating short tunnels. None are currently known but the subject is unexplored.

> On the way up to the house there is a fountain: a little ship of the type they use in the Netherlands is floating on the water, complete with cannons, flags and sails.

He later adds:

> In the garden you see lilies and other flowers growing among the shrubs: the garden also contains some alabaster busts of the Caesars. An outstanding feature is a delightful and most beautifully made ornamental pool (at present dry, but previously supplied with water from two miles away): it is approached by 24 steps leading up to it. The water was brought up to this height by lead pipes and it flowed into the pool through the mouths of two serpents. In two of the corners of this pool you can see two wooden water-mills built on a rock, just as if they were on the shores of a river. The roof itself is painted in tempera with appropriate episodes from history, and is very finely vaulted. A space behind the pool houses white marble statues of the 12 Roman Emperors. [270]

The great chamber in the house was a large room with grotto-like decoration. It was described by Rathgeb who wrote an account of the Duke of Wurtemburg's visit to England in 1592:

> There is a very high rock, of all colours, made of real stones out of which gushes a splendid fountain that falls into a large circular bowl or basin supported by two savages. This hall has no pillars; it is about 60 ft. in length and upwards of 30 wide. The ceiling or upper floor is very artistically constructed: it contains the 12 signs of the Zodiac, so that at night you can see distinctly the stars proper to each: on the same stage the sun performs its course, which is, without doubt contrived by some concealed ingenious mechanism. On each side of the hall are six trees, having the natural bark so artfully joined, with birds' nest and leaves as well as fruit [that] when the steward … opened the window the bird flew into the hall and began to sing.[271]

The grotto was also seen by Baron Waldstein:

> In the first room there is an overhanging rock or crag (here they call it a 'grotto') made of different kinds of semi-transparent stone, and roofed over with pieces of coral, crystal, and all kinds of metallic ore. It is thatched with green grass, and inside can be seen a man and a woman dressed like wild men of the woods, and a number of animals creeping through the bushes. A bronze centaur stands at the base of it. A number of columns by the windows support the mighty structure of the room: these columns are covered with the bark of trees, so they do in fact look exactly like oaks and pines. In this same room there is an exceedingly fine alabaster fireplace, and also another in black and white marble.[272]

William Cecil bought the manor of Theobalds in 1564 but building continued over many years.[273] The grotto appears to have been completed by 1585 when Cecil referred to them while making an 'apology' for the extravagance of the project.[274]

Francis Carew seems to have been on friendly terms with Robert Dudley, Earl of Leicester, who created a significant garden at Kenilworth and another later one at Wanstead in Essex.[275]

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[270] Waldstein 1981 p. 83 and 87.
[271] Quoted in Summerson 1959 p. 122-3.
[272] Waldstein 1981 p. p. 83.
[273] Andrews 1993 p129.
[274] Summerson 1959 p114
[275] See section 4.4.

Queen Elizabeth gave Kenilworth to Leicester in 1563 and he has started building there by 1568. The Queen visited in the course of her summer progresses in 1566, 1568, 1572 and 1575 the last being the occasion of a major entertainment spread over several days.[276] The lavish scale of the building suggests that Leicester saw Kenilworth both as the centre of his rural estates and as a key point in the Queen's progresses. The garden features in Robert Langham's description of the 1575 visit. The garden was within the castle walls above the water level of the lake and moats. There was a pipeline which brought water from a conduit head about 1.2km from the castle.[277] This was sufficient to supply a central fountain, but it would not have been possible to construct the streams and channels found at Beddington even if Leicester had wanted to. The central fountain was an elaborate affair and there was also a large aviary and two obelisks, but there is no evidence for a grotto or ornamental rock. It seems likely that the garden was built in the first half of the 1570s and is therefore slightly later than the work documented at Beddington around 1570.[278] It seems that Leicester knew Francis Carew and it is likely that he was well aware of the work at Beddington. Whether his failure to carry out similarly elaborate work at Kenilworth was due to his personal taste, the limitations of the site or a reluctance to spend a huge sum on a site which both he and the Queen seldom visited is open to doubt. The scale of his building work suggests that the latter was not a factor.

Leicester acquired the lease of Wanstead in Essex in 1577 and the freehold the following year. Very little is known about the garden there although surviving accounts contain payments for planting. He tried recruited a French gardener to make arbours and topiary and care for exotic plants.[279] The house was within easy reach of London, and Elizabeth visited six times. If Leicester wanted to create elaborate grottoes and water works, this out of town house was the place to do it: there they would be seen. However, the house appears to have been set well above the River Roding. There was a supply of water from gravel terraces. In the 18th century these fed several lakes but the water supply was probably rather precarious and would not match the quality of a chalk stream. It was not an ideal site for a water garden and Leicester must have known this when he bought it: presumably it did not matter.

Jane Whitaker has suggested that a grotto at Wimbledon House may have been made for Thomas Cecil, although it is not recorded until 1649 when it appears in a Parliamentary survey.[280] The grotto was entered from the stone gallery which lay on the east side of the house, level with the orange garden. The gallery is clearly shown on Robert Smythson's plan of the house which is dated 1609.[281] The centre of the gallery stepped forward into the garden and the grotto was presumably behind this in the basement of the house. The arrangement suggests that the grotto was already in place in 1609. If so, it would be the work of Thomas Cecil who was with Francis in Paris in the early 1560s. This may have been the start of a long friendship: in a postscript to a letter dated 1575 Thomas commended Francis to his father 'for old friendship'.[282] In 1649 the grotto was described as:

> One other roome placed in the midle of the said stone gallery called the Grottoe having three double leaved doores opening thereunto floored with very good paynted tyle and wrought in the arch and sides thereof with sundry sorts of shells of greate lustre and ornament formed into the shapes of men Lyons Serpents antick formes and

[276] Adams 2013.
[277] Demidowicz 2013.
[278] For the date of Kenilworth see Jacques 2013 p. 10.
[279] Adams 1995 p. 220, 225, 226 and 239-40.
[280] Whitaker 2019 p. 140-2.
[281] Reproduced in Higham 1962 figure 2.
[282] Historical Manuscripts Commission *MS of the Marquis of Salisbury at Hatfield House* part II p. 111-2.

> other rare devices the bottomes of the walls are sett round with cement of glass in nature of litle rockes in the midle of this roome is one cesterne of lead : 7 : foote square and twentie one inches deepe sided with black and whyte marble having one pipe of lead in the midle thereof there is allsoe opposite to the doores of this roome fortie Lights of seeing glass sett together in one frame much adorning and setting forth the splendor of the roome.[283]

Thomas Cecil is traditionally said to have started building the house in 1588.[284] If so, and if Thomas was the creator of the grotto, it is likely to have been made in the early 1590s. This is probably later than the work at Beddington, Nonsuch and his father's house at Theobalds: perhaps it is where the craftsmen went next.

After Cecil's death Charles I acquired Wimbledon House for his queen Henrietta Maria. She made many improvements in the late 1630s and early 1640s. André Mollet improved the gardens and Inigo Jones was also employed – probably on the house. The orangery appears to have been part of these improvements. It appears in the parliamentary survey and is clearly shown on Winstanley's view of the south side of the house in 1678.[285] It is, however, not on the Smithson plan of 1619.

Another interesting comparison with Beddington is Hill Hall, Essex which was built for Sir Thomas Smith, an academic who served as an ambassador and, in 1573 succeeded William Cecil as principal secretary. Smith came from a modest background and was almost certainly less wealthy than Sir Francis Carew, particularly in terms of landed income. He is, however, an interesting comparison with Francis Carew, as he had travelled on the continent, particularly in France, and had therefore been exposed to some of the same influences that Francis encountered. Smith's travels were more extensive than Francis's known travels. In 1540-42 he visited Paris, Orleans and Padua to study law. He visited Antwerp on government business about 1548, was a member of an embassy to France in May 1553 and then ambassador to the French court 1562-6, which involved an extensive tour of the provinces including Toulouse, Arles and Nimes. He was again in France in 1567 and 1572. He acquired Hill Hall in 1554 through his marriage to Phillippa Hampden, who had a life interest in the property. He bought the reversion in 1556 and three major building campaigns followed, 1557-8, 1568-9 and 1574-5. The design of the building was a personal and somewhat eccentric mixture of classical and gothic, clearly influenced by what he seen in France and especially by the early French renaissance and the School of Fontainebleau. The building included unglazed terracotta, tin-glaze and a series of internal wall paintings all probably produced by foreign craftsmen working in England.[286]

Smith was clearly interested in gardening and a letter to William Cecil in January 1572 from Montreuil in the Pas de Calais he said that he was sending home 'certaine tootes of Hyacynchne and two or iii of Asphodelus' which he had not seen in England. He then expresses his regret in not being able to send plants from further south in France. Very little is known of the garden until it appears on a map of 1657. This shows an area behind the house divided into four quarters with moat-like fish ponds on two sides. The house is set fairly high, so still water ponds were achievable, but there was a lack of running water. He had a vine which may have been covered in winter but there is no evidence for other plant houses or grottoes.[287]

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[283] Hart 1871 p. 106-7.
[284] Higham 1962 p. 23.
[285] Higham 1962 p. 32 and figure 5.
[286] Drury 2009 p. 248-282.
[287] Drury 2009 p. 137-140.

21. CONCLUSIONS

Queen Elizabeth visited Beddington at least fourteen times making it one of her most favoured courtier houses. Sir Francis Carew was not a significant political figure, and it seems likely that the main attraction was the garden. The principal features can be listed, and the list may be more or less complete. The main features were a banqueting house with a grotto below it, a grotto with a hydra in it, a rock, a fountain with fishes and frogs as if they were alive, statues, toy mills and ships, an oval pond, orchards, an orangery and other plant houses. Our knowledge of the planting is probably more sparse, although it seems that most of the exotics were of Mediterranean origin. Roy Strong pointed out that contemporaries tended to focus on the water in the garden, and the archaeological work has found evidence of a surprising number of water channels and ponds. However, the overall layout is still uncertain. There appear to have been three garden areas to the southeast, east and northeast of the house.

The area to the southeast had the rock on its eastern edge where the stream entered the garden. This probably stood in a pool with the stream running from it although its course is unclear, possibly the axial course shown on later maps is a survival from this period. The rock, toy mills and the statue of Polyphome may have stood in this area. The orange house extended along the northern edge of this area and the area to the west of it would be an obvious location for other plant houses.

The area to the north, immediately east of the house, appears to have been a water garden, although the complete layout is unclear. The main channel of the river may have run across this area and flowed into the moat.

The area to the northeast of the house was probably the site of the oval pond.

Orchards appear to have extended to the west and north west of the house in what was later open deer park.

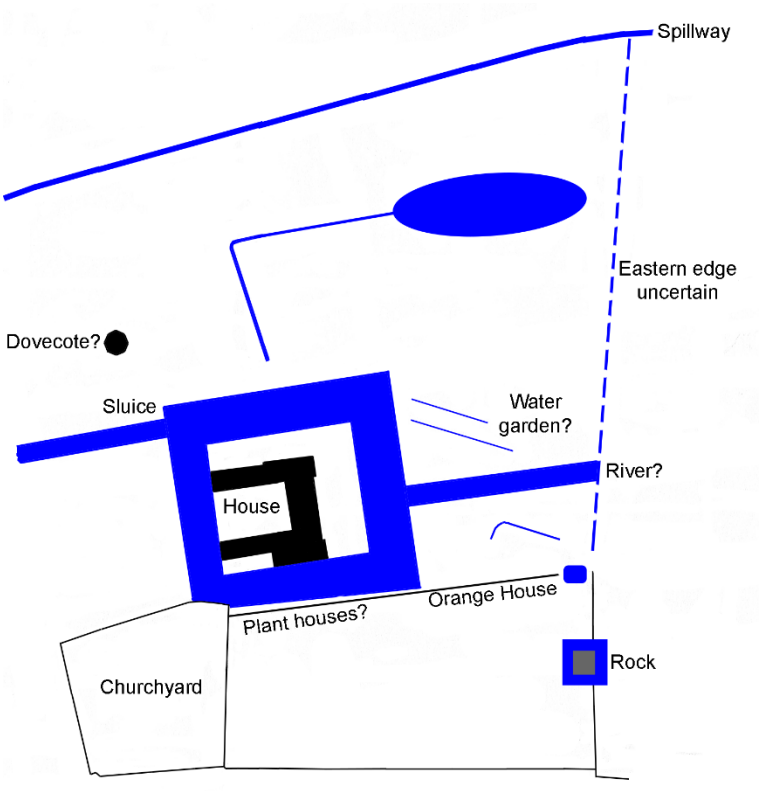

Figure 251. A tentative partial reconstruction of the Elizabethan garden.

At least some of the features in the Francis Carew's garden are older than Nonsuch and Theobalds. The rock existed or was being constructed in the 1570s, as was the house on the water (if it was a separate structure). French gardeners were also working at Beddington in 1570. However, there are other elements of the Beddington garden which seem to be later, such as the painting of Flanders, Holland and Zealand on the ceiling of the Banqueting House, which may belong to the first half of the 1580s. Other features such as the hydra grotto, the small ships and mills which could be of similar date and therefore of about the same age as Theobalds and Nonsuch. All three gardens stand out as unusual in the Elizabethan period and share some ornamental devices, and the obvious suspicion is that they are the work of the same group of craftsmen.

The ornamental rock at Beddington could have drawn on ideas that Francis had acquired in Paris or perhaps at Rouen and Gaillon. Palissy was almost certainly not in Paris, but Francis might have of heard of the grotto project from Montmorency or someone in his circle. The Hessen gentleman said that the Beddington rock was 'handsomely furnished with all sorts of neatly made animals and little men as though they were alive'. The little animals are obviously the kind of thing that Bernard Palissy created, and it may be that the scraps of pottery found at Beddington were from this structure. However, the little men were not typical of Palissy and they seem to fit uneasily with conventional garden rocks which usually referred to Mount Parnassus and the muses although, as we have seen, Gaillon seems to have had a more Christian theme. 'Animals and little men' sound more like the curious miniature landscapes found in German handstones. These consist of a miniature rock with figures and sometimes buildings set on a cup-like silver gilt base. The rock is usually mineral and the decorations often have a religious theme and include mining scenes. There are several examples in the Kunsthistorisches Museum in Vienna which came from the Hapsburg collections. These examples were made in Joachimsthal, now Jáchymov in the Czech Republic. They were the work of Casper Ulich who was active in the third quarter of the 16th-century.[288] Although they are broadly contemporary with the Beddington garden it is difficult to imagine how Francis Carew could have seen one unless it was in the collections of Montmorency or some other French aristocrat.

Waldstein said that the stream flowed right through the rock and washed all around it. A channel through was probably not a feature of the rock at Gaillon, although du Cerceau's engraving is not sufficiently clear to be certain. It is a feature of the 17th-century rock in the garden of the Real Alcazar in Seville. This has two channels through, which are at right angles and cross in the centre. It was originally a Parnassus with terracotta figures of which only fragments survive.[289] Two rocks with cross channels were installed in the lower garden at Tivoli at some point in the first half of the 17th-century.[290] These were modelled on the ruins of the Meta Sudans, a tall conical fountain of 1st-century date, which stood in a circular pool near the Colosseum in Rome.[291] There is no evidence for a cross channel in the Beddington rock, and the Meta Sudans seems a very unlikely source of inspiration. It is possible that the central channel at Beddington housed a small water wheel which drove a pump to supply water jets.

The hydra grotto also seems somewhat removed from French precedents. The hydra was often used as a symbol of evil. The representation of Polyphome and the ships and mills may also have had a symbolic element, either singly, or perhaps less likely, some sort of narrative. This approach is entirely consistent with the Elizabethan love of devices – symbols that conveyed a meaning that often needed to be puzzled out – which were common in English

[288] Haag 2013 p. 124-5.
[289] Fidalgo p. 107-8.
[290] Coffin 1960 p. 112.
[291] Claridge 1998 p. 271-2.

architecture and decoration of the period.[292] This also seems removed from the approach taken in French grottoes. The Maison Blanc at Gaillon is part of a garden which seems to have been presented as a setting for Christian meditation, whatever other purposes it had. The grotto at the Bastie d' Urfe is connected to the house chapel through the latter's east door. The grotto is in effect a prelude to the chapel, suggesting that it was intended to be a place for meditation rather than secular amusement. The grotto at Meudon seems to have been a place to display the Cardinal of Lorraine's collection of classical sculpture and might have been presented as a place of meditation, although it also appears to have contained water tricks.[293] The interior of the grotto at Fontainebleau has gone, although it is difficult to imagine it as a focus for meditation in the morally lax atmosphere of Francis I's court. It is easy to imagine that Francis Carew could merge his experience of French gardens with an interest in devices. Other influences may have been at work, but exactly what is unclear as the evidence base is too thin. Research on French renaissance gardens has been overshadowed by the great gardens of the 17th-century, and it is easy to believe that they are underestimated. The great terraced garden at Blois was created in 1499-1508 by the Pacello da Mercogliano and was surely not much behind the fashion in his native Italy.[294] The grotto at Fontainebleau was created about 1541-3 and Bâtie d' Urfé about 1551, closely following contemporary Italian fashion.[295]

Elaborate garden automata – as opposed to simple trick water jets triggered by hidden taps – are generally thought to have originated in Italy and to have been introduced, in the early 17th-century, into the garden at St Germain en Laye outside Paris by the Francini brothers, and into England by Solomon de Caux.[296] The completeness of this narrative is, however, open to doubt. When Ippolito d' Este wanted to construct a water organ at Tivoli he turned to a Frenchman who the Italians called Lucha Clericho.[297] Building a water organ would have required musical knowledge, the ability design an elaborate machine and to make and fit scores of valves and other components. We do not know anything about Clericho's training or previous work, but he is unlikely to have got such a commission without substantial experience, probably at least partly in or around Paris, where Ippolito might have heard of his reputation.

The designs of the automata were sometimes derived from Hero of Alexander's *Pneumatica* but nobody could create a complete automata, or even make the Beddington fish, from a simply reading a book. The construction of the fish requires sophisticated metalworking skills which would almost certainly be learnt by apprenticeship to a master working within an established tradition. The skills need to construct automata were similar to those needed for organ building: both rely on mechanics to control a series of valves to regulate the flow of either water or air. Decorative elements like the fish also demand a considerable degree of artistry. In practice the builder of an organ or automata is likely to have had a small network of associates with the various skills needed to make particular components. Clericho's French background hints that such a network existed in renaissance Paris, and the gardens of Beddington, Theobalds and Nonsuch suggest that such a network may have existed in late Elizabethan London or Southwark. It was very likely made up of Protestant refugees from France or the Low Countries, but who the people were, we do not currently

[292] Girouard 2009 chapter 4.
[293] Miller 1982 p. 54-5.
[294] Latrémolière 2016.
[295] Amico 1996 p. 51-2.
[296] Strong 1979 chapter iv.
[297] Coffin 1960 p. 17.

know. Neither do we know if they or their heirs were sub-contractors to Solomon de Caux in the early 17th-century.

As an English garden, Francis Carew's Beddington is strikingly original, as Sir Roy Strong observed in his 1990 paper. He also pointed out that foreign travellers commented more on the garden's water features than the oranges and other exotic plants.[298] The archaeological evidence suggests that apart from the rock, fountains and egg pond there was a network of channels on what is now the east lawn, although the detail of this is still unclear.

Many of the features such as rocks and grottoes became common in the early 17th-century and one might argue that there was some influence from Beddington. This is, however, difficult. Francis Carew's garden drew on ideas that were circulating in Italy, France, south Germany and the Low Countries in the second half of the 16th-century. This means that it is very difficult to disentangle specific sources and influences.

There are at least three surviving travellers' accounts, one from the pen of a Moravian and two from Germans, and it seems reasonable to assume that other foreigners visited the garden – especially those from Protestant areas.[299] If Beddington had any influence on these areas is not easily traced, partly because any possible influence cannot easily be separated from the general European background and partly because so much of Renaissance Germany was destroyed in the Thirty Years War.

The gardens designed by Solomon de Caux at Somerset House in London, Richmond in Surrey and at Heidelberg contained rocks, grottoes and water tricks and had obvious affinities with Beddington. However, de Caux had been in Italy before he came to England and, although it seems likely that he visited Beddington, it would have offered him little in the way of novelty.[300] The works at Richmond were commissioned by James I's eldest son Prince Henry. He was often in the care of the Lord Admiral, Charles Howard, Earl of Nottingham, who had a house in Carshalton. There is a passing mention of the Prince hunting in Beddington Park so he was presumably familiar with the house and garden.[301] In 1611 the new mount house at Beddington which may have been at the end of a gallery projecting into the garden contained 25 glasses with feathers. Where these in honour of Henry whose badge as Prince of Wales was 3 ostrich feathers?[302] Were the little naval vessels floating on the water reflecting the Prince's interests?[303]

Francis Carew's experiments with the ripening of fruit caught the attention of Hugh Platt, and they are perhaps echoed in Francis Bacon's *New Atlantis.* Bacon left *The New Atlantis* as an incomplete manuscript which was published in 1627 – the year after he died. The essay describes a utopian society on a mythical island where life there was guided by the members of a learned college called the House of Salomon. This sought 'knowledge of the causes and secret motions of things; and the enlarging of the bounds of human empire, to the effecting of all things possible'. Their achievements straddle the boundary between magic and practical research some of which seem to recall activities in Francis Carew's garden. They had made 'trees and flowers to come earlier or later than their seasons', and had 'particular

[298] Strong 1990 p. 236-8.
[299] Baron Waldstein in 1600; Hans Jacob Wurmsser von Vendehheym accompanying Duke Lewis Frederick of Wirtemberg in 1610 (Rye 1865 p. 60) and the gentleman accompanying the Landgraf Otto of Hessen-Kassel in 1611.
[300] Morgan 2007 p. 42 and following.
[301] Historical Manuscripts Commission. *Calendar of the manuscripts of the most honourable the Marquise of Salisbury*… Part XVIII (1606) edited by MS Giuseppi. HMSO, 1940. p. 175.
[302] See section 4.5
[303] For Prince Henry's interest in the navy see Strong 1986 p. 57 and following.

pools where we make trials upon fishes'. They also imitated 'the motions of living creatures, by images of men, beasts, birds, fishes and serpents' and carried out 'all manner of exquisite distillations'. There is a mechanical fish from Beddington and also evidence for distillation in the garden, although there is no way of knowing whether this was of a routine nature or extended to experimentation.[304]

The Elizabethan garden at Beddington is not easy to place in context. The enigmas, doubts and uncertainties are perhaps a reminder of how little we know about the craftsmen who created the renaissance gardens in Europe north of the Alps. What is clear is that the garden contains several types of material such as the metalwork and Palissy-type pottery which are currently unique to the site. Only a tiny fraction of the channel and moat fills have been excavated and it is also possible that some of the 16th-century garden surface survives buried under the East Lawn. What remains below the ground is likely to be of at least national importance and quite likely of European importance.

[304] Bacon 2018 pages 31, 33-5 and 38.

22. BIBLIOGRAPHY

Simon Adams, 1995
The *Household accounts and Disbursement books of Robert Dudley, Earl of Leicester 1558-1561, 1584-1586* edited by Simon Adams. Camden Fifth Series Volume 6. Cambridge University Press.

Simon Adams, 2013
The Earl of Leicester and his world. In Keay and Watkins 2013 p. 3-8

William Howard Adams, 1979
The French garden 1500-1800. Scolar Press.

Leonard N Amico, 1996
Bernard Palissy. Flammarion.

J Corbet Anderson, 1882
A short chronicle concerning the parish of Croydon. Reeves and Turner. Republished SR press, 1970.

KR Andrews, 1964
Elizabethan Privateering. CUP.

Martin Andrews, 1993
Theobalds Palace: the gardens and park *Garden History* 21 (2) p. 129-149.

John Aubrey, 1718
Natural History and Antiquities of the County of Surrey. Curll. (Reprinted 1975).

Francis Bacon 2018
New Atlantis in Francis Bacon and Tomasso Campenella New Atlantis & The City of the Sun. Dover Publications, 2018.

Thomas Bentham, 1923
A history of Beddington. John Murray.

Martin Biddle, 1999
The gardens of Nonsuch: sources and dating. *Garden History* vol. 27, no. 1 p. 145-183.

ST Bindoff, 1982
The House of Commons 1509-1558. Secker & Warburg.

Vannoccio Biringuccio, 1990
The Pirotechnia of Vannoccio Biringuccio translated by Cyril Stanley Smith and Martha Teach Gnudi. Dover.

Christopher Booth, 2016
The stalled development of the still: material evidence for changes in distilling practice in Britain. *Post Medieval Archaeology* 50, part 2, p. 419-426.

Frederick Braithwaite, 1861
On the rise and fall of the river Wandle its springs, tributaries and pollution. *Minutes of proceedings of the Institution of Civil Engineers* 20, p. 191 - 258 (including discussion).

Stuart Carroll, 2011
Martyrs and murderers: the Guise family and the making of Europe. OUP.

Amanda Claridge, 1998
Rome: an Oxford archaeological guide. Oxford University Press.

David Coffin, 1960
The Villa d'Este at Tivoli. Princeton University Press.

M Colthorp, 1986
Queen Elizabeth I and the Croydon horse race: a check list of the Queen's visits to Croydon', *Surrey Archaeological Collections,* 77, p. 181-186.

Thomas Coryate, 1905
Crudities. Glasgow: James MacLehose and sons.

W Santo Crimp, 1894
Sewage disposal works. Second edition. Charles Griffin.

Solomon De Caus, 1981
Le Jardin Palatin Editions Moniteur. A reprint of *Hortvs Palatinvs a Friderico Rege Boemiae Electore Palatino Heidelbergae Exstrvctv*. Theodor de Bry, 1620.

George Demidowicz, 2013
The water supply to Leicester's fountain. In Keay and Watkins 2013 p. 184-8.

Daniel Defoe, 1748
A Tour thro' the Whole Island of Great Britain … Fourth edition. London: S. Birt etc, 1748.

John Dent, 1981
The quest for Nonsuch. London Borough of Sutton Libraries and Arts Services.

Henry Dewey and CEN Bromhead, 1921
The geology of south London Memoirs of the Geological Survey England and Wales explanation of sheet 270. HMSO.

Paul Drury, 2009
Hill Hall: a singular house devised by a Tudor intellectual. The Society of Antiquaries of London.

Jacques Androuet du Cerceau, 1988
Les plus excellents bastiments de France presentation et commentaries par David Thomson. Sand & Conti.

David Dugworth, 2006
Examination of vitreous samples from the grotto at Carew Manor, Beddington. Word processed report. English Heritage, 12 May 2006.

B Enright, 1956
Richard Rawlinson and the publication of Aubrey's Natural History and Antiquities of Surrey', *Surrey Archaeological Collections,* 54, p. 124-133.

Ana Marin Fidalgo
The Real Alcazar of Seville. Guadalquivir SL Ediciones. No date.

Derek Ford and Paul Williams, 1989
Karst Geomorphology and hydrology. Unwin Hyman.

M Gascoyne, 1977
Trace element geochemistry of speleothems. *Proceedings of the 7th International Speleological Congress* p. 205-7.

John Gerarde, 1597
The herball or generall historie of plantes. John Norton.

Mark Girouard, 2009
Elizabethan architecture: its rise and fall, 1540-1640. Yale University Press.

Montague S Giuseppi, 1908
The River Wandle in 1610. *Surrey Archaeological Collections,* 21, p. 170-191.

Hedley Marne Gowans, 1983
The courts of the manors of Beddington and Bandon. London Borough of Sutton Libraries and Arts Services.

Sabine Haag, 2013
Masterpieces of the Kunstkammer Vienna. (A brief guide to the Kunsthistorisches Museum Vienna volume 12). Kunsthistorisches Museum.

Hamilton, 1794
A short account of several gardens near London with remarks on some particulars wherein they excel, or are deficient, upon a view of them in December 1691, communicated to the Society by Dr. Hamilton, *Archaeologia,* 12, p. 182-3.

Peter and Jean Hansell, 1988
Doves and dovecotes. Millstream Books.

WH Hart, 1871
The Parliamentary Surveys of Richmond, Wimbledon, and Nonsuch, in the county of Surrey, AD 1649. *Surrey Archaeological Collections* 5, p. 75-156.

PW Hasler, 1981
The House of Commons 1558-1603. HMSO.

Maree Haynes, Fiona Baker and Richard Tipping, 1998
A still worm from excavations at Carrick Castle, Argyll. *Post Medieval Archaeology* vol. 32, p. 33-44.

Paula Henderson, 2005
The Tudor house and garden. Yale University Press.

CSS Higham, 1962
Wimbledon Manor House under the Cecils. Longmans.

Mary Hollingsworth, 2004
The cardinal's hat: money, ambition and housekeeping in a renaissance court. Profile Books.

Michael Hughes, 2013
Chemical characterization by ICPS of tiles and pottery from Carew Manor. Word-processed report.

Paul Hulton, 1984
America 1585: the complete drawings of John White. The University of North Carolina Press and British Museum Publications.

David Jacques, 2013
The place of Kenilworth in garden history. In Keay and Watkins 2013 p. 9-20.

Anna Keay and John Watkins, 2013
The Elizabethan garden at Kenilworth Castle. English Heritage.

RJ Knecht, 1959
The voyage of Sir Nicholas Carew to the Emperor Charles V in the year 1529. The Roxburge Club at the University Press, Cambridge.

Henry Lambert, 1918
A Carew Household Book. *Surrey Archaeological Collections*, 31, p. 1-22.

Susan Lasdun, 1991
The English Park. Andre Deutsch.

Baldwin Latham, 1917
Records of underground water and Croydon bourne flows. *Transactions of the Croydon Natural History and Scientific Society* VIII Part 3 for 16 Feb. 1916 - 16 Jan. 1917, p. 113 - 132.

Elisabeth Latrémolière, Françoise Lafabrié and Morgane Lacareux, 2016
The Château de Blois. Editions du Patrimoine. Centre des Monuments Nationux.

SE Lauritzen, DC Ford and HP Schwarz, 1986
Humic substances in speleothem matrix. *Communications of the 9th International Speleological Congress*, Barcelona. p. 77-9.

Claudia Lazzaro, 1990
The Italian Renaissance garden. Yale University Press.

Prudence Leith-Ross, 1984
The John Tradescants: gardeners to the Rose and Lily Queen. Peter Owen.

Naomi Miller, 1982
Heavenly caves: reflections on the garden grotto. George Allen and Unwin.

Alan Mitchell, 1988
A field guide to the trees of Britain and Northern Europe. Revised edition. Collins.

Luke Morgan, 2007
Nature as model: Solomon de Caus and early seventeenth century landscape design. University of Pennsylvania Press.

Robin Nielsen, 1990
Report on archaeological excavation / site watching brief of Wandle overflow and main effluent carrier channels February 1990. Museum of London DGLA.

Clive Orton, 1984
The hanging garden of Beddington. *London Archaeologist* 4 (15) p. 414-5.

Geoffrey Parker, 1985
The Dutch revolt. Penguin Books.

John Phillips, 2013
The orangery at Carew Manor Beddington. Carshalton & District History & Archaeology Society Occasional paper 4.

John Phillips, 2015
Beddington Park Cottages: investigations before and during building work, 1982-1987. Carshalton & District History & Archaeology Society Occasional paper 6.

John Phillips, 2016
Investigations in the garden at Carew Manor, Beddington. Carshalton & District History & Archaeology Society Occasional Paper 11.

John Phillips, 2018
A former barn at Carew Manor Beddington: excavations in 2015 and 2016. Carshalton & District History & Archaeology Society Occasional Paper 12.

John Phillips, 2020
The Dovecote at Carew Manor, Beddington. Carshalton & District History & Archaeology Society occasional Paper 13.

John Phillips, 2020
The Portioner's House, Beddington Park. Carshalton & District History & Archaeology Society occasional paper 16.

John Phillips and Nicholas Burnett, 2005
The chronology and layout of Sir Francis Carew's garden at Beddington, Surrey. *Garden History* 33 (2) Winter 2005, p. 155-188.

John Phillips and Nicholas Burnett, 2016
Carew Manor, Beddington.
Volume 1: the house and its owners
Volume 2: the moat
Carshalton & District History & Archaeology Society Occasional Paper 10.

Hugh Plat, 1594
The jewel house of art and nature. Fourth edition. Peter Short.

Hugh Plat, 1654
The Garden of Eden. *William Leake.* First published in 1608.

Rob Poulton, 2016
Woking Palace excavations, 2015. *Surrey Archaeological Society Bulletin* 456 p. 13-15 especially p. 13 and 15.

Conyers Read, 1960
Lord Burghley and Queen Elizabeth. Cape.

Eric Robinson, 1988
Gravel-stone in Middlesex churches: what's in a name? *London Archaeologist* 5 (14) p. 367-371.

AL Rowse, 1962
Ralegh and the Throckmortons. Macmillan.

William Benchley Rye, 1865
England as seen by foreigners in the days of Elizabeth and James the first comprising translations of the journals of the two Dukes of Wirtemberg in 1592 and 1610... John Russell Smith, 1865.

Jean-Pierre Samoyault, 1994
Guide to the museum of the Château de Fontainebleau. Réunion des Musées Nationaux.

David Saxby, 1999
Orchard Works, Streeters Lane Beddington, London Borough of Sutton: an archaeological evaluation report. Museum of London Archaeology Service. (site code STL99).

Beverley Shew, 2012
Times Remembered Times Past: a history of Beddington and Bandon. Carshalton & District History & Archaeology Society.

TA Slater, 1978
A short account of several gardens near London'. *Garden History,* 6 p. 29-30.

Roy Strong, 1977
The cult of Elizabeth. Thames and Hudson.

Roy Strong, 1979
The Renaissance garden in England. Thames and Hudson.

Roy Strong, 1990
Sir Francis Carew's garden at Beddington in Chancy and Mack *England and the Continental Renaissance*. Boydell Press p. 229-38.

Roy Strong, 1986
Henry Prince of Wales and England's lost Renaissance. Thames and Hudson.

Roy Strong and JA Van Dorsten, 1964
Leicester's triumph. Leiden University Press and Oxford University Press.

John Summerson, 1959
The building of Theobalds 1564-85. *Archaeologia* 97, p. 107-126.

David Thomson, 1984
Renaissance Paris: architecture and growth 1475-1600. A. Zwemmer.

Simon Thurley, 1993
The royal palaces of Tudor England. Yale University Press.

Baron Waldstein, 1981
The Diary of Baron Waldstein. Translated by G.W. Groos. Thames and Hudson.

JB Ward Perkins, 1981
Roman imperial architecture. Penguin.

Jane Whitaker, 2019
Gardens for Gloriana: wealth, splendour and design in the Elizabethan garden. Bloomsbury Academic.

WB White, 1981
Reflectance spectra and colour in speleothems. *National Speleological Society Bulletin* 40, p. 20-6.

May Woods and Arete Swartz Warren, 1988
Glass Houses: a history of greenhouses, orangeries and conservatories. Aurum.