THE UPDOWN ANGLO-SAXON CEMETERY: A REVISION OF THE SITE'S CHRONOLOGY USING CORRESPONDENCE ANALYSIS

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With the publication of a holistic typology and chronology for Anglo-Saxon artefacts in 2013 it is now possible to review and, if necessary, revise the chronology of previously-dated cemeteries. In this paper, the burial chronology of Updown cemetery in Eastry, created by Martin Welch in 2008, is reviewed using the newly available typological scheme as well as the statistical method of Correspondence Analysis. Grave furnishings from the cemetery are re-analysed and dated and grave assemblages are compared with those from other Anglo-Saxon cemeteries in Kent and beyond. The aim of the study is to refine the seventh-century dating and the division of the cemetery into three broad phases as postulated by Welch. It has proved possible to refine the initial site chronology into four better-defined phases, of which two can be placed in the second half of the sixth century. This revised chronology raises questions regarding the relationship between Updown cemetery and the wider settlement and burial landscape of Eastry and east Kent.

This study of the chronology of Updown cemetery has been undertaken as part of a larger project that compares the chronology and material culture of early medieval cemeteries in Kent with those in The Netherlands. Over many years, British archaeology has benefited from studies into the typology and seriation of Anglo-Saxon grave goods.[1] Whilst providing valuable insight, these have also highlighted issues regarding the establishment of a suitable chronological framework in which multiple artefact-types combine. A large project, executed by Professors John Hines, Alex Bayliss and their team, compared chronological data from 224 Anglo-Saxon cemeteries across England. The densest cluster, consisting of thirty-eight cemeteries, is located in Kent.[2] Their research, published in 2013, presents a sound framework for the assignment of chronological phases to a wide range of artefact types from grave assemblages. These phases, in turn, are related to calendrical dates.[3] This holistic artefact typology and chronology can now be applied to other cemeteries in Kent (such as Updown) which were not part of the original thirty-eight studied.

   This paper presents the results of an analysis of the Updown data within the larger English framework as created by Hines and colleagues. The analysis provides a new insight into the site's chronology and a revision of the phasing as previously suggested by Welch in Updown's initial 2008 publication.[4]
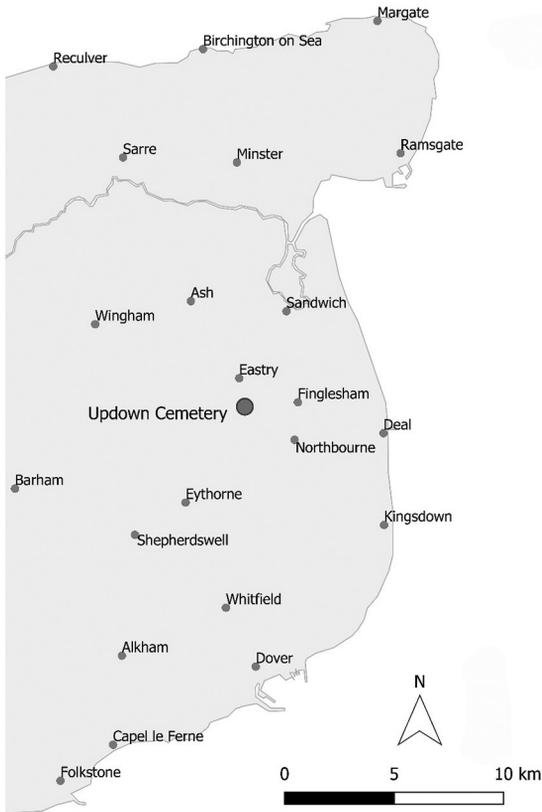
Fig. 1 The location of Updown cemetery in east Kent. (Crown copyright 2019, using Ordnance Survey/EDINA outline map data.)

Evidence for Anglo-Saxon Eastry

To appreciate Updown cemetery's place in the wider history of east Kent, the site should be considered as part of the much larger Anglo-Saxon complex in and around Eastry (**Figs 1 and 2**). Research by Drs Dickinson, Fern and Richardson, published in 2011, provides a comprehensive overview of the early antiquarian discoveries as well as various excavations in the environs of the village. Most important for understanding Eastry's significance and extent in the Anglo-Saxon period, however, are the burials at Cross Farm (Eastry 1),[5] Thornton (Eastry 2)[6] and Updown (Eastry 3). In addition, information gained from chance finds suggests two more cemeteries in the immediate surroundings of Eastry, at Ham[7] and Highborough Hill (Fig. 2).[8]

Also significant is the so-called Cobb collection in Maidstone Museum, of Anglo-Saxon finds material from Eastry. Its exact provenance, however, is not firmly established.[9] In a letter, Cobb referred to the origin of the material as 'Updown near Eastry', whilst 'Eastry House near Dover' is named in other letters.[10] At the time, a large amount of material entered the museum's collection from excavations in Sarre, Dover and other places, which seems to have overwhelmed the curator.[11] Analysis of the material by Sonia Chadwick Hawkes in the 1970s, as well as the re-discovery of three drawings of artefacts in the Cobb collection, suggest, however, that the material is most likely to have come from Updown as initially stated.[12]
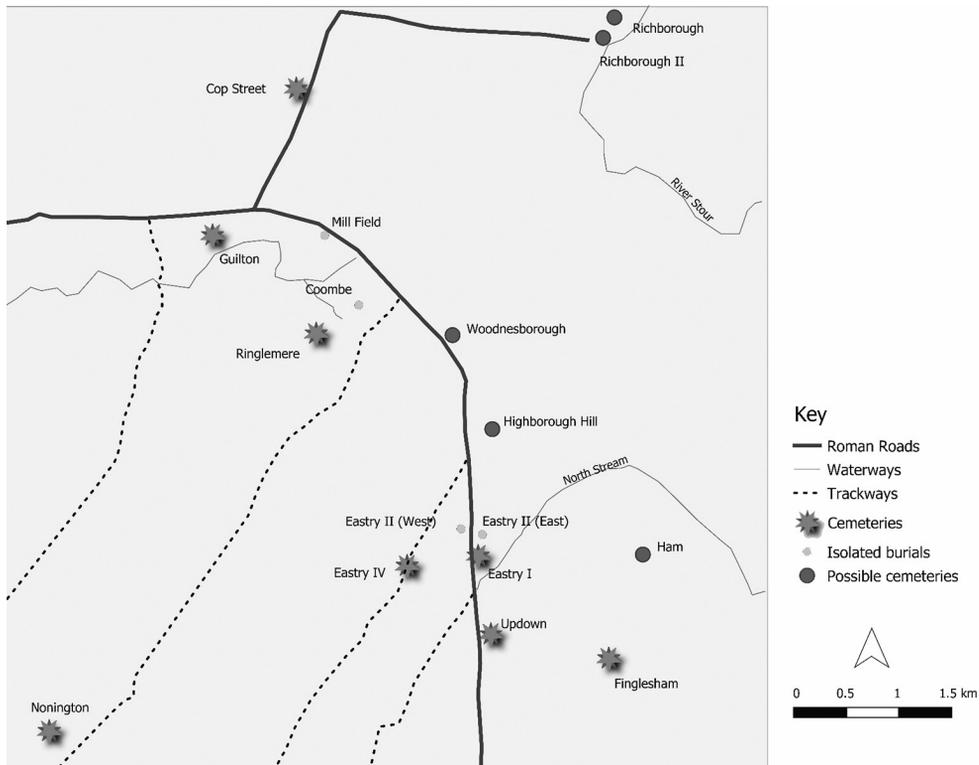
Fig. 2 Anglo Saxon burial sites in and around Eastry (data from Dickinson *et al*. 2011, 4).

Excavations at Updown cemetery

The Updown cemetery is located in a field named Sangrado's Wood, formerly tree-covered, and situated less than a kilometre south of the village of Eastry (**Fig. 3**). The site was first identified in 1973 when aerial photography showed cropmarks suggesting the presence of several inhumations within ring-ditches. On seeing these images, Hawkes recognised the importance of studying this undisturbed cemetery and the value of a possible comparison between it and her work at nearby Finglesham. In 1975, the area showing the cropmarks was declared an Ancient Monument and thus no longer accessible for excavation. The scheduled area, however, did not include the eastern part of the field, where no crop marks could be seen due to an overlaying crop of barley.[13] In 1976, the local water company announced that a pipeline was to be built across Sangrado's Wood and Hawkes undertook a rescue excavation (**Fig. 4**). The waterpipe was planned to run through the southern part of the scheduled monument area and further to the east of the field. In collaboration with the landowner and the water company, however, Hawkes managed to excavate a limited extra area directly north of the proposed pipeline alignment. During the excavation, one grave (76:37) in the path of the pipeline was unfortunately missed and therefore largely destroyed by the workforce. Some
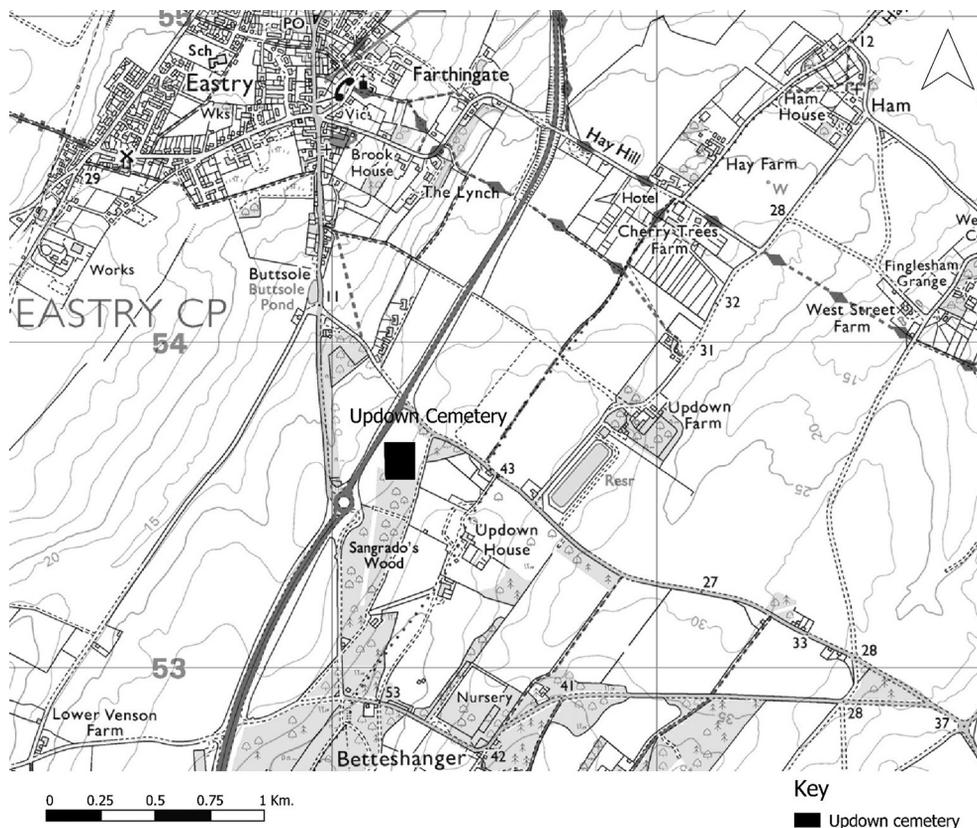
Fig. 3 Updown cemetery's location near to the village of Eastry. (Crown copyright 2019, using Ordnance Survey/EDINA base map data.)

graves in the extra area of excavation, 76:38, 39, 40, 41 and 42, could not be studied in detail due to time restrictions. The outcomes of the 1976 excavation, comprising a total of forty-two recorded graves, were not published until 2008.[14]

By the end of the 1980s, a long-standing proposal to build a bypass for the A256 road from Sandwich to Dover was at the point of becoming reality. The Kent Archaeological Rescue Unit (KARU) carried out the excavation. In the early autumn of 1989 an area of *c*.1,500 sq. metres of Sangrado's Wood was excavated (Fig. 4). During this excavation, a total of forty-one new graves was recorded out of fifty-four uncovered. Only three of these graves were located within the scheduled monument area. Thirteen of the fifty-one graves excavated outside the scheduled area had already been dug in 1976. The new excavation brought the total number of graves excavated at Sangrado's Wood to seventy-eight, including destroyed grave 76:37. The 1989 excavations seem to have established the northern and southern edges of this part of the cemetery. Both limits lay some 50m apart. With the location of grave 76:37, an indication for the eastern limit to the burial ground was already established in 1976 (**Fig. 5**).[15]

The results of the 1989 excavations were published by KARU, separately from
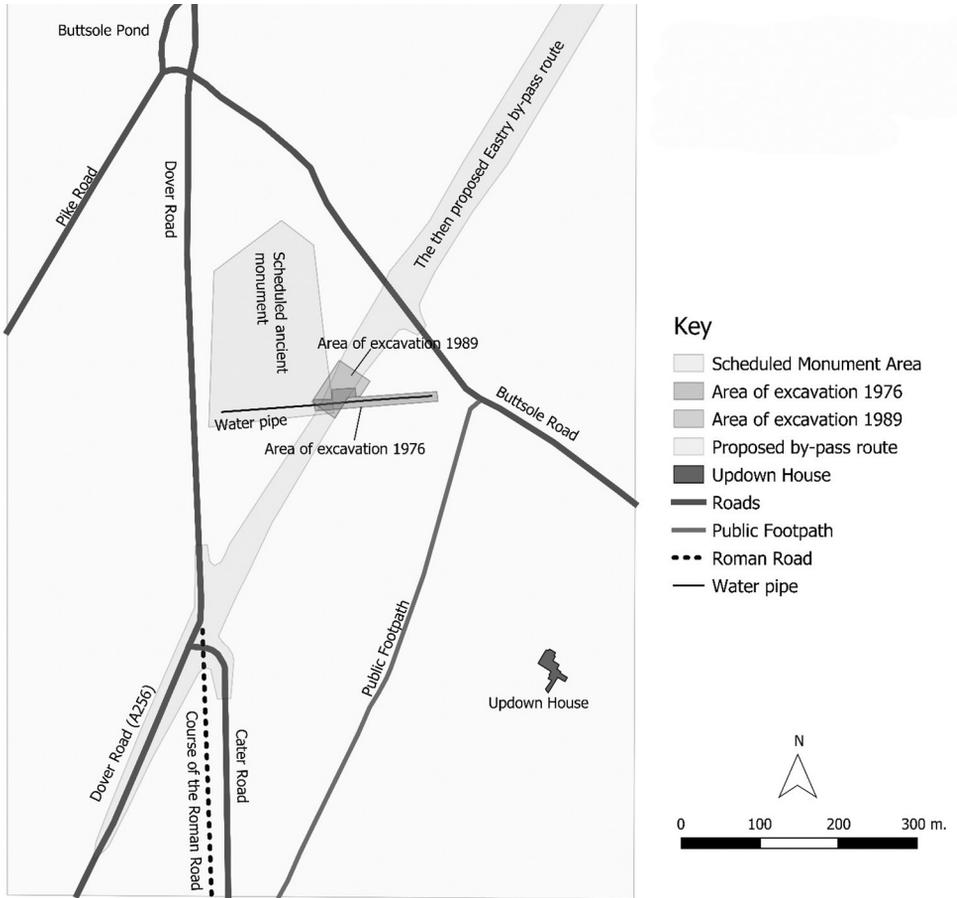
Fig. 4 Location of Updown cemetery in relation to the planned pipeline in 1976 and the planned Eastry by-pass route in 1989 (data from Welch 2008, 5).

those of the 1976 excavation, the system of grave numbering never being harmonised. Instead of opting for a numbering running from 1 to 78, the authors chose to number the graves 1 to 42 with the year prefix year code 76 and graves 1 to 54 with the prefix code 89. The publication by KARU outlines the 1989 newly found grave furnishings but does not address the chronology of the cemetery.[16] (*A concise grave catalogue containing the general data recorded for all excavated inhumations at Updown cemetery is available on the KAS website.*)

The existing chronological framework for Updown

A brief overview of the chronological situation in the wider regional context of east Kent is required. After a period of apparently only marginal settlement in Eastry and its environs during the fourth century, evidence from the fifth century shows a remarkable change in burial practice and material culture. Styles are introduced which originate from the coastal zones of Jutland and northern Germany. Also,
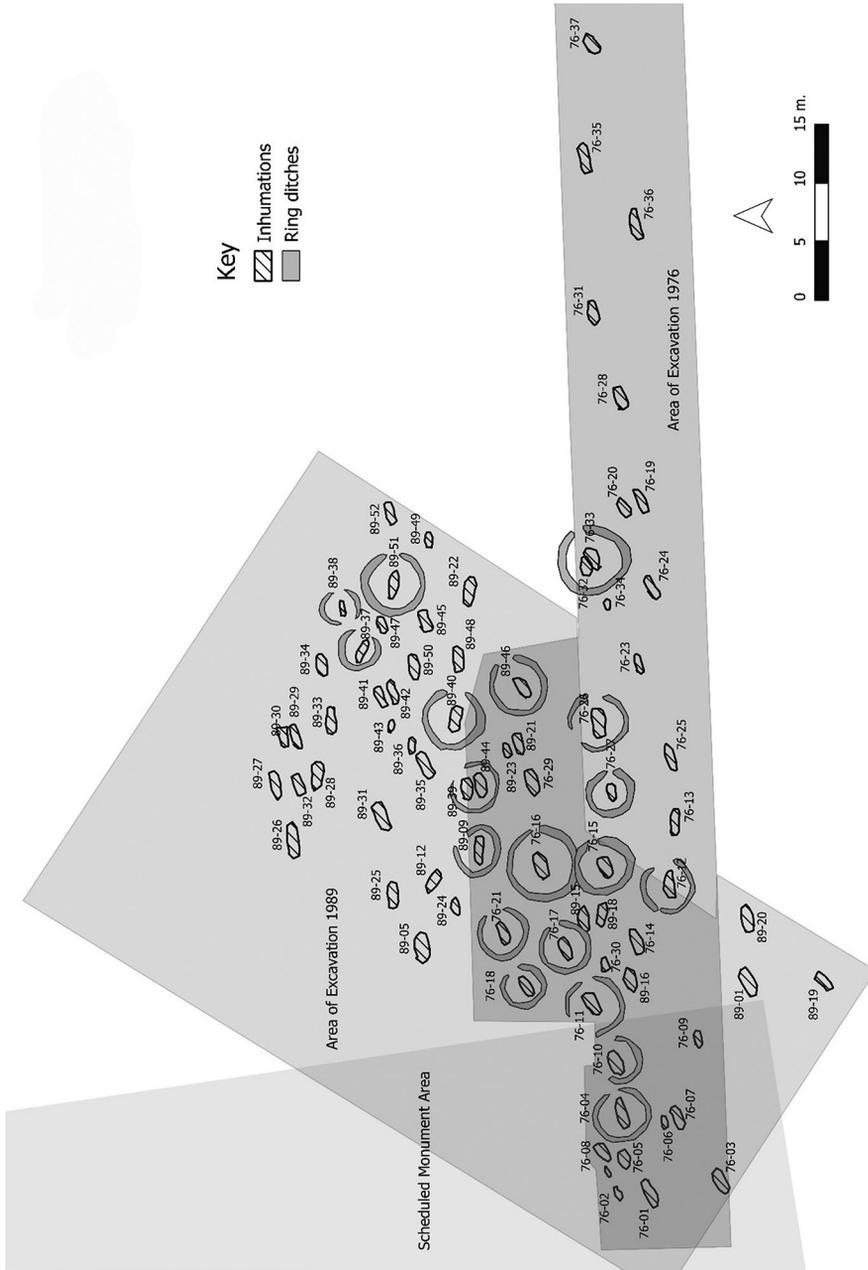
Fig. 5 Combined plan of the 1976 and 1989 excavations at Updown cemetery (data from Welch 2008, 7).
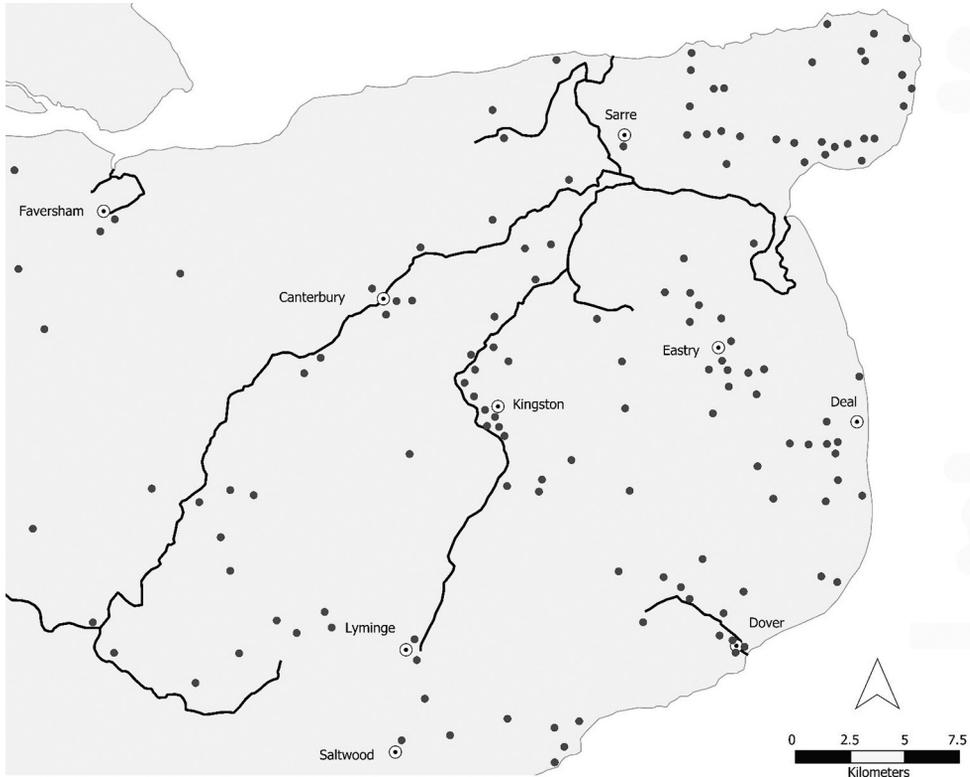
Fig. 6 Early Anglo-Saxon cemeteries in east Kent (data from Dickinson *et al*. 2011, 2. (Crown copyright 2019, using Ordnance Survey/EDINA outline map data.)

parallels can be found with early Merovingian practices and material culture.[17] These Frankish influences are traditionally suggested to originate from contact with northern France and possibly Belgium.[18] It is equally possible that contact with northern Merovingian groups in what is now The Netherlands and Flanders, may have played a role.

Cemeteries dating to the middle of the fifth century in the area east of the Medway, are mostly found close to the Wantsum Channel. This includes the lands around Deal, Sarre and Canterbury. Smaller clusters of cemeteries can be found near Dover and Lyminge whilst there is meagre evidence from the region west of Canterbury (**Fig. 6**).[19] Eastry district in the fifth or early sixth century lies astride the Roman road connecting the south of the Wantsum Channel with Dover. The core of the district seems to be focussed between Eastry and Woodnesborough where several trackways leading from the North Downs and the Weald join the Roman road (Fig. 2). The cemeteries at Eastry 1 and Ringlemere can be regarded as evidence of late fifth-century settlement.[20]

From the early sixth century, furnished burial becomes widely observed in Kent. The large number of cemeteries in the area around Eastry are established during this period, with examples in Guilton, Cop Street, Highborough Hill, Ham

and Finglesham (Fig. 2). Various graves in these cemeteries revealed luxury and prestige objects which can be regarded as Scandinavian and/or Merovingian imports as well as prestigious objects made locally. These burials suggest the presence of a settlement at Eastry which was home to people of high status and with some considerable influence in the region. Indeed, the theory of Eastry as the *villa regalis* or royal centre for the eastern region of the Kentish kingdom is postulated by various researchers.[21]

By AD 600 all main routes leading to Eastry are flanked by cemeteries, of which many contain high status burials. Not all of the cemeteries are used at the same time or remain in use by 600, but they would have been clearly visible when approaching Eastry.[22] Also close to the road at Updown, Dickinson and colleagues postulate the presence of a number of late sixth- or early seventh- century elite burials (Fig. 2).[23] These graves are considered precursors of Updown cemetery itself (see below).

The earlier chronology based on analysis of spatial features

In order to establish a chronology for Updown Welch analysed stratigraphy and the positioning of graves in relation to each other. From the excavation data, it is clear that graves 76:32 and 76:33 are the only two intercutting (Fig. 5). Both these graves are located within one single ring-ditch. There are also two intercutting ring-ditches in the cemetery, enclosing graves 76:15 and 76:16. The few intercutting features in Updown cemetery largely limits the use of stratigraphy as an indicator for the chronology of the burials. A possible indicator that deserves a closer look, however, is the relationship between graves 76:32 and 76:33, located within the same ring-ditch. The archaeological data shows that it is grave 76:33 that cuts grave 76:32 (Fig. 5). The latter is that of a possible adult female buried without any grave goods. The former is the grave of an adult male who is buried with a simple iron buckle and a knife. When viewing the alignment of both graves in relation to the ring-ditch, it becomes clear that male grave 76:33 shows an alignment with the causeway of the ring-ditch whilst grave 76:32 does not. This suggests that grave 76:32 should be assigned to an earlier phase than grave 76:33. The former might have been forgotten about, subsequently cut by the latter and provided with a ring-ditch and corresponding earthworks.[24]

Welch examined closely the orientation of the graves. From the cemetery plan it becomes clear that graves 76:13, 26, 27, 34 and 89:24, 40, 43, 51 all share an orientation of around 100 degrees. This orientation is similar to the orientation of grave 76:32, the supposedly older one of the two intercutting graves. A second group of burials, all with an orientation of between 65 and 72 degrees has the same orientation as grave 76:33, the supposedly younger one of the two intercutting burials. This group consists of graves 76:19, 20, 23, 24, 25, 31, 35, 36, 37 and 89:1, 16, 20, 23, 31, 32, 33, 35, 41, 42, 44 and 47 (Fig. 5). He suggests that this group can be assigned to a different and chronologically later burial episode than the graves from the first group.[25]

Unfortunately, intercutting ring-ditches 76:15 and 76:16 provide very little insight into the cemetery's chronological build-up. The section of intercutting between the two ring-ditches does not decisively indicate a sequence. Based on

probability it seemed more plausible to Welch for the ditch surrounding grave 76:15 to be the older. This would mean that the oldest of the two graves is that of a child, probably a girl, who was wearing typical female dress fittings from the final phase.[26] The dress fittings are relatively rich and seem equally appropriate for an adult female. The supposed younger grave, 76:16 is that of an unsexed adult, probably of male gender, who is buried with a silver-inlaid iron buckle, a second small buckle and a knife. Based on the finds and their dating, it can be argued that grave 76:16 is the first interred one and therefore the elder, in marked contrast to the apparent sequence of the ring-ditches.

Artefact typologies and chronologies for Kentish grave furnishings

In addition to stratigraphical information and clustering based on grave orientation, grave furnishings provide important indications for Updown's chronology. As previously mentioned, the chronology and typology by Hines and colleagues was not available at the time of Updown's publication. This left Kent largely without a suitable sequence for artefact classification and dating, based on chronological ranges covering one generation (*c.* thirty years). One option available, however, was the system of date ranges covering the sixth century developed by Dr Brugmann, specifically focussing on east Kent.[27] These are, however, mainly based on Continental dress-fittings and bead combinations rather than on Kentish Anglo-Saxon material. Furthermore, Brugmann's chronological phases are connected to absolute date ranges gained from coin-dated graves in the Frankish kingdoms on the Continent. This basis makes the typology and chronology less suitable for application to the Updown artefacts.

   Another avenue explored by Welch was the dating of Updown's artefacts with help of the chronological phases developed for the Buckland-Dover cemetery.[28] For this burial ground, first excavated in the 1950s, Evison developed a chronological framework based on particular artefact types and grave assemblages, but more importantly on visible clusters in the cemetery plan. This method led to the development of a useful relative chronology of plots, moving eastwards across the cemetery terrain. Like Brugmann's, Evison's system largely depends on Continental dates. Although Evison's theory provides a rough and only relative indication of the chronological build-up of Buckland over time, the evidence for the different absolute phases is not equally strong for the whole period the cemetery was in use. There was, for instance, no independent basis for checking the absolute date ranges assigned to the seventh- and eighth-century burials.[29] This is largely caused by the rarity of closely datable Frankish imports or coins amongst grave assemblages in the cemetery. The artefact chronology constructed by Evison played an important role in dating Anglo-Saxon archaeology in Kent, for instance the finds from the Mill Hill cemetery near Deal,[30] until the work of Hines and Bayliss in 2013.

Welch's suggested chronology for Updown cemetery

When considering the meagre stratigraphical evidence from Updown and the lack of a comprehensive typology and chronology for artefacts, Welch clearly had a

difficult task dating the graves. He postulates a global division into two groups. The first group includes graves assumed to date before AD 650 (i.e. *c*.AD 600-650) and a second, later group *c*.AD 650-700. For the Phase 1 group, the presence of artefacts which are considered to be typical for the first half of the seventh century was essential. These include the one jewelled disc brooch from grave 76:6 as well as the Kentish triangular buckles, sometimes decorated with animal ornaments in Style II. The imported Frankish silver-inlaid belt set from grave 76:29 and the silver-inlaid iron buckle with rectangular plate and associated belt fittings from grave 76:16 are also considered to belong in Phase 1. The tall cone-shaped shield boss from grave 76:14 is associated with one of the triangular buckles with Style II boar-head decoration and is therefore considered a relatively early type. Other graves to be assigned to the pre 650 Phase 1 include 76:5, 11, 12, 13, 24, 28, 31 and 89:12, 18.

Finds that are considered to be typical for Updown's Phase 2 sometimes include artefacts that have previously been assigned to the 'Final Phase' as defined by Leeds.[31] Examples of artefacts which form the basic types of Updown's second phase are the copper-alloy cylindrical 'boxes' from graves 76:34 and 89:45, the palm cup from grave 89:35 and classic female dress fittings such as single silver pins and necklaces made of silver-wire slipknot rings. Also indicative for Phase 2 are combinations of the above-mentioned artefact types with amethyst beads and/or monochrome opaque glass beads. In addition, the many graves containing a small buckle with rectangular plate are also placed in Phase 2. Updown's later phase further includes graves 76:2, 10, 15, 18, 20, 21, 22, 25, 26, 27,30, 35, 36 and 89:1, 5, 20, 23, 26, 32, 34, 36, 38, 39, 43 and 46.[32]

On the cemetery plan (**Fig. 7**), the graves that are considered to be part of Phase 1 are broadly spaced across the southern part of the excavated area. The graves sometimes occur isolated but also in pairs or small clusters of three. The substantially larger number of graves assigned to Phase 2 can be found distributed both to the south and north of the Phase 1 burials. Phase 2 burials, however, also occur in the zone dominated by graves from Phase 1, but their distribution extends further to the west and east. As the basis for correlating finds from Updown to a larger regional framework was uncertain at the time of publication, many graves in the cemetery were left unassigned. This is often the case for graves containing weapons, but not in a combination with a datable buckle. Welch concludes that a more general seventh-century date should be assigned to graves 76:1, 3, 4, 7, 8, 9, 17, 19, 23, 32, 33, 37 and 89:9, 21, 24, 25, 28, 31, 37, 40, 41, 42, 47, 48, 49, 50, 51 and 52.[33] Within the three groups of Phase 1 and 2 and the general phase, Welch includes all graves in the cemetery except for the following nine contexts: 89:15, 16, 19, 22, 27, 29, 30, 33 and 44, for which presumably no dating could be assigned.

Comparison of the results of Welch's dating based on artefact typology and those of the initially explored theory of stratigraphic succession (76:32 followed by 76:33) led to no significant outcomes. From the graves aligned similarly to grave 76:32, only grave 76:13 can be assigned to Phase 1, based on its assemblage. Only graves 76:26, 27 and 34 can be assigned to Phase 2. Furthermore, there are two graves with similar alignment, 76:32 and 89:9, which can be assigned a general seventh-century date. Of the thirty-one graves with a globally similar orientation
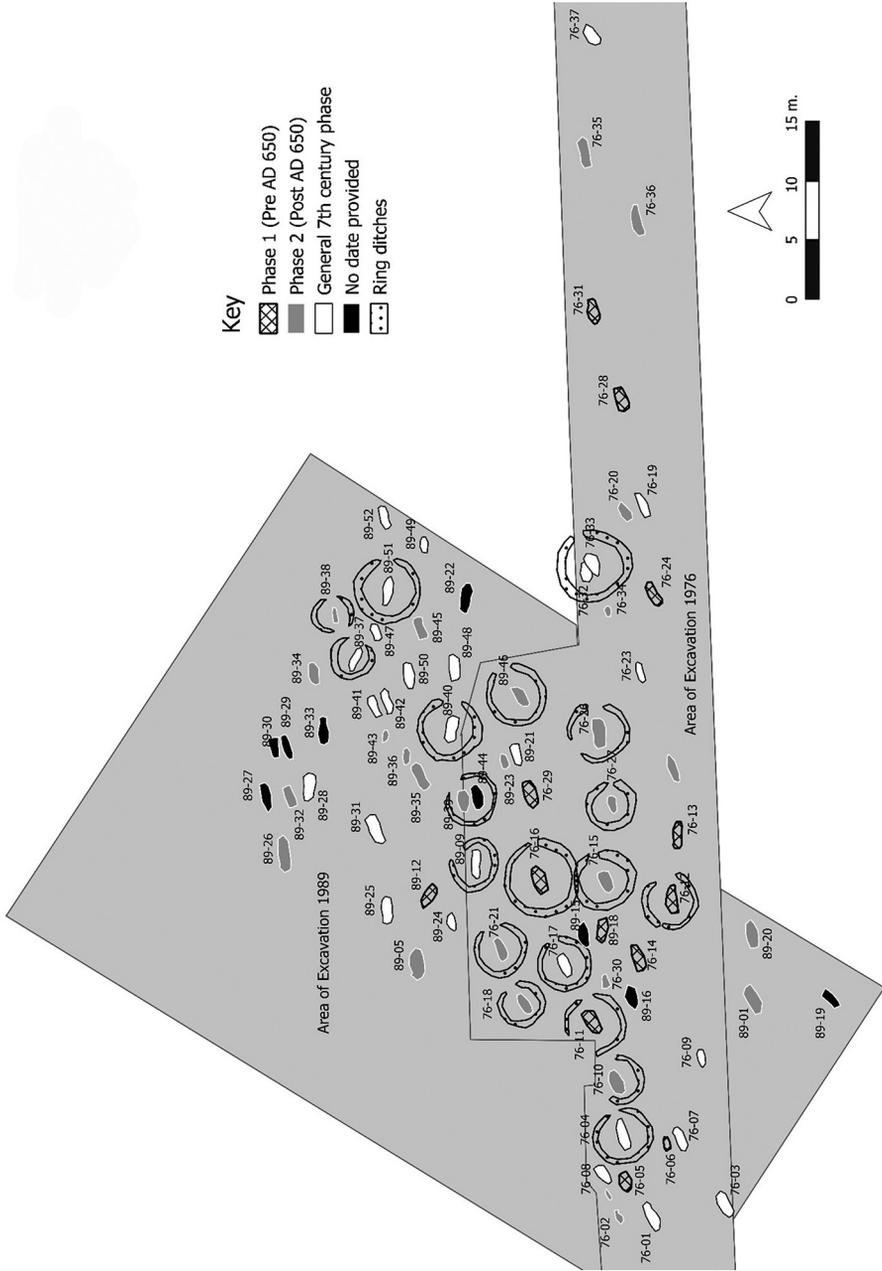
Fig. 7 Chronological phasing of the graves in Updown cemetery (data from Welch 2008, 48).

to grave 76:33, seven can be dated to Phase 1 (76:6, 11, 14, 24, 28, 29 and 31). Twelve of them can be assigned to the second phase (76:10, 15, 18, 20, 21, 25, 30, 35, 36 and 89:1, 35, 46). A further twelve graves share a more general seventh-century date (76:1, 3, 4, 7, 17, 19, 23, 33, 37 and 89:32, 41, 42).[34]

Apart from the question as to whether the chronological phases assigned to the Updown graves by Welch are correct, they are clearly broad and only of limited use for comparison with other cemeteries in Kent and/or beyond. When the date ranges set by Welch are compared with other evidence from the Eastry district, the Updown cemetery appears to be one of the (if not, *the*) youngest. Elite burials are established widely around the district by 600, most likely including some graves close to the Updown road. Around the turn to the seventh century, it can be suggested that some cemeteries already ceased their active function and were no longer expanding. In this regard the Updown cemetery, which is relatively large compared to its neighbours, could be regarded as a 'final phase' cemetery. It is, however, questionable if a cemetery used solely in the seventh century, as postulated by Welch, would have grown to such an extent as Updown's did. Based on the pattern of cemetery expansion in the district, it would be more likely to expect a start at Updown in the second half of the sixth century with further development into the seventh century. This would imply that the elite graves found near Updown, which are regarded as older than the cemetery itself, are in fact contemporary with its earliest phases.

Is Updown a 'final phase' cemetery?

When viewing the evidence from Updown there are arguments both in favour and against labelling it as a 'final phase' cemetery. The label 'final phase' was, as previously mentioned, defined by Leeds in 1936 and represents the youngest datable phase of Anglo-Saxon burial in Kent,[35] considered typical for seventh- or early eighth-century cemeteries.[36] They mark the first episode of Christian burial, distinctly different from the former burial episodes in regard of grave furnishings. At the same time, the final phase marks the last episode of furnished burial before a shift towards inhumation in churchyards takes place in the late seventh and eighth century.[37] Although the basics of this general model are still relevant, in recent years archaeological consensus on the subject now recognises a more complex situation. Instead of linking a change in material evidence and burial practice solely to the arrival of Christianity, today it is accepted that additional factors – social, economic and political – would have influenced this development.[38]

For Updown, Welch assigned graves with so called final phase characteristics to his Phase 2, post AD 650. Boddingdon postulates that one of the main characteristics of a final phase cemetery is the relatively large number of unfurnished burials.[39] In Updown, there are only twelve unfurnished graves found to date, representing *c.*15 per cent of the total.[40] Besides the unfurnished graves mentioned, the Updown cemetery can be regarded as relatively rich in material culture. Following Boddingdon' view, this would be an argument against a final phase cemetery. It must be noted, however, that whilst relatively rich in material culture, Updown does not display the wealthiest graves in the Eastry district or the wider region of east Kent.[41] The cemetery contains, however, various imported goods such as cowrie

shells from the Red Sea region, amethyst beads from the eastern Mediterranean, a Byzantine copper-alloy buckle and various items of Frankish origin (e.g. wheel thrown pottery, known in Germany as *Knickwandgefäßen*).[42] The presence of these imported items is consistent with the many richly furnished graves in the wider Eastry district in the late sixth and early seventh century. It contrasts with the barely (or non-) furnished graves noted by Boddingdon to be typical for the final phase. This may be explained by Updown being a cemetery that was largely established during the sixth century and thence continued in use into the final phase. The orientation of graves in the Updown cemetery is predominantly east-west or west-east and inhumation is the leading form of burial practice. These characteristics are consistent with a final phase cemetery.[43]

Another characteristic of a typical final phase cemetery is that some graves are placed under barrows and/or within ring-ditches.[44] In Updown this is the case for a maximum of twenty-one graves,[45] representing *c.*27 per cent of the total excavated to date.

Boddingdon postulates the presence of grave goods with Christian symbolism as an additional indicator of a cemetery of the final phase, the first step towards fully embracing Christian burial practice, without grave furnishings, during the eight century.[46] Christian symbolism, however, is largely absent in the Updown cemetery with only one clear cross symbol appearing on a coin pendant. The coin used for this pendant is a contemporary (AD 580-670) Merovingian tremisses and thus a Frankish import or copy thereof. Welch notes that the use of Merovingian coins in pendants in Anglo-Saxon Kent is typical for the seventh century citing the pendants from the Sibertswold cemetery grave 172.[47]

As previously mentioned, Welch's post 650 phase is mainly defined by grave goods that can be seen as traditionally belonging to the final phase. These grave goods include copper-alloy cylindrical 'boxes', small buckles with rectangular plates, a palm cup and classic female dress fittings such as single silver pins, necklaces made of silver-wire slipknot rings and combinations of the above-mentioned types with amethyst beads and/or monochrome opaque glass beads. In the case of silver-wire slipknot rings with beads (pendant style), however, Hines dates these to 555/85-660/85. Beads made of amethyst are assigned a similar date. Silver-wire slipknot rings without beads are dated 580/640-660/85.[48] In the German Rhineland and Eifel regions, amethyst beads occur between 565 and 670/80 with a peak in use between 580/90 and 610/20.[49] Silver-wire slipknot rings with beads from these parts of Germany are dated between 610/20-710/50.[50] Considering the English as well as the Continental dates for these objects, it could be suggested that the contexts in which these were found belong to the final phase. However, the chronology of the objects equally allows for a pre-final phase date for the graves, namely in the second half of the sixth century or first half of the seventh century.

Single silver pins are not assigned a date in the chronology by Hines. Double silver pins, however, were assigned a date between 625/50 and 660/85 (585/615-610/45).[51] Also in this case the refined dating allows for these objects to belong in the period post 650 but equally in the period before that date. The copper-alloy boxes found at Updown, as well as glassware, are not considered in the chronology established by Hines and Bayliss.

CORRESPONDENCE ANALYSIS AS A METHOD FOR CHRONOLOGICAL STUDY

From the above review of the published dating of Updown it is clear that the theories advanced regarding its chronology are based on outdated and sometimes contradictory methodologies. Their conclusions may be valid but are very basic and therefore only of limited value for comparison with results from other Kentish cemeteries. During the excavations at Updown and subsequently, no scientific dating of organic material or human remains was undertaken. As Welch acknowledged,[52] there is scope for refinement with the help of modern techniques.

Correspondence Analysis (CA) is a statistics-based method that calculates degrees of diversity within a dataset which can help establish typological seriations within large volumes of archaeological data. In the case of Updown, an already established seriation of archaeological data can be used as a basis. CA, as applied to archaeology, is based on the principle of different artefact types being fashionable at or around the same time. Specific combinations of different artefact types can often be found together, as one grave assemblage, being current for a certain time period. The content of such an assemblage changes over time, artefacts no longer in use disappearing in younger graves and being replaced by others which in due course assume growing significance. This serial replacement has been accepted by the archaeological community for many years.[53]

CA makes it possible to create, or refine, seriations in a relatively rapid and consistent manner. To establish a typological seriation of artefacts, the development of a certain item is viewed over time. For example, in its early phase a buckle is relatively simple, an oval loop with straight tongue and made of iron or bronze. Over the years, it develops and a shield- or club-shaped tongue comes into fashion. This development is followed by the arrival of a back-plate, initially square, later triangular and with a growing amount of decoration. All artefact types such as spearheads, shield bosses, beads and brooches, follow unique paths of design development. The simplest brooch, for instance, is contemporary with the simple oval buckle. A hundred years later, different brooch types are in fashion which are contemporary with, for instance, buckles with a triangular plate and silver-inlaid decoration. With the help of CA it becomes possible to determine the presence frequency of each individual object type within a cemetery content and to establish which combinations with other artefact types commonly occur in individual graves. Artefacts within one 'grave assemblage' can be considered more or less contemporary, following the above principle of serial replacement. However, exceptions occur; for example, very early artefacts can be recognised in later graves, possibly passed on as heirlooms.

When determining the presence frequency of artefacts or assemblages in multiple cemeteries, it becomes possible to establish a relative timeline for a larger area within which every artefact has its unique place. This timeline represents a sequence or seriation like the one made by Hines and his colleagues where exact date phases have been assigned to the relative timeline, aided by radiocarbon and dendro dating, and also any known dates of coin finds and specific objects imported from the Continent.[54]

With a seriation for England already established, all that is necessary for Updown is to assign a typological classification to each individual artefact from

the cemetery and to form a database of existing grave assemblages. With the help of CA these assemblages are analysed and compared with other assemblages from different cemeteries in England. It will become clear where the assemblages from Updown are positioned on the relative timeline in comparison to assemblages from other cemeteries. The relative positions of Updown's grave assemblages on the timeline makes it possible to connect them to the exact date phases assigned to the Hines and Bayliss seriation.

Preparing the existing Updown data for CA

All graves in the Updown cemetery and their contents have been re-examined by detailed study of the two excavation reports. All individual artefacts have been placed, where possible, in the Hines and Bayliss seriation. To qualify it is necessary for a grave to contain two or more artefacts that can be placed in the seriation. The more artefacts per grave that can be classified this way, the more certainty of the grave's position on the relative timeline. Likewise every artefact must have at least two occurrences in the total dataset. This rule of thumb underlines a critical issue that should be noted. CA is based on the premise that there is always a seriation possible within a dataset. It is based on a subjective choice as to which artefacts can be regarded as chronologically significant, and therefore useful for the analysis.[55] To employ CA effectively it is important to work with the concept of gender-specific grave goods. Thus, all types of weaponry are typical examples of indicators for a male gender; female gender is indicated by such items as beads, brooches, pins and pendants. Buckles are also used in the analysis but occur in graves of both males and females.[56]

After collecting the necessary information and categorising each individual artefact, the outcomes were integrated into an existing spreadsheet containing similar artefact data for each individual grave from the research done by Hines and his team. There are separate spreadsheets for graves with male- or female-specific grave goods.

The spreadsheets used for CA contain two categories – objects and values. The objects are the individual graves, placed in the rows; the values are the different artefact types, placed in the columns and in chronological order, corresponding with the Hines and Bayliss seriation.[57]

The output of the calculation is shown in a two-dimensional plot formed by a horizontal x-axis and a vertical y-axis. The horizontal axis reveals the greatest element of variation within the dataset. The more related to each other the assemblages are, the closer together they appear. The vertical y-axis represents the second-largest element of variation within the dataset, namely the serial replacement of artefact types within the grave assemblages.

The output plot of a perfect seriation will yield a parabolic curve on the two principal axes. When working with real datasets from archaeological excavations, however, a perfect outcome is hardly to be expected. The plot will, in most cases, only approximately approach the shape of a parabola.

As noted, the outcomes of CA itself do not provide exact dates for graves or artefacts. The parabola, therefore, cannot be read as an absolute timeline. The position of the objects and variables relative to the y-axis provide an insight into
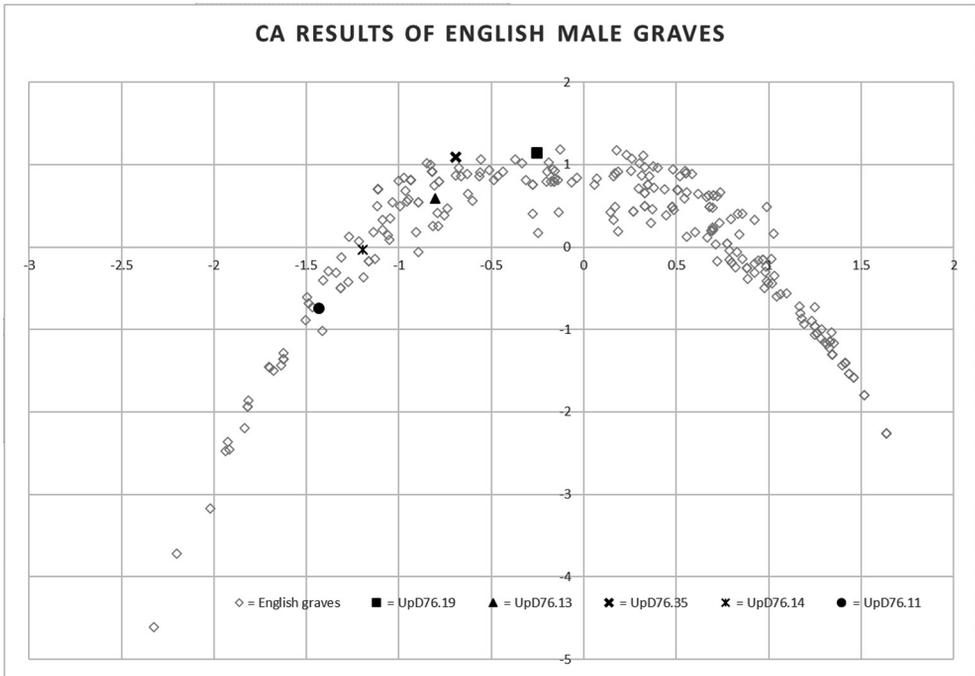
Fig. 8 Result of Correspondence Analysis on male gender graves from England. The symbols in black represent graves from Updown cemetery amongst graves from other Anglo-Saxon cemeteries in England (grey). The dataset for Correspondence Analysis was kindly provided by Professor J. Hines of Cardiff University.

serial replacement within the dataset and thus into development of the seriations (the content of a cemetery) over time. With this, the parabola shows only a relative timeline with the oldest graves on the right and the youngest on the left.

The Results of CA for Updown

The results of the CA procedure for Updown are presented in **Fig. 8** (male gender) and **Fig. 9** (female). Fig. 8 shows two main clusters of graves, one relatively early cluster to the right and one late cluster to the left. The male curve is much more regular than the female curve stemming from the use of many beads for the dating of female graves. Unlike male-specific grave assemblages, female-specific ones are often built-up of a large number of individual artefacts with *each* individual bead counted as one unique artefact. If a grave contains a bead necklace, the number of individual finds becomes very high and as some bead types are used multiple times in one necklace, some individual artefact types occur multiple times in the same grave. This can lead to a very precise indication of the grave's relative position on the timeline, but only in case of the artefacts belonging to a well-defined phase. Unfortunately, as beads often get re-used and passed down from generation to generation, their phase of usage is often quite long and not always well defined.[58]

Another possible pitfall of using beads in CA is that many graves contain similar
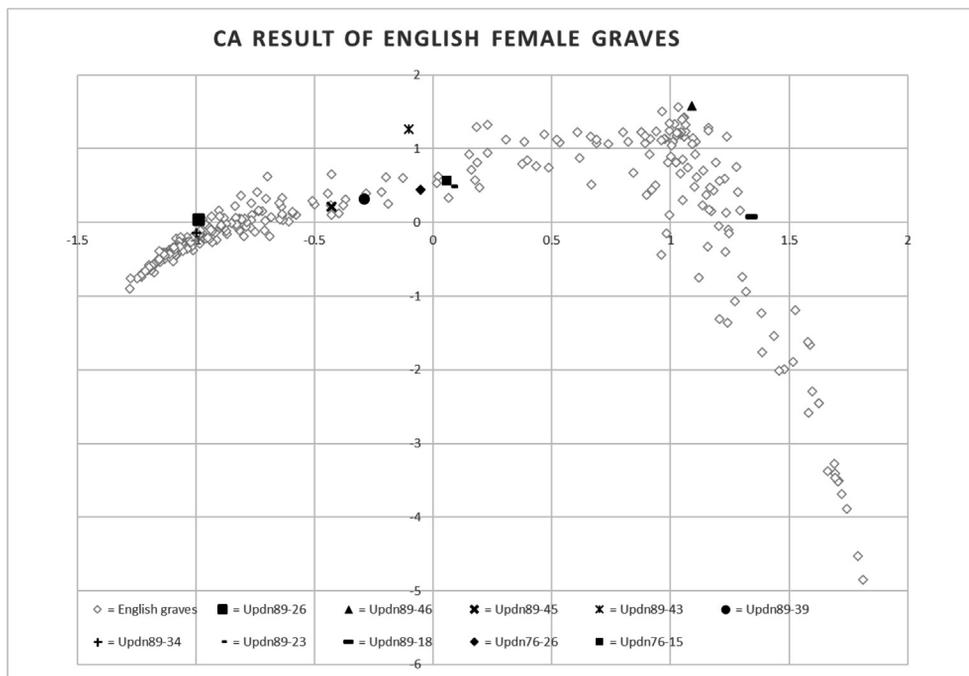
CA RESULT OF ENGLISH FEMALE GRAVES

Fig. 9 Result of Correspondence Analysis on female gender graves from England. The symbols in black represent graves from Updown cemetery amongst graves from other Anglo-Saxon cemeteries in England (grey). The dataset for Correspondence Analysis was kindly provided by Professor J. Hines of Cardiff University.

bead types but in many different combinations. From these different combinations, a large number of different grave assemblages can be calculated. But, because they all contain many similar beads, their serial replacement rate is relatively low. This leads to an output curve in which these graves (assemblages) are located very close to their nearest neighbour and therefore in clearly visible clusters.

In the case of Updown, however, it becomes clear from the graph that only four of the ten female graves used in the analysis can be seen belonging to one of the two clusters. This is possibly indicative of a cemetery with a long and continuous usage period with multiple burial episodes.

The curve for the Updown male graves does not show many noteworthy features – typically individual graves do not contain multiple similar weaponry. It is very regular and the graves fit in well with the build-up of other cemeteries in the England. Due to a low number of grave goods suitable for classification, only five male graves could be used for CA. Nevertheless, the relatively even spread along the second half of the relative timeline is apparent. This again may be an indication for a cemetery with a longer and continuous usage period. The graves in the left half of the curve indicate usage of the cemetery in the late sixth and seventh century.

Together with the results generated with CA, the placing of the artefacts from Updown into the chronological framework by Hines and Bayliss made it possible

to generate an absolute date range for forty-three of the seventy-eight graves found. Where possible, the graves have been dated based on multiple key artefacts. Unfortunately, not every grave held multiple artefacts which could be dated, so some of the date ranges are based on only one type.

The assigned date ranges are presented in **Table 1**, together with the key artefacts on which the dates are based.[59] Although some dates could be assigned with a

TABLE 1. NEW DATING OF INHUMATIONS FROM UPDOWN, AND KEY GUIDING ARTEFACT TYPES

Inhumations that do not appear in the table could not be assigned a date. (The artefact codes used correspond with Hines and Bayliss (eds) 2013, 561-71).

Grave	Dating	Key artefact(s)
76:1	525/50 – 610/45	Spear head (SP1-a3)
76:3	525/50 – 580/610	Spear head (SP1-a4)
76:4	525/50 – 550/70	Spear head (SP2-b1a3)
76:5	545/65 – 580/610	Buckle (BU3-b)
76:6	510/45 – 625/50	Brooch (BR2-b4)
76:10	580/640 – 660/85	Bead (WoundSp)
76:11	585/615 – 610/45	Spear head (SP2-a1b1) – Buckle (BU-3a)
76:12	550/70 – 610/45	Buckle (BU-3a)
76:13	550/70 – 610/45	Buckle (BU-3a) – Spear head (SP1-a2)
76:14	585/615 – 610/45	Buckle (BU-3a) – Spear head (SP1-a3) – Shield boss (SB5-a)
76:15	510/45 – 580	Bead (CylRound) – Bead (SegGlob) – Bead (ConSeg)
76:16	525/50 – 585/615	Buckle (BU4)
76:19	525/50 – 550/70	Spear head (SP1-a2) – Seax (SX1-c)
76:22	510/45 – 625/50	Bead (CylRound)
76:24	550/70 – 565/95	Buckle (BU3-g)
76:26	555/85 – 625/50	Bead (Amethyst) – Bead (CylRound)
76:28	550/70 – 610/45	Buckle (BU-3a)
76:29	525/50 – 550/70	Spear head (SP2-b1a3)
76:30	580/640 – 660/685	Bead (Dghnt)
76:31	550/70 – 610/45	Buckle (BU-3a)
76:35	565/95 – 585/615	Spear head (SP1-a2) – Buckle (BU4b)
89:1	510/45 – 625/50	Bead (CylRound)
89:5	550/70 – 660/80	Buckle (BU7)
89:12	525/550 – 550/70	Buckle (BU4a)
89:18	510/45 – 555/85	Bead (Koch58) – Bead (Koch20Wh or Koch20Ye)
89:20	580/640 – 660/685	Bead (Dghnt)
89:23	555/85 – 625/50	Bead (CylRound) – Pendant (PE2c)
89:24	550/70 – 660/80	Buckle (BU7)

Grave	Dating	Key artefact(s)
89:25	525/50 – 610/45	Spear head (SP1-a2)
89:26	580/640 – 660/80	Bead (WoundSp) – Buckle (BU7)
89:32	580/640 – 660/85	Bead (WoundSp)
89:34	580/640 – 660/85	Bead (WoundSp) – Bead (Amethyst)
89:36	580/640 – 660/85	Bead (WoundSp)
89:37	525/50 – 550/70	Seax (SX1-c)
89:39	580/640 – 625/50	Bead (SegGlob) – Bead (WoundSp)
89:40	525/50 – 610/645	Spear head (SP1-a2)
89:41	610/45 – 660/80	Spear head (SP1-a5)
89:42	585/615 – 660/80	Seax (SX3-a)
89:43	580/640 – 625/50	Bead (WoundSp) – Bead (CylRound) – Bead (WhSpiral)
89:45	580 – 615	Bead (Disc) – Bead (WoundSp) – Bead (CylRound) – Buckle (BU3)
89:46	510/45 – 580/640	Bead (CylRound) – Bead (Koch20Ye OR Koch20Wh)
89:51	525/50 – 585/615	Spear head (SP1-a4)
89:52	525/50 – 565/95	Spear head (SP2-a1a2)

degree of certainty, those based on one single artefact need to be viewed with caution. Unfortunately, the occurrence of most artefacts is not restricted to one of the limited time brackets as designated by Hines; therefore the brackets provided are in most cases rather large. When multiple artefacts are present, the date range can sometimes be reduced but in most cases the range comprises two or three brackets of about a generation's length.

The graves that are not represented in the table did not hold sufficient information to make it possible to generate a date range. The dates assigned to the graves are based on the phasing in Hines and Bayliss 2013 and are presented in **Table 2.**

TABLE 2. CHRONOLOGICAL PHASING FOR ANGLO-SAXON INHUMATIONS

(Hines and Bayliss (eds) 2013, 485.)

Hines (male)		Hines (female)	
Phase	*Date*	*Phase*	*Date*
AS-MA	Pre 525/50	AS-FA	Pre 510/45
AS-MB	525/50 – 545/65	AS-FB	510/45 – 555/85
AS-MC	545/65 – 565/95	AS-FC	555/85 – 580/640
AS-MD	565/95 – 580/610	AS-FD	580/640 – 625/50
AS-ME	580/610 – 610/45	AS-FE	625/50 – 660/85
AS-MF	610/45 – 660/85		

THE REVISED UPDOWN CHRONOLOGY

After CA and the placing of the artefacts found at Updown cemetery into the chronological framework for Anglo-Saxon cemeteries, a new light can be shone on the cemetery's chronology. When viewing the newly generated dates for the Updown graves (Table 1), it becomes clear that the simplified phases assigned by Welch, all set within the seventh century, provide an incomplete picture. The oldest phase of the cemetery, as now discovered here, is likely to include graves from the sixth century. Although the first phase, set by Welch as pre- AD 650, can literally include sixth-century graves, the wording does not explicitly suggest that the presence of pre seventh-century graves was considered. With the use of the revised CA dates, it is now possible to establish four phases A-D of which the first one is in the second half of the sixth century (**Table 3**).

TABLE 3. REVISED PHASING FOR UPDOWN CEMETERY, INCLUDING ABSOLUTE DATES, AND GRAVES BELONGING TO EACH PHASE

Phase	Dates	Graves
A	550-600	76:4, 15, 19, 24, 29 89:5, 12, 18, 37, 52
B	570-615	76:3, 5, 11, 16, 35 89:45, 51
C	600-650	76:1, 6, 12, 13, 14, 22, 26, 28, 31 89:1, 23, 25, 39, 40, 43, 46
D	625-685	76:10, 30 89:20, 24, 26, 32, 34, 36, 41, 42

Phase A: this early phase of usage and the graves it contains can be dated between *c*.550 and *c*.600. The positioning of the graves belonging to this phase shows an even spread over the cemetery as excavated to date, without any noticeable clusters (**Fig. 10**). Three of the nine graves, 76:4, 15 and 89:37, are located within a ring-ditch.

As described earlier, the ring-ditches of graves 76:15 and 76:16 cut each other. Welch subsequently suggested that grave 76:15 is probably the elder of the two, based on the intercutting section and the presence of a chatelaine in the grave. Also, grave 76:16 contained a silver inlay buckle of type BU4 which suggested this grave to be the youngest of the two. The intercutting, however, was not decisive. When considering the beads which were found in grave 76:15, these suggest that this grave predates 76:16, in accordance with Welch. On the basis of the fourteen beads in grave 76:15, the grave is placed in Phase A. In this case, the chronological information that is available from said beads is more reliable and more precise than for the chatelaine. This is partly caused by the incomplete state in which the chatelaine was found, making it difficult to precisely classify and date the artefact.[60] Chatelaines occur in various forms over a long period of time, starting in the sixth century.[61] This is exemplified by the one found in Dover Buckland grave 28 which dates to 525-575.[62] Chatelaines were, however, most frequently used during the end of the seventh and beginning of the eighth century.[63] The dating of
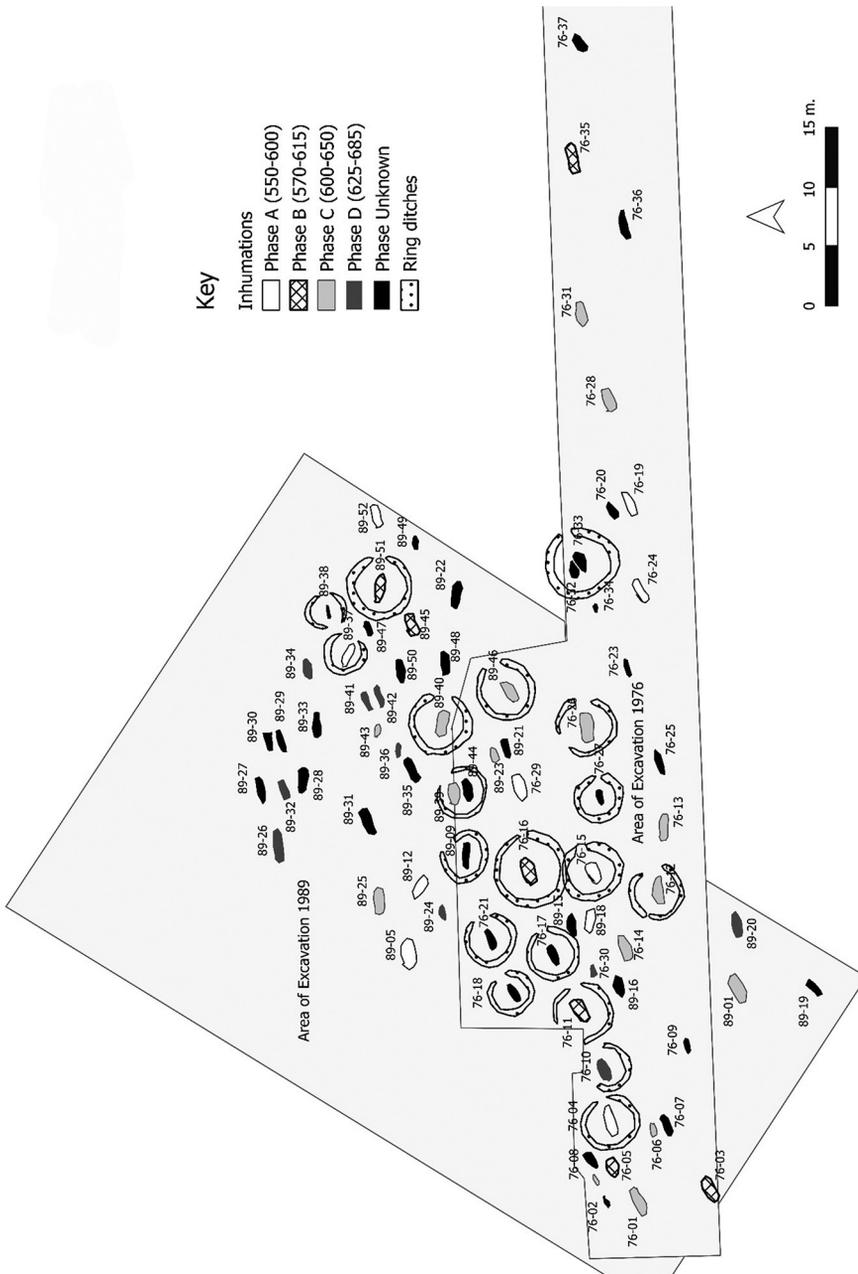
Fig. 10 Cemetery plan of Updown cemetery with revised chronological phasing. (Base map data from Welch 2008, 7.)

the beads in combination with the fact that it is possible for the chatelaine to have occurred as early as 550/600 makes it highly likely that grave 76:15 belongs in Phase A. It is not abnormal for beads to be re-used over multiple generations and passed on from one female to another. If this applies to the finds in grave 76:15, the Phase A date is possibly too early.

The dating of grave 76:15 in Phase A, as described above, is derived from visual inspection of the artefactual evidence. The outcome of the CA, however, shows a rather different picture. It should be noted that the chatelaine is not considered in the CA as not enough chronological and typological data is available for this artefact type. Of the female graves used in the CA, 89:18 is the oldest and is thus in Phase A. Following the relative chronological order of the CA outcome curve, it can be seen that grave 76:15 is older than 76:26 but younger than 89:23. Based on its position on the relative timeline alone, 76:15 should be placed in Phase C rather than A, which would make it younger than 76:16. This again highlights the difficulty that beads can bring to the process of dating, especially through their grouping and treasuring over multiple generations. Although grave 76:15 is placed in Phase A as a best guess here, the evidence remains indecisive as to its exact position in the chronology. From the male graves, 76:19 is the eldest in the CA, and hence its place in Phase A.

Guiding artefacts for the dating of the male graves of Phase A are spear heads SP1a2, SP2a1a2, SP2b1a3[64] and seax type SX1c.[65] Buckles are, as previously explained, chronological indicators for both male and female graves. In the case of the Phase A graves, buckle types BU3g and BU4a are leading.[66] Indicative bead combinations in female graves of Phase A consist of the types CylRound, SegGlob and ConSeg. Also two beads were found which have a continental Frankish origin. These types are Koch58[67] and Koch20WH.[68] From the excavation notes, the exact colour of the Koch20WH bead is not clear; it is possible that the example found was yellow rather than white in which case it should be Koch20YE.

Phase B: a second phase that can be distinguished comprises seven graves which can be dated between *c*.570 and *c*.615. Graves belonging to this phase are 76:3, 5, 11, 16, 35 and 89:45, 51. Whilst the graves of Phase A can all be dated within the sixth century based on artefactual evidence, it can be considered unlikely that any of them should be placed before 550. Within Phase B, all graves can be placed in the late sixth or very early seventh century. As no clear division can be made for these graves between the two centuries, Phase B is created as a separate category with a slightly later start date than Phase A. The above mentioned grave 76:16, which shows an intercutting ring-ditch with grave 76:15, can be suggested to belong to Phase B based on the presence of a buckle of type BU4. This makes it plausible that both inhumations took place within a relatively short time period, possibly of one or two generation(s), regardless of whether 76:15 belongs to Phases A, B or C. Within Phase B graves 76:16 and 76:11 have a ring-ditch enclosure. The guiding artefacts for dating the male graves in this phase are spear heads SP1a4, SP2a1b1and SP1a2.[69] In both male and female graves, buckle types BU3a, BU3b, BU4 and BU4b are indicative.[70] A CylRound bead in combination with a buckle of type BU3 in grave 89:45 indicates a date before 615. The examples of a WoundSP and Disc bead in the same grave can be regarded relatively early but do support the latest date of 615.[71]

Grave 76:11 is placed in Phase B, based on the presence of a combination of spear head (SP2-a1b1) and buckle (BU-3a). It is however possible that this grave should be assigned a slightly later date, in Phase C, as is suggested by the CA. Within the CA output curve, 76:11 is regarded younger than 76:13 and 14, two graves which both feature in Phase C, based on the combined presence of a buckle (BU-3a) and spear head (SP1-a2) and a buckle (BU-3a), spear head (SP1-a3) and shield boss (SB5-a) respectively. Female gender grave 89:45 is placed in Phase B based on the combined presence of bead (Disc), bead (WoundSp), bead (CylRound) and a buckle (BU3). The CA, however, calculates a placing for this grave in the final Phase D. It is possible that the content of this grave resembles a very early Phase D, which would mean a date of circa 15-20 years after the end of Phase B. Four of the seven graves in Phase B are to be found to the centre west of the excavated area. Together with graves 76:15, 29 and 89:18 from Phase A, graves 76:16 and 11 form a cluster in the centre of the excavated area. Two Phase B graves can be found to the north of this cluster and one is located on the eastern edge of the excavation (Fig. 10).

Phase C: can be placed entirely within the first half of the seventh century. It comprises graves 76:1, 6, 12, 13, 14, 22, 26, 28, 31 and 89:1, 23, 25, 39, 40, 43, 46. The dating of the male gender graves in this phase is mainly based on spear head types SP1a3 and SP1a2[72] as well as buckle type BU3a.[73] For the female gender graves, this same buckle type is also considered, together with brooch type BR2b4,[74] pendant type PE2c[75] and beads of the type CylRound.[76] In one of the graves, 76:26, the presence of an amethyst bead is a marker for a seventh-century context.[77]

Within Phase C, the CA outcome refines the dating of the male gender graves by showing that 76:13 is older than 76:14. In the case of the female gender graves, the order of inhumations from old to young should be regarded 89:46, 89:23, 76:26, 89:43 and 89:39.

A cluster of seven Phase C graves is to be found in the centre and north of the excavated area. A second cluster, also of seven graves, can be found to the west. The two remaining graves are located to the east of the excavation (Fig. 10).

Phase D: the final newly identified Phase D contains graves 76:10, 30 and 89:5, 20, 24, 26, 32, 34, 36, 41, 42. The graves in this phase can be dated to the period between *c*.625 and *c*.685 based on their inventory. Guiding artefacts for a Phase D date are spear head SP1a5,[78] seax type SX3a[79] and buckle type BU7.[80] For the female graves, this buckle type also plays a role. Further dating evidence for the female graves is gained from the beads present. Types WoundSP and Dghnt are an indicative combination.[81] In grave 89:34, these types are found in combination with an amethyst bead which is, as stated earlier, an indicator for a seventh-century context.[82]

Amongst the male gender graves suitable for CA, unfortunately none can be placed in Phase D. For the female gender graves, the CA outcome shows that grave 89:26 is likely to be older than 89:34. A large cluster of eight Phase D graves can be found in the northern part of the excavation, a second group of three graves is located in the west.

The spatial distribution of the dated graves over the excavated area seems rather random (Fig. 10). The graves of phases A and B, in particular, do not show

a clear clustering. This makes it impossible, at this stage, to recognise, say, a chronological movement from one side of the cemetery to another. This contrasts with, for instance, the chronological build-up of Buckland cemetery as postulated by Evison.[83] Most of the seventh-century graves, however, can be found to the north and west of the excavated area. It is possibly necessary to excavate more of the eastern area of the cemetery to identify more clearly a spatial pattern. Four graves of Phase A are located within a ring-ditch enclosure. For Phases B, C and D there are 3, 4 and 1 respectively. Phase A grave 76:4, to the west of the cemetery, is one of the four located within an enclosure. This is the only enclosed burial, at this moment, which can be possibly related to graves from phases B and C just outside its ring-ditch. It is possible to suggest that this micro cluster should be seen as a family group built up over several generations.

CONCLUSION

This research shows that it is possible to refine the chronology of the Updown cemetery with the help of Correspondence Analysis in the light of the artefact typology and chronology published by Hines in 2013. The initial two fifty-year phases postulated by Welch, as well as his larger general seventh-century phase can now be divided into four new phases of which one falls completely in the sixth century. The second phase spans the transition from the sixth to the seventh century and phases C and D belong entirely to the rest of the seventh century.

CA cannot assign a date to all graves in the Updown cemetery. The strict qualifying conditions that apply to individual graves mean that the method is only effective for a limited number of graves in the dataset. The dates for most graves are based on one or more artefacts which feature in Hines' seriation. This seriation and chronology, however, have been largely brought about by the application of CA on many cemeteries across England. This means that, indirectly, the graves that do not feature in the CA for Updown are still dated with the help of this statistical method. The CA on the Updown data has proven useful for the creation of a relative chronological order of graves within the newly created phases. There are, however, exceptions. In some cases, the direct date gained from the seriation shows a difference to the CA outcome. This phenomenon is caused, in this case, by the unavoidable overlap between the newly created phases, the high reliance on beads for dating of female gender graves and the fact that many artefacts in the seriation cannot be assigned to a single time bracket of approximately thirty years alone. When using CA for relative dating or refining of chronological data, archaeologists should always bear in mind that there are various factors which can cause a distorted picture. Besides, CA outcomes tend to be influenced, at least to some extent, by the subjective choices made during data gathering and prediction of the chronological order of the artefacts used.

When placing the outcomes of this research in a wider context, it is most important to note that it is now possible to postulate a start for Updown cemetery in the second half of the sixth century, rather than a start in the seventh. For a long time Updown cemetery was regarded a very late example, starting only when the other cemeteries in the Eastry district were already well established (e.g. Finglesham), or already out of active use. If this was the case, it would imply that the cemetery only started during,

or even after, the peak in elite settlement in the area as postulated by Dickinson and colleagues. This belatedness seems inconsistent, however, with the size of Updown cemetery (and only partially excavated to date). Updown is relatively rich in material culture and shows various imported items from the Frankish areas on the Continent, but also the Byzantine Empire and the Red Sea region. There are parallels between Updown and the large Finglesham cemetery in terms of grave structure and furnishings. This suggests that Updown was an integral part of the postulated elite settlement in the district. The presence of relatively rich graves and imports further suggests that Updown was not solely a 'final phase' cemetery. An earlier start to the cemetery, in the second half of the sixth century is now supported and is more coherent with the presence of a low number of unfurnished burials and the scarcity of objects referring to Christian symbolism. The period of usage of the cemetery, however, does stretch into the second half of the seventh century and therefore into the period that is traditionally named the 'final phase'.

The start of the cemetery in the second half of the sixth century would mean that Updown is part of the development of cemeteries along all roads leading into the Eastry district, as described by Dickinson. The few elite graves along the road leading to Updown can probably be regarded contemporary with, or slightly earlier than, the first phase of the larger Updown cemetery.

Various aspects of the material evidence from Updown cemetery, for instance the relatively large number of chatelaines and the presence of amethyst beads, single silver pins and silver-wire slipknot rings, postulate a usage peak in the seventh century. It can be argued, however, that this should not necessarily mean a peak in the second half of the seventh century, as postulated by Welch. As demonstrated by the new Updown phasing, the cemetery shows a decline in use between AD 670 and 685 which places the usage peak in Phase C, between *c*.600 and *c*.650. This is, of course, based on the archaeological information gained to date. Further excavations of the cemetery may shine a different light on various factors such as the level of unfurnished burials, the number of imported grave goods, the number of graves belonging to the different new phases and the chronological structure of the cemetery in a spatial sense. Through more data gained from excavation it might be possible to further refine the chronological phases as presented in this paper and remove some of the overlap between them.

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ENDNOTES

[1] Hines and Bayliss (eds) 2013. 13-20.
[2] *Ibid.*, 2-3.
[3] *Ibid.,* 4
[4] Welch 2008, 45-9.
[5] Dickinson *et al*. 2011, 14-30.
[6] *Ibid.*, 56-61.
[7] *Ibid.*, 65-7.
[8] *Ibid.*, 62-5.
[9] *Ibid.*, 9-14.
[10] *Ibid.*, 9.
[11] Dickinson *et al*. 2011, 9.
[12] *Ibid.*, 10, 14.
[13] Welch 2008, 2.
[14] *Ibid.*, 6.
[15] *Ibid.*, 6-8.
[16] Welch 2008, 8.
[17] Dickinson *et al*. 2011, 72
[18] Halsall 2007, 311.
[19] Dickinson *et al*. 2011, 72.
[20] *Ibid.*, 72.
[21] Parfitt and Sweetinburgh 2009, 313.
[22] Dickinson *et al*. 2011, 73.
[23] *Ibid.*, 73.
[24] Welch 2008, 45-6.
[25] *Ibid.*, 46.
[26] Welch 2008, 17, 46.
[27] Parfitt and Brugmann 1997; Brugmann 1999.
[28] Evison, 1987, 138-40.
[29] *Ibid.*, 136-42.
[30] Parfitt and Brugmann 1997, 94-5.
[31] Leeds 1936.
[32] Welch 2008, 48.
[33] Welch 2008, 48.
[34] *Ibid.*, 48.
[35] Leeds 1936, 96-114.
[36] Geake 1992, 84.
[37] Meaney and Hawkes. 1970, 50-5.
[38] Scull 2015, 75.
[39] Boddingdon 1990, 181.

[40] Welch 2008, 45.

[41] *Ibid.*, 49.

[42] *Ibid.*, 49-50.

[43] Boddingdon 1990, 181.

[44] *Ibid.*, 181.

[45] Welch 2008, 46.

[46] Boddingdon 1990, 181.

[47] Faussett 1856, 130-2; Meaney and Hawkes 1970, 47-8; Geake 1997, 9.

[48] Hines and Bayliss (eds) 2013. 566, 569.

[49] Müssemeier *et al.*, 2003, 38.

[50] *Ibid.*, 39.

[51] Hines and Bayliss (eds) 2013, 570.

[52] Welch 2008, 47-8.

[53] Petrie 1899, 295-301.

[54] Hines and Bayliss (eds) 2013, 328-36.

[55] Shennan 1997, 218.

[56] Härke 1989; Stoodley 1999.

[57] With the use of a Microsoft Excel plug-in called CAPCA, developed by Emeritus Professor Torsten Madsen (Aarhus University, Denmark). The CAPCA plug-in is available via www.archaeoinfo.dk.

[58] Brugmann 2004, 29.

[59] An overview of the assigned type codes for the artefacts as well as a list of their phases of occurrence in Anglo-Saxon cemeteries can be found on pages 561 to 571 of Hines and Bayliss 2013.

[60] Welch 2008, 100.

[61] *Ibid.*, 36.

[62] Evison 1987, 117-18.

[63] Welch 2008, 36.

[64] Hines and Bayliss (eds), 2013. 565-66.

[65] *Ibid.*, 564.

[66] *Ibid.*, 562.

[67] *Ibid.*, 566-67; Koch 1977, colour plate 5

[68] Hines and Bayliss (eds) 2013, 566-67; Koch, 1977, colour plate 2

[69] Hines and Bayliss (eds) 2013, 565.

[70] *Ibid.*, 561-62.

[71] *Ibid.*, 566-67.

[72] Hines and Bayliss (eds) 2013, 565.

[73] *Ibid.*, 561.

[74] *Ibid.*, 570.

[75] *Ibid.*, 568.

[76] *Ibid.*, 566.

[77] Brugmann 2004, 58.

[78] Hines and Bayliss (eds) 2013, 565.

[79] *Ibid.*, 564.

[80] *Ibid.*, 562.

[81] *Ibid.*, 566-67.

[82] Brugmann 2004, 58.

[83] Evison 1987, 136.