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Author(s)	Bergh, Stefan
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# THE NEOLITHIC DATES FROM CARROWMORE 1978-98

## A source critical review

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### INTRODUCTION

This is a review of the contexts of the Neolithic dates obtained by the Swedish Archaeological Excavations at Carrowmore Project during its two excavation campaigns 1978-1982 and 1994-1998. It represents a phase of research undertaken by the authors as part of a recent radiocarbon dating project at Carrowmore (Hensey and Bergh 2013).

The review is mainly based on information from the unpublished interim excavation reports (Burenhult 1994; 1995; 1996; 1997; 1998a; 1998b), but also on the excavator's relevant published work (1980; 1984; 2003 and 2009). The interim excavation reports were annual reports on the work carried out each season and submitted to The National Monument Service, Department of the Environment, Heritage and Local Government in accordance with Excavation Licence. These documents are to be treated as interim 'technical reports', communicating the work carried out at various monuments during the previous season's excavation, and are not intended as final reports. In the absence of final detailed publications of some of the sites excavated, these reports are however the only source for the relevant excavations.

As several monuments were excavated over more than one season, more than one annual report has to be consulted for some sites. Furthermore, a site's radiocarbon dates may be found in a separate report, submitted after its excavation report. This spread of

information regarding a particular monument over a number of reports makes the compilation of data quite complicated, but is of course a result of the promptly submitted reports to fulfil the requirements linked to the Excavation Licence. Another complicating factor related to the analysis of the data from the monuments, is the lack of coherent documentation with often only interim plans and sections included in the annual reports.

The more substantial publication from 1980 is a detailed report of the excavation seasons 1977-79 and is the most comprehensive source of information relating to the four important monuments of Tomb 4, 7, 26 and 27. The following 1984 publication mainly reported on a series of excavations and surveys of non-megalithic character carried out within the Carrowmore Project on the Cúil Irra peninsula. Only summary accounts of the excavations of the four monuments published in 1980 are included in that publication. In 2002 Burenhult (2003a) organised the conference *Stones and Bones. Formal disposal of the dead in Atlantic Europe during the Mesolithic-Neolithic interface 6000 – 3000 BC*, which was closely linked to the overall results of the Carrowmore Project. The proceedings of the conference include a short paper by Burenhult (2003b) which is the most detailed summary of the chronology of Carrowmore to date. The final direct source used for this review is *The Illustrated Guide to The Megalithic Cemetery of Carrowmore, Co. Sligo, Ireland* (Burenhult 2009), which in its third revised edition includes additional information regarding the chronological interpretations of the various sites and is important as it is the latest publication where the dates are contextualised by Burenhult.

For this review, all published plans and sections, including those in the annual interim reports, have been comprehensively analysed. Plans or sections are not repeated here due to the provisional character of this documentation, as well as their lack of systematic representation of contexts of the dated samples. The published material is available through a variety of sources, while the annual interim reports can be consulted through The National Monument Service, Department of Environment, Community and Local Government. The essential contents of these reports are outlined below, followed by

details regarding our assessment of the contexts of the samples used for radiocarbon purposes on a monument-by-monument basis.

### **Interim Reports 1994-98: summary of contents**

#### **Excavation Report 1994**

Excavation	C4 C56 (1/2)
<sup>14</sup> C dates	C4 C56
Wood anatomical analysis	

#### **Excavation Report 1995**

Excavation	C1 (1/2) C56 (2/2)
Survey	Primrose Grange court tomb and hut site

#### **Excavation Report 1996**

Excavation	C1 (2/2) C51 (1/3) Primrose Grange court tomb (1/2) Primrose Grange hut site (1/1)
<sup>14</sup> C dates	C51 C56 Primrose Grange court tomb

#### **Excavation Report 1997**

Excavation	C51 (2/3) C19 Primrose Grange court tomb Primrose Grange tomb 2
<sup>14</sup> C dates	Primrose Grange court tomb and tomb 2 C51 C19

#### **Excavation Report 1998**

Excavation	C51 (3/3)
<sup>14</sup> C dates	Tomb 51

#### **Excavation Report 1998a**

Excavation	C55A
<sup>14</sup> C dates	Tomb 55A

When assessing dated samples, as demonstrated below, it is crucial to be aware that there may be a clear difference between a sample's stratigraphical relation to the burial chamber or/and e.g. the surrounding stone packing and its actual relation in age. If a sample's stratigraphical location gives a TPQ date for the chamber (e.g. in a sealed context in the stone packing surrounding the chamber), this does not necessarily say anything about the actual age of the chamber. If there is no evidence of burning in the area where the charcoal was found, the charcoal could very well have been part of a deposition of material, the history of which we have no knowledge. This approach to the relation between charcoal and constructions has been one of the guiding principles in our review of the Carrowmore dates.

All dates are given as intervals at 2 sigma (95% confidence). Please note that all dates are presented as intervals, and all TPQ's and TAQ's are expressed as date ranges. All dates have been calibrated by OxCal v3.10.

## Summary of sample contexts

<u>Site</u>	<u>Cal. BC</u>	<u>Dating evidence</u>
C1	4340 - 3960	Relation unclear
C3	3270 - 2710	Possibly TPQ chamber/stone packing
	3970 - 3520	TPQ for chamber
	5620 - 5310	TPQ for chamber/stone packing
	4800 - 4370	TPQ for chamber
	4320 - 3800	Relation unclear
	4240 - 3770	TPQ stone packing/ chamber
	3020 - 2570	Relation unclear
	3490 - 2880	Relation unclear
	2840 - 2280	TPQ for final use
	3370 - 2890	TPQ stone packing/ chamber
	3340 - 2880	Relation unclear
C7	4330 - 3940	TPQ for chamber
	3350 - 2890	TPQ for final use
C19	3640 - 3020	Relation unclear
	3940 - 3530	Possibly TAQ for chamber/ Relation unclear
C27	3970 - 3670	Probably TPQ for stone packing around chamber
	3960 - 3640	Probably TPQ for stone packing around chamber
	3960 - 3530	Probably TPQ for stone packing around chamber
C51	4260 - 3940	Relation unclear
	3700 - 3370	TPQ for cairn
	3650 - 3360	TPQ for cairn
	3640 - 3310	TPQ for cairn
	3710 - 3370	TPQ for cairn; TPQ/TAQ for chamber
	3780 - 3500	TPQ for cairn; TPQ/TAQ for chamber
	3700 - 3370	TPQ for cairn; TPQ/TAQ for chamber
	3770 - 3390	TPQ for cairn; TPQ/TAQ for chamber
	3650 - 3360	TPQ for cairn; TPQ/TAQ for chamber
	3650 - 3100	Relation unclear
C55A	4040 - 3520	TPQ for final use/ Relation unclear
C56	3340 - 2890	TPQ chamber
	3490 - 2910	TPQ stone packing around chamber
	3500 - 2920	TPQ stone packing around chamber
	3500 - 2920	TPQ stone packing around chamber
	3630 - 3100	TPQ stone packing around chamber

## CARROWMORE 1

Lab. number	Sample ID	Radiocarbon age (BP)	Calibrated date range (BC) (95%)	δ13 C (0/00)
Ua-16970	ID 60106	5320 ± 80	4340 – 3960	-26.2

### Ua-16970

Sample ID 60106      X -2.55 Y -2.98 Z 54,57

The dated sample (ID 60106) was, as per the coordinates given in the report (Burenhult 1995, 23), located in the SW quadrant (Q1) in a layer defined as ‘Disturbed layer (light brown)’ (Burenhult 1995, 67). According to section drawing (Drawing 1:L) this layer was immediately above the ‘sterile moraine’, but has obviously seen extensive secondary disturbances, since it is stated that ‘most documented parts have been completely destroyed’ (*ibid.* 21). Even though modern material such as china, iron nails and glass was found ‘throughout the construction down to a considerable depth’ (*ibid.*), no such finds are, however, noted from this layer in the List of Finds.

It is hard to ascertain the actual composition and stratigraphy of this layer, since what would be considered as being primary inner stone circles features and settings recorded *in situ*, were well above the ‘disturbed layer’, and c. 0.3m above the dated sample.

The dated sample was located in an obviously disturbed part of the monument, and without any detailed locational description or stratigraphical record of the sample, its relation to the megalithic monument of Carrowmore 1, cannot be ascertained with any acceptable certainty.

**Note:** In the *Stones and Bones* paper this sample is described as ‘charcoal from stone socket’ (Burenhult 2003b, 67). There is, however, no information in the excavation report that supports such an interpretation of the context for the dated charcoal. The report does not in fact contain any record of stone sockets within the monument.

**Comment:** The relation between the dated sample and the monument is unclear due to obvious extensive secondary disturbances and lack of securely recorded context of sample.

**SUMMARY:** The single dated sample from Carrowmore 1 lacks secure context and gives no clear indication of when this monument was built or used.

## CARROWMORE 3

Lab. number	Sample ID	Radiocarbon age (BP)	Calibrated date range (BC) (95%)	$\delta^{13}\text{C}$ (0/00)
<b>Lu-1750</b>	2:79	4320 $\pm$ 75	3270 - 2710	-24.3
<b>Lu-1840</b>	4:79	5750 $\pm$ 85	4800 - 4370	-30.2
<b>Ua-4486</b>	Sample no. 7	4 945 $\pm$ 100	3970 - 3520	-26.9
<b>Ua-12736</b>	26/94	6500 $\pm$ 75	5620 - 5310	-26.1
<b>Ua- 13382</b>	19/1994	5180 $\pm$ 90	4240 - 3770	-27.6
<b>Ua-16971</b>	3/79	3975 $\pm$ 70	2840 - 2280	-25.7
<b>Ua-16972</b>	14/94	4220 $\pm$ 80	3020 -2570	-26.0
<b>Ua-16973</b>	16/94	4430 $\pm$ 100	3490 - 2880	-26.1
<b>Ua-16974</b>	17/94	5230 $\pm$ 80	4320 - 3800	-25.6
<b>Ua-16975</b>	20/94	4425 $\pm$ 80	3370 - 2890	-26.9
<b>Ua-16976</b>	24/94	4390 $\pm$ 70	3340 - 2880	-25.2

### Lu-1750

Sample ID 2:79      X-0.65 Y+2.40 Z 52.85

The dated sample of unspecified charcoal was located c. 3m due east of chamber, in the area between the inner stone circle and the circular shaped stone packing immediately surrounding the chamber. No detailed description of sample location or context is given in report, nor is its location shown by a stratigraphical record. In the first excavation report the sample is described as 'charcoal from inner stone packing' (Burenhult 1980, 72), while in a later report it is described as from 'Double stone arc' (Burenhult 1984, 64).

From locational data and published plans and sections of the monument (Burenhult 1980, 72; 76) it is apparent that the charcoal came from the lower part of the stone packing covering most of the interior of the monument. (Note that the Z-value of 53.00 has been wrongly indicated on published main E-W section in Burenhult 1980, Fig. 24.



At the right hand edge of this section the Z value of 53.00 has mistakenly been placed at 53.45, which has critical implications if the section is used to analyse the stratigraphy.)

According to the sample's Z-value of 52.85 it must have been collected close to original ground level, since main E-W section (located 0.3m south/in front of sample) shows original ground level at c. 52.90 in this area. From published sections, it is clear that it originates from the lower part of the stone packing, covering the interior of the monument. It should in this context, however, be noted that the stone packing has been disturbed immediately to the south of the location of the charcoal sample, but to what extent is not stated (Burenhult 1979, 78)

The dated sample was found in the lower part of the stone packing covering the interior of the monument, c. 2m east of the chamber. The location of the sample would give a secure TPQ for the general stone packing surrounding the chamber, but since the exact context is unknown, as is also the extent of the nearby disturbance of the stone packing, its exact relation to the various elements of the monument must remain unclear. A possible interpretation is that it gives a TPQ for the stone packing surrounding the chamber.

**Comment:** The sample possibly gives a TPQ date for the stone packing surrounding the chamber.

#### **Lu-1840**

Sample ID 4:79      X -0.20   Y -1.20   Z 52.60

Sample of unspecified charcoal located in a soot-covered area together with charcoal in among stone packing between chamber stones A and B. It is not stated in the description of the context of the sample, whether the stones were soot-covered as well, which would have indicated burning *in situ*.

The dated charcoal comes from the same general context as the charcoal in sample Ua-4486, and constitutes part of the material backfilled into the large depression which had been dug to receive the chamber orthostats (Burenhult, 1980, 76ff) (see Ua-4486).

The dated charcoal was found in 'backfilled' material which stratigraphically has been deposited after, or when the chamber was built. The date of the charcoal gives a TPQ for the backfilling around the orthostats, and thereby also a TPQ for the building of the chamber.

**Comment:** The sample gives a TPQ date for the building of the chamber.

**Ua-4486**

Sample ID 7      X 0.03 Y 0.41 Z 52.51

Charcoal sample (*Corylus avellana* <20y) was, according to coordinates in the excavation report (Burenhult 1994, 10), located at the base of 'orthostat d', which is the back stone of the chamber. No description of sample location or context is given. The location is not shown by any stratigraphical record. Two chert fragments (F14) and an unspecified amount of human cremated bones (Cremated bones no. 2), were found together, c. 20cm north of, and on the same level as the dated charcoal. The chert and bone have, however, identical coordinates to dated sample.

During the excavation in 1994 the three orthostats c, d and e were lifted to facilitate retrieval of material below these chamber stones. Even though it is not stated in excavation report, the dated material is probably coming from material recorded when orthostats d had been removed.

The orthostats of the chamber, as well as some of the passage stones, were all placed in *one single depression* dug into the original subsurface. This depression measures c. 3 x 2m and has a depth of c. 0.3m (for section and plan, see Burenhult 1980, 76). No individual sockets for the different orthostats were recorded. After the orthostats had been placed in position, the depression seems to have been backfilled with a separate type of material as indicated in excavation report (Burenhult 1980, 76). The content or character of this material is not described.

The dated charcoal (as well as the nearby cremated bones and chert fragments), was found in this apparently backfilled material. Stratigraphically, this material has been deposited after, or when the chamber was built. The date of the charcoal gives a TPQ for the backfilling around the orthostats, and thereby also a TPQ for the building of the chamber.

**Note:** The context of this sample has also been described as 'charcoal from stone socket in passage' (Burenhult 2003, 67), which does not correspond to excavation report, since 'orthostat d' is recorded as the back stone of the chamber.

**Comment:** The sample gives a TPQ for the building of the chamber.

**Ua-12736**

Sample ID 26      X 0.67 Y 1.17 Z 52.69

Dated sample of unspecified charcoal is, according to coordinates (Burenhult 1994, 11), located at a distance of *c.* 0.8m NE of backstone in chamber. The sample is close to the outside base of a small boulder that seems to be part of a central packing of stones around the chamber. No description of sample location or context is given in report. The location is not shown by a stratigraphical record. The top of the adjacent boulder has a Z value of 53.02. It seems that the sample was located more or less on the original ground level, since the Z value of the untouched ground level in this general area is *c.* 52.80, and the sample was recorded at Z 52.69. It has no connection with the depression into which the chamber orthostats have been placed, as the sample is *c.* 0.6m to the NE of the edge of this depression.

The sample is located only 0.15m SE of Ua13382, but at a level 0.14m below that sample. Their relation is unclear.

The dated charcoal was located on what seems to be original ground level *c.* 1m NE of the chamber. Stratigraphically, the surface on which the charcoal was found represents a phase before the stone packing surrounding the chamber was put in place. The date of the charcoal could *possibly* – even though no stratigraphical record is available – give a TPQ for the stone packing surrounding the chamber, and thereby also a TPQ for the chamber.

It should be noted that C14:21 (Ua12735), located in a similar stratigraphical position as Ua12736 (but *c.* 0.5 outside the chamber to the NW), returned a date of 34450 ± 1300 BP (Burenhult 1998, 26).

**Note:** In a later publication the sample, as well as Lu-1840, are described as coming ‘from foundation sockets of the stones in the cist’ (Burenhult 2003b, 68). However, the location given in excavation report (Burenhult 1994, 11) firmly places the sample well outside the chamber, in a rather unclear stratigraphical position, and not in a foundation socket for a chamber orthostat.

**Comment:** The sample possibly gives a TPQ for the building of the chamber. But lack of detailed context makes this hard to verify.

**Ua-13382**

Sample ID 19/1994      X 0.81 Y 1.14 Z 52.83

The dated sample of unspecified charcoal is according to coordinates in the excavation report, located at a distance of *c.* 0.8m NE of back stone in chamber Burenhult 1994, 10). No description of sample location or context is given in report. Location is not shown by a stratigraphical record. Coordinates indicates that it was located *underneath* a stone (*c.* 0.3m x 0.4m) which forms part of what seems to be an arc of small boulders enclosing the NE side of the chamber. The top of the stone has a Z value of 53.02. It seems like the sample was located more or less on the original ground level, since the Z value of the untouched ground level in this general area is *c.* 52.80, and the sample was recorded at Z 52.83.

The sample is located 0.15m NW of Ua12736, but at a level 0.14m above that sample. Their relation is unclear.

The sample has no connection with the depression into which the chamber orthostats have been placed, as the sample is *c.* 0.6m to the NE of the edge of this depression.

Stratigraphically the surface, on which the charcoal was found, represents a phase of the monument before the stone packing surrounding the chamber was constructed. The date of the charcoal would therefore (even though no stratigraphical record is available) give a TPQ date for the stone packing surrounding the chamber, and possibly also a TPQ date for the chamber.

**Note:** In a later publication this sample is described as ‘charcoal from stone socket’ (Burenhult 2003b, 67). This interpretation of the context for the sample does not agree with the information published in excavation report, since the presence of a stone socket in the vicinity of the sample is not indicated or described. From the coordinates in report it is however clear that the sample was located 0.19m below the top of a small boulder. Whether a socket for this stone was present or not is not detailed.

Cooney *et al.* (2011, 645), after Burenhult, refer to this sample as belonging to ‘second phase, when passage and inner stone circle were added’. No evidence to support this interpretation is present in the available excavation report.

**Comment:** The sample possibly gives a TPQ for the building of the chamber. But lack of detailed context makes this hard to verify.

**Ua-16971**

Sample ID 3/79 Cist A      X-3.20 Y-2.00 Z 52.75

This dated sample comes from charcoal found together with cremated bones and a stone bead in the small Cist A in the SW quadrant of the monument. The small cist, which was more or less intact when excavated, is placed on the perimeter of the outer of the two inner stone circles. A second small cist (Cist B), also placed on the same inner stone circle, was present some 3m to the NW. It cannot, however, be ascertained with any confidence, whether these cists actually are contemporary with the stone circle on the perimeter of which they are found, or whether they were placed there after the construction of the stone circle.

**Note:** Radiocarbon dates from pin fragments found in Cist B (Ua-36373 and Ua-36374) indicate that the deposition in that cist took place some 800-1000 years prior to the charring of the wood dated in Cist A (Bergh & Hensey 2013).

Cooney *et al.* (2011, 646) mistakenly described the sample as coming 'from a secondary cremation with barbed and tanged arrowhead', which in fact describes a deposit found in Carrowmore 7 (see Burenhult 2001, 19).

**Comment:** The sample dated from Cist A gives a TPQ for the final depositional activity at Carrowmore 3.

**Ua-16972**

Sample ID 14/94      X-0.44 Y 1.29 Z 52.81

This sample of unspecified charcoal was, according to the coordinates, located just some 0.25m outside the eastern orthostat. No description of context is present in the excavation report. The sample was located only a few cms behind (north of) the published E/W section of the monument (Burenhult 1980, Fig. 24), but not indicated in section. From this section it seems, however, to have originated from the lower part of the stone packing surrounding the chamber, c. 0.2m above the upper part of the backfilled material in the hollow in which the chamber was placed.

According to the excavation plan in the report, however (Burenhult 1994, Plan III), the Z value of original ground, only a few cms from the dated sample, is indicated as 52.79, implying that the sample more or less was found on original ground level, underneath the infill material around the chamber. Since some confusion seems to prevail regarding the stratigraphical location of the sample its exact location cannot be ascertained. No additional information relating to its context can be gained from the excavation report.

The lack of detailed information regarding the context of the sample as well as the confusion relating to its location, give the sample a very limited value as dating evidence. If it was located more or less on original ground level it would give a TPQ for the erection of the chamber and the infill of the hollow around the chamber. If it was located in the stone packing surrounding the chamber, its *location* would give a TAQ for the chamber and the infill, and a TPQ for the stone packing.

**Note:** Cooney *et al.* (2011, 645) interpreted this sample as being linked to the monument's '3rd phase, when the 2nd inner stone circle and 2 cists [were] built'. However, there is no evidence to support this interpretation in the available excavation report.

**Comment:** Due to lack of detailed information of location and context the sample's relation to the monument cannot be ascertained.

#### **Ua-16973**

*Sample ID 16/94*      *X 0.20 Y 0.90 Z 52.78*

This sample of unspecified charcoal was, according to the given coordinates, located just outside the chamber, *c.* 0.2m north of the backstone (Stone d). No description of context is present in the excavation report (Burenhult 1994). According to Z-value it was located in the lower part of the stone packing surrounding the chamber, and just outside the large pit dug for the chamber.

The dated sample would probably (even though no stratigraphical record is available) give a TPQ for the stone packing surrounding the chamber, and possibly also a TPQ date for the chamber.

**Note:** Cooney *et al.* (2011, 645) interpreted this sample is by as being linked to the monument's '3rd phase, when the 2nd inner stone circle and 2 cists [were] built'. However, there is no evidence to support this interpretation in the available excavation report.

**Comment:** Due to lack of detailed information of location and context the sample's relation to the monument cannot be ascertained.

#### **Ua-16974**

*Sample ID 17/94*      *X 3.16 Y 1.64 Z 52.89*

The dated sample of unspecified charcoal was, according to coordinates in the report (Burenhult 1994, 10), located c. 3.5m due north of the chamber, midway between the two inner stone circles. No description of sample location or context is given in report, nor is its location shown by any stratigraphical record. The Z value indicates, however, that the sample was collected c. 20cm above original ground level, but its relation to the general stone packing surrounding the chamber is unknown.

Stratigraphically, it seems to belong to the lower level of the stone packing that covered the interior of the site. The stone packing in this part had, however, been affected by later disturbances, and even some of the boulders in the boulder circle were missing close to the area from where the sample came. It should be noted that in the published N/S section (which is located 1.6m to the west of the sample, it is evident that there is a more or less stone free area at c. 3.5m north of the chamber (Burenhult 1980, Fig. 24). Even though the sample was collected 1.6m in front of the section, the section seems to indicate disturbances in this general area.

A confusing circumstance is that excavation plan II in the report (Burenhult 1994) shows Z value for what seems to be original ground level as 51.84 very close to the sample which has a Z value of 52.89. In other parts of the excavated quadrant Z values of 51.84 and 51.85 respectively are indicated. These values must be misprints, since they do not correspond either to the published sections or to the dated sample discussed in this section.

**Note:** In a later publication this sample is described as ‘charcoal from stone socket’ (Burenhult 2003, 67). This interpretation of the context for sample does not agree with the information published in the excavation report, since the presence of a stone socket in the vicinity of the sample is not indicated or described.

**Comment:** The lack of information regarding the context of the sample, taken together with its location in an area with unclear stratigraphical relation to the chamber and the stone packing, give the sample a very limited value as dating evidence.

#### **Ua-16975**

*Sample ID 20/94      X 0.60 Y 3.27 Z 52.85*

This sample of unspecified charcoal was, according to the given coordinates, located c. 2m ENE of the chamber, close to original ground level. No description of sample location or context is given in report, nor is its location shown by any stratigraphical record. From plan in report (Burenhult 1994, 74) the location of the sample is overlain by a c. 0.5m large slab just inside the innermost stone circle. From the z-value of the sample



it seems to have been collected very close to original ground level, and is thereby stratigraphically overlain by the stone packing surrounding the chamber.

**Comment:** The sample gives a TPQ for the stone packing surrounding the chamber.

**Ua-16976**

Sample ID 24/94      X 0.40 Y 5.62 Z 52.70

The dated sample of unspecified charcoal was, according to the coordinates, located due east of the chamber, 5.62m east of x-baseline aligned N/S. Some confusion seems, however, to prevail regarding the documentation of this section of the monument. According to published *plans* (Burenhult 1978, Fig. 27 and 28; Burenhult 1994, 74, 75), this y-value places the sample literary at the western, inner edge of stone 21 in the boulder circle. However, if the published *section* is consulted, (Burenhult 1978, Fig. 24), the same y-value places the sample c. 1.1m west of stone 21. According to the coordinates, the sample would have been located in a stone free area close to Stone 21 in boulder circle (Burenhult 1994, 74). No z-values in the vicinity of this location are, however, given on excavation plan, to facilitate an assessment whether the sample was found on original subsoil or not. The z-value of 52.70 would, based on the main E/W section which is c. 0.8m south of the sample, place the sample c. 0.15m into the subsoil. This might indicate that sample was found close to original ground level, which would give a TPQ for the overlying stone packing.

The stone packing that covers most of the interior of the site inside the boulder circle, seems however to have been extensively disturbed in this part of the monument, from which follows that very little can be said about the sample's actual stratigraphical context. The lack of detailed information regarding the context of the sample, the confusion relating to section versus plan documentation, as well as the extensive disturbance in this area of the monument, give the sample a very limited value as dating evidence.

**Note:** Cooney *et al.* (2011, 645) interpreted this sample as being linked to the monument's '3rd phase, when the 2nd inner stone circle and 2 cists [were] built'. However, there is no evidence to support this interpretation in the available excavation report.

**Comment:** Due to lack of detailed information of location and context the sample's relation to the monument cannot be ascertained.



SUMMARY: A sample dated to 3970-3520 BC gives a clear TPQ for the chamber. It can thus be concluded that the chamber was built sometime after the deposition of this sample. Depositional activity at the monument seems to have continued at least until the period 2840-2280 BC.

## CARROWMORE 7

Lab. number	Sample ID	Radiocarbon age (BP)	Calibrated date range (BC) (95%)	$\delta^{13}\text{C}$ (0/00)
Lu-1441	I:77	5250 $\pm$ 80	4330-3940	-26.2
Ua-16978	6/77	4405 $\pm$ 70	3350-2890	-26.5

### Lu-1441

*Sample ID 1:77; charcoal from intact bottom layer in central chamber (posthole, midpoint of chamber and circle) (Burenhult 1980a, 32)*

The dated sample of unspecified charcoal is, according to the dating certificate, a mixed sample consisting of 0.5 g of charcoal coming from the posthole, 2.5 g from a layer including charred bark just S. of the posthole, and 3 g without specified context (Burenhult 1977). There is, however, a possibility that the 3 g of charcoal also comes from the layer which included the charred bark.

From the published plans and sections it is evident that the posthole and the dated layer are two separate features (Burenhult 1980a, Figs 4-7). The latter is not recorded in plan. The posthole is one of in all ten pits or postholes recorded within the monument. The dated posthole has been interpreted by Burenhult as part of the primary construction, since it is located close to the actual centre of the boulder circle, and also of the chamber. The pits all seem to have been dug into the underlying boulder clay and are overlain by a 'culture-layer' (*ibid.*) without defined content. The dated 'intact bottom layer' is located on the boulder clay but partly underneath a layer labelled 'ancient ground level' (*ibid.* Fig. 6, 7). The dated sample gives thereby a *terminus post quem* for the chamber.

There is nothing to support the interpretation of the date as representing a 'construction date' for the monument, especially since only a minor part of the sample can be linked to the actual posthole, which according to the excavator, held the post from which the monument was laid out.

**Comment:** The sample probably gives a TPQ for the chamber.

**Ua-16978**

Sample ID 6/77      X 7.30 Y 11.75 Z 53.82

The dated sample was, according to the given coordinates, located between orthostat D and E in the SW part of the central chamber (Burenhult 1980a, Figs 3-7). Sample is not listed or described in excavation report (Burenhult 1980a, 19-32), but included in diagram in later publication (Burenhult 2003, Fig. 2). Based on coordinates, the sample coincides with Bone Deposit 3, consisting of cremated bones found in the void between the bases of the orthostats. The z-value for Bone Deposit 3 is given as 53.70 (whether value indicates top/centre/bottom of deposit is, however, not indicated), while the dated sample has a z-value of 53.82, possibly indicating that the charcoal was located above, or in the upper part of the bone deposit.

**Comment:** Stratigraphically the sample gives a TPQ for the final use of the chamber, but since no record of the context of the sample is presented, its actual relation to the monument remains unclear.

SUMMARY: A sample dated to 4330-3940 BC probably gives a TPQ date for the chamber. The chamber of Carrowmore 7 was therefore likely built after the deposition of this sample.

## CARROWMORE 19

Lab. number	Sample ID	Radiocarbon age (BP)	Calibrated date range (BC) (95%)	$\delta^{13}\text{C}$ (0/00)
Ua-12734	ID 60207	4610 $\pm$ 90	3640 - 3020	-24.9
Ua-16981	ID 60206	4915 $\pm$ 75	3940 - 3530	-26.0

### Ua-12734

*Sample ID 60207      X 1.25 Y -0.70 Z 55.71*

The context of the sample is not described and it is not marked on plan or section. According to the coordinates given, the sample of unspecified charcoal was located c. 0.5m to the north and outside, what was interpreted as the remains of a chamber. From Z values it seems to be located in the lower part of the stone packing that covered the interior of the monument.

In Table of charcoal samples in excavation report (Burenhult 1997, 37), seven out of the eight samples collected have context given as either 'Cist A' or 'Central chamber', while the dated sample is the only one with no specified context.

While the sample is clearly located outside what is considered to be the partly destroyed remains of the central chamber, it is stated in report that it 'provided a date of use for the chamber of about 3400 BC' (Burenhult, 1997, 32).

The sample seems to originate from the lower part of the stone packing, but as its stratigraphical context is poor, and relation to chamber unclear, nothing can be said about its relation to the monument as such.

**Comment:** Due to lack of detailed information of location and context the sample's relation to the monument cannot be ascertained.

### Ua-16981

*Sample ID 60206      X 2.52 Y -3.23 Z 55.67*

The context of the sample is not described in report and it is not marked on plan or section. According to coordinates in the excavation report (Burenhult 1997, 31-38) the dated charcoal was located underneath Stone I, which seems to be a flat limestone slab

located in the western part of what remains of the central chamber of the monument. Under the limestone slab, but also in this general area of the assumed chamber, quantities of cremated bones, as well as a fragment of a bone pin were found. The area is indicated as Cist A on plan.

According to a published section located c. 2.5m east of the dated sample, it is probable that the cremated bones and dated charcoal were found in the lower part of what is labeled 'Dark layer with stones' (Burenhult 1997, 138: Drawing 13). In a later publication the sample is described as dating 'charcoal from cremation in central chamber' (Burenhult 2003, 67).

The dated charcoal might have been part of a deposit of cremated bones found underneath a flat slab in the chamber, which possibly was part of the original flooring. But without any detailed record of the context for the dated sample, there is very little information to support its actual relation to the construction of the chamber/monument. Its location might however represent a TPQ for the chamber.

**Comment:** The sample could probably represent a TPQ date for the burial chamber, but lack of detailed context and location makes this not possible to ascertain.

SUMMARY: Based on the two available samples from Carrowmore 19, it is probable that the chamber was erected sometime after the deposition of a sample dated to 3940-3530 BC.

## CARROWMORE 27

Lab. number	Sample ID	Radiocarbon age (BP)	Calibrated date range (BC) (95%)	$\delta^{13}\text{C}$ (0/00)
<b>Lu-1698</b>	4/79	5040 $\pm$ 60	3970 - 3670	-22.9
<b>Lu-1808</b>	1/79	5000 $\pm$ 65	3960 - 3640	-23.7
<b>Lu-1810</b>	3/79	4940 $\pm$ 85	3960 - 3530	-23.4

### **Lu-1698**

*Sample ID 4/79      X 19.05   Y 14.50   Z 54.61*

### **Lu-1808**

*Sample ID 1/79      X 18.70   Y 14.60   Z 54.68*

### **Lu-1810**

*Sample ID 3/79      X 18.95   Y 14.83   Z 54.65*

Three samples have been dated from this monument, and they come from three different deposits of charcoal not more than 0.4m apart, and in the same stratigraphical location (Burenhult 1984, Fig. 20). According to published report the samples came from 'the original megalithic construction... between and under the lowest layer of stones in the stone-packing surrounding the chamber' (Burenhult 1984, 61).

The area where the samples were collected was *c.* 3m NW of the chamber. The stone packing in C27 covered more or less the entire interior of the site and was relatively intact. It consisted of tightly laid stones 0.2-0.4m in size. Secondary disturbances in the packing were recorded in the vicinity of the samples. The dated charcoal was collected among the stones in the lower level of the stone packing, and *not on the underlying* original ground level. (It is interesting to note the very limited evidence of activity was recorded on original ground level, in comparison to e.g., C3 and C7 (Burenhult 1980, Fig. 20).

*The stratigraphical* location of the dated samples seems to be contemporary with the construction of the stone packing, since the deposit was found in the body of packing. The location of the charcoal might thereby give a TAQ for the building of the chamber, around which the stone packing had been laid. Since no soot or evidence of burning was recorded together with the charcoal, it does not seem like the fire that produced the charcoal had been lit at the spot. *The age of the charcoal* therefore gives a TPQ date for the stone packing. Its relation to the chamber must, strictly speaking, remain unknown.

**Comment:** The date possibly gives a TPQ for the stone packing surrounding the central chamber.

SUMMARY: Based on the three samples from this monument it is reasonable to conclude that the central chamber with its surrounding stone packing was constructed sometime after the deposition of the charcoal dated to 3970-3630 BC.

## CARROWMORE 51

Lab. number	Sample ID	Radiocarbon age (BP)	Calibrated date range (BC) (95%)	$\delta^{13}\text{C}$ (0/00)
Ua16110	ID 60186;C14:8/98	5255 $\pm$ 70	4260 – 3940	-26.3
Ua12731	ID 60102	4790 $\pm$ 65	3700 – 3370	-26.4
Ua12732	ID 60164	4655 $\pm$ 65	3640 – 3310	-27.6
Ua16109	ID 60177	4745 $\pm$ 70	3650 – 3360	-26.4
Ua11578	ID 60067	4800 $\pm$ 70	3710 – 3370	-27.2
Ua11579	ID 60071	4830 $\pm$ 60	3780 – 3500	-26.6
Ua11580	ID 60072	4775 $\pm$ 60	3700 – 3370	-28.1
Ua16111	ID 60186; C14:15/98	4815 $\pm$ 75	3770 – 3390	-26.3
Ua-16108	ID 60165	4740 $\pm$ 70	3650 – 3360	-25.6
Ua-11581	14C ben A	4625 $\pm$ 60	3650 – 3100	-22.7

Ten Neolithic dates have been returned from this monument.

The dated samples from C51 can be grouped into five different stratigraphical categories:

- 1) charcoal found on sterile boulder clay underneath monument
- 2) charcoal 'embedded' in the sub-cairn layer, called 'brown/yellow layer'
- 3) charcoal found on the surface of the 'brown/yellow layer'
- 4) charcoal found in features dug into the same layer
- 5) samples collected in top soil

For clarity the samples are in the following discussed within these five groups.

The 'brown-yellow layer' is c. 0.25m thick, and has been recorded above the 'sterile boulder clay' in all cuttings, and consists of 'light brown-yellow moraine' (Burenhult 1998a, 19). This layer has been interpreted as soil brought in, and spread over the entire



area, prior to the building of the monument. Since no turf horizon was recorded underneath this layer, it was concluded that the site had been completely stripped of its topsoil before this soil was spread over the site. On this, assumed artificial layer of moraine, the chamber and cairn was then constructed.

[It should, however, be noted that there is no record in the excavation report to support an interpretation that the layer is confined to the area of the cairn, since recorded sections indicate that it continues beyond the edge of the cairn, with no outer limit defined (Burenhult 1998b, Figs. 15, 29, 30). It should further be noted that a similar layer, described as 'yellow silty clay with patches of fine sand and gravel', and located between the topsoil and the underlying boulder clay, was recorded during test excavation in an area c. 150m north of Carrowmore 51 (Bergh 2001). This layer was a naturally deposited layer, and there is no reason to believe that the layer recorded under C51 has a different origin].

#### 1. On sterile boulder clay

##### **Ua16110**

Sample ID 60186; C14:8/98      X -18.85 Y 2.37 Z 58.20

The charcoal for Ua-16110 was collected on sterile moraine just outside a limestone boulder in the kerb, due south of the chamber. In the report it is stated that it was collected 'near the edge of stone packing' (Burenhult 1998b, 18) of a supposed site just outside the kerb. The distance is, however, c. 1m to this packing, and the charcoal cannot be considered being linked to this feature. Underneath the kerbstone, outside which the charcoal was collected, a cremation deposit was found, but c. 35cm above the dated charcoal.

On plan the sample is indicated as coming from a location underneath the kerbstone but is described as 'outside, and very close to the kerbstone' (*ibid.*).

The charcoal probably represents remains of activity in the area but since it is not clearly stratigraphically related to either the kerbstone or the cairn, its date cannot formally be considered to be a TPQ for the cairn.

#### 2. Embedded in brown-yellow layer

##### **Ua12731**

Sample ID 60102      X 0.24 Y 0.42 Z 58.38

##### **Ua12732**

*Sample ID 60164*      X 1.12 Y -2.26 Z 58.04

**Ua16109**

*Sample ID 60177*      X 0.52 Y -2.02 Z 58.20

These three samples are all described as 'embedded in brown-yellow layer'. Since the size and extent of the charcoal deposits from which these samples derive, are not stated in report it is hard to ascertain how this charcoal came to end up embedded in this seemingly homogenous layer. Small fragments could have been carried by root action, while other deposits could have been placed in the layer and backfilled with the same material.

The dates are very consistent and correspond well to the dates returned from samples collected on the actual surface of the same layer.

The three samples give a TPQ for the building of the overlying cairn.

3. On surface of brown-yellow layer

**Ua11578**

*Sample ID 60067*      X -2.30 Y 1.88 Z 58.57

**Ua11579**

*Sample ID 60071*      X -1.86 Y 0.42 Z 58.53

**Ua11580**

*Sample ID 60072*      X -2.00 Y 0.35 Z 58.53

**Ua16111**

*Sample ID 60186; C14:15/98*      X -18.85 Y 2.37 Z 58.20

These samples have been collected from 'the surface of the brown-yellow layer', and were taken from a large amount of charcoal recorded on this surface around the megalithic chamber. On that surface two areas (c. 3 x 2m) of burning were also recorded north and south of the chamber respectively, as were also a number of shallow pits.

An important observation in this context is that the two large burnt areas on each side of the chamber stratigraphically pre-dates the chamber, since they both evidently have been cut by the insertion of the chamber orthostats (Burenhult 1998b, Figs. 13, 40). Only one of the samples from the surface of this layer has, according to published plans, been collected from these areas of burnt material (Ua11578), while Ua12731 is described as being embedded in burnt area of brown-yellow layer, but not indicated on plan as coming from area of burnt material (Figs. 39, 40).

It cannot be ascertained with certainty whether the activity represented by the isolated occurrence of charcoal and shallow pits recorded in the vicinity of the chamber, were

contemporary with the two large burnt areas. But, if that was the case, it would follow that the remains on the surface of the brown-yellow layer would actually pre-date the erection of the chamber.

The dates collected from the surface of the brown-yellow layer are very consistent and probably represent a relatively focused activity within a limited time span. The dates give a clear TPQ for the cairn above, but their relation to the chamber is more unclear. If they do represent activity on the ground *around the chamber*, they would give a TAQ date for the chamber, but as outlined above, it cannot be excluded that they actually represents activity on the site, where the chamber later was erected. In the latter case they would give a TPQ date for the megalithic chamber.

#### 4. In features dug into brown-yellow layer

##### **Ua-16108**

Sample ID 60165      X 0.75 Y -2.45 Z 57.92

The charcoal for Ua-16108 comes from the lower part of 'Structure VI', which was a c. 0.35m deep pit with stone packing and a large amount of charcoal. Since this pit evidently had been dug through the 'brown-yellow layer' the date gives a TAQ for the layer (if not accepted as a natural layer), while its relation to the chamber remains unclear.

It is, however, probable that the charcoal is linked to the same range of activity that has been dated on the surface of the brown-yellow layer.

#### 5. In top soil

##### **Ua-11581**

Sample ID 14C ben A      X 0.52 Y -2.61 Z 59.33

This piece of a human skull fragment was found just below the topsoil at the northern corner of the chamber. It is of course out of primary context and has probably been thrown out of the chamber during its exploration. The date is, however, very consistent with the other dates returned from charcoal from the area around the chamber.

**Comment:** Out of the in all ten samples dated to the Neolithic period from C51, nine of them have returned dates from the period 3750–3360 BC. Their stratigraphical location varies slightly, but not enough to facilitate higher chronological resolution; though clearly there is substantial evidence for activity around the chamber area at 3550 BC. It

cannot be ascertained whether this activity pre-dates the chamber and the boulder circle, or whether it is contemporary or even post-dates the chamber. However, the activity pre-dates the overlying cairn. On a scale of probability, it is reasonable however, to assume that the erection and use of the chamber is not too far removed in time from the activity around the chamber. This is supported by the dating of a piece of a human skull (found in topsoil) to the same interval. This bone had most likely originally been deposited in the chamber, and removed during later explorations.

A sample from outside the kerb on the south side has been dated to 4260–3940 BC. The stratigraphical relation between the main monument and the sample is not clear, but it is probable the sample represents activity which pre-dated the main monument.

SUMMARY: Based on the eleven Neolithic dates from this central monument at Carrowmore, it is reasonable to assume that the large central chamber was built in the period 3750–3530 BC, after which the surrounding cairn was added. How soon after the building of the chamber the cairn was added, cannot be established on current evidence.

## CARROWMORE 55A

Lab. number	Sample ID	Radiocarbon age (BP)	Calibrated date range (BC) (95%)	$\delta^{13}\text{C}$ (0/00)
Ua-13753	ID 60512	4970 $\pm$ 120	4040 – 3520	-25.2

### Ua-13753

*Sample ID 60512      X 4.68 Y 1.61 Z 51.51*

The partial excavation of this monument was not concluded, and excavation was not carried out down to untouched ground below the monument. The main focus of excavation was around two concentrations of cremated bones, Cist A and Area B. The dated sample was located in 'Layer 4' which was the lowest layer excavated in the monument. The context of the sample is described as 'from the cremation layer below the floor-slabs' (Burenhult 1998c, 6).

This description of the context for the dated charcoal is to some degree at variance with the record in the excavation report. Unlike other areas in the trench, as well as in the strata above Layer 4, no cremated bones were recorded in the c. 2.5m sq. large area where the sample was collected. A clear definition of 'cremation layer' is not available in the report, but human remains seems to be absent from the dated context.

It should be noted that the large amount of antler/bone pins recorded at the site, as well as other finds were all recorded in layers above the sample. A clay bead (ID 10504) was, however, found in the lower layer roughly corresponding to that of the dated sample, but at a distance of c. 1.8m to the NW. In this context Section C-D in excavation report is slightly misleading, as the dated sample, which is located c. 1.0m in front of the section, has been projected into the drawn section 'to allow for a stratigraphical analysis' (*ibid.* 6). The sample was according to published plans, however, not found in the rich find context of 'Cist A' which might be concluded from Section C-D.

Since the full section down to the underlying untouched ground level has not been recorded, the wider context of the sample cannot be ascertained. From present stratigraphical evidence the interpretation must be that the dated charcoal was deposited in the monument prior to the substantial deposition of cremated bones and related artefacts in what seem to be the remains of a chamber. From available record it can only interpreted as a TPQ for the final use of the monument. The age of the charcoal does not, however, reveal anything about the date it was deposited in this monument.

**Comment:** From existing records the sample must be interpreted as a TPQ for the final use of the monument.

SUMMARY: The single dated sample from Carrowmore 55A gives limited information about the age of this monument, but indicates that the monument was used at some date after the deposition of the sample dated to 4040–3520 BC.

## CARROWMORE 56

Lab. number	Sample ID	Radiocarbon age (BP)	Calibrated date range (BC) (95%)	$\delta^{13}\text{C}$ (0/00)
Ua-4487	35	4395 $\pm$ 65	3340 – 2890	-26.7
Ua-4488	63	4480 $\pm$ 75	3490 – 2910	-22.7
Ua-10735	C154/ID 60250	4495 $\pm$ 80	3500 – 2920	-26.3
Ua-10736	C155/ID 60251	4525 $\pm$ 80	3500 – 2920	-25.2
Ua-10737	C159/ID 60256	4620 $\pm$ 70	3630 – 3100	-25.9

### Ua 4487

Sample ID 35      X -1.95 Y -1.00 Z 55.54

The sample (*Corylus avellana*  $\leq 5\text{y}$ ) was located *c.* 1.5m SW of chamber stone A which forms the western side of the entrance to the chamber (Burenhult 1994). The charcoal was collected from a sooty layer labelled 'Activity Area B', consisting of three separate spreads of charcoal within an area measuring *c.* 1.5 x 1.0 m. The charcoal comes from the north western of these three spreads. The thickness of the sooty layer constituting Activity Area B is not stated, but its easternmost part has a thickness of *c.* 15cm according to main N-S section in report. An arrowhead (F11) and a flint flake (F19) were found in the south western spread, *c.* 0.5 to the south of where the charcoal was collected. Activity Area B is interpreted as a 'possible cremation spot', but no remains of cremated bones were recorded.

The location of the sample is not shown in section, but from coordinates and Z value it seems like the sooty layer of Activity Area B had been deposited on original ground level. The eastern edge of the layer continued under Stone A of the chamber.

According to section drawing, at least the eastern part of the spread from which the sample was collected was located above the 'light brown sterile gravel' which, according to the excavator, had been spread out to create a level area on the site before the construction began (Burenhult 1995, 9). The charcoal spread also continues below chamber stone B. From this follows that the stratigraphical context of the sample gives a TAQ date for the light brown sterile gravel layer, and a TPQ date for the erection of the chamber.

**Comment:** The sample gives a TPQ date for the erection of central chamber.

**Ua 4488**

Sample ID 63      X -0.29 Y 2.17 Z 55.46

This charcoal sample (*Corylus avellana* ≤25y) was located c. 1m outside the chamber, east of chamber stones G and H (Burenhult 1995). The charcoal was collected from a sooty layer labelled 'Activity Area C', consisting of a charcoal spread measuring c. 0.5 x 0.4m and with a depth of c. 0.1m. The full extent of this charcoal spread was not recorded as its northern part continues into unexcavated ground in the NE quadrant of the site. No finds were made in the sooty layer.

From section in excavation report it is evident that the charcoal spread from which the sample was collected was located on the 'light brown sterile gravel' layer brought in to create a level foundation for the site (Burenhult 1995). The stratigraphical context of the sample therefore gives a TAQ date for this layer, and a TPQ date for the stone packing surrounding the chamber.

**Comment:** The sample gives a TPQ date for the stone packing around chamber.

**Ua 10735**

Sample ID C154/ID60250      X 0.34 Y -0.60 Z 55.15

Charcoal sample (*pomoideae*) was located just outside chamber stone C in NW quadrant, in what is labelled 'Activity Area E' (Burenhult 1995, 11). This area '...is defined by a sooty layer. Concentrations of charcoal were collected' (*ibid.*). Extent and thickness of Activity Area E is not stated, and its central coordinate is the same as that given for the charcoal sample.

Location of sample is not indicated in plan or section, but from coordinates and Z value it seems to have been located in lower level of 'light brown sterile gravel' layer brought in to create a level foundation for the site, or even on the original ground level. Exact stratigraphical location is not stated.

From available records its stratigraphical context gives a TAQ for the 'light brown sterile gravel' layer brought in to create a level foundation for the site, and a TPQ date of the stone packing surrounding the chamber.

**Comment:** The sample gives a TPQ for the stone packing around chamber.



**Ua 10736**

Sample ID C155/ID60251      X 1.61 Y -0.40 Z 55.12

Charcoal sample (*Corylus avellana*) was located just outside chamber stone D in NW quadrant. Location of sample is not shown in plan or section, but from coordinates and Z value it seems to have been located on original ground level, or in the 'light brown sterile gravel' layer brought in to create a level foundation for the site. Exact stratigraphical location is unfortunately not stated.

It is located only 13cm south of Ua 10737, but at a level 0.27m above that sample. As it is located below the stone packing around chamber, its stratigraphical contexts gives a TPQ date for this stone packing surrounding the chamber, and probably a TAQ date for the gravel layer on the site.

**Comment:** The sample gives a TPQ for the stone packing around chamber.

**Ua 10737**

Sample ID C159/ID60256      X 1.48 Y -0.40 Z 54.85

Charcoal sample (*Corylus avellana*) was located just outside chamber stone D in NW quadrant. The location of the sample is not shown in plan or section, but from coordinates and Z value it seems to have been located on original ground level, or in the 'light brown sterile gravel' layer brought in to create a level foundation for the site (Burenhult 1995, 9). Exact stratigraphical location is not stated. It is located only 0.13m north of Ua10736, but at a level 0.27m below that sample. As it is located below the stone packing around chamber, its stratigraphical context gives a TPQ date for this packing surrounding the chamber and probably a TAQ date for the gravel layer on the site.

**Comment:** The sample gives a TPQ for the stone packing around chamber.

It is likely that all five dates from Carrowmore 56 derive from charcoal deposited on the light brown sterile gravel layer that, according to the excavator, had been brought in to create a level foundation for the site. Since the available record for samples Ua 10735, Ua 10736 and Ua 10737 do not, however, state the exact stratigraphical location of the samples, this cannot be stated with 100 per cent confidence for these samples. Since the orthostats of the chamber had been 'placed in this gravel layer, rather than dug down into the sterile ground' (Burenhult 1994, 1995), this indicates that the chamber had been constructed when this gravel layer was in place.

All dated samples seem to, on a slightly varied scale of probability, give TAQ's for the constructed gravel layer underneath the chamber, and TPQ's for the chamber and its surrounding stone packing.

It is further likely that the dated charcoal reflect activity closely linked to the early phase of the monument (before the stone packing was brought in), and that the construction and use of the chamber formed part of, or possibly post-date, this phase of the monument.

SUMMARY: The five dates from Carrowmore 56 gives a rather coherent chronological picture, and indicates that the central chamber and its surrounding stone packing was built at some time during the period 3630-2890 BC, or shortly thereafter.

## CONCLUSIONS

Based on a critical analysis of the stratigraphical information from submitted excavation reports, only the following can be concluded regarding the chronology of *the construction* of the Carrowmore monuments from which dates were returned in the 1978-98 excavations.

- We can say nothing with any certainty about the age of Carrowmore 1
- Very little can be said about the age of Carrowmore 55A beyond that it was used at some date after 4040 – 3520 BC.
- Carrowmore 3 was probably built at some point after the interval 3970–3520 BC, while depositional activity at the monument seem to have continued at least until the period 2840–2280 BC.
- The chamber at Carrowmore 7 seems to have been built sometime after 4330-3940 BC.
- The chamber and the surrounding stone packing at Carrowmore 27 were built at some stage after 3940-3530 BC.
- The chamber and surrounding stone packing at Carrowmore 56 were probably built at some stage during or shortly after the period 3630-2890 BC.
- The large central chamber at Carrowmore 51 was probably built in the period 3750-3530 BC, while its large surrounding cairn, totally enclosing the chamber, was added some time after this date.

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