

**NEW DATES FROM POTTERY MOUND**

By

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## Introduction

This paper presents three radiocarbon AMS dates obtained from Pottery Mound (LA 416). The dates provide, for the first time, adequate chronometric information on the later part of the site's occupation. As such, they are an important addition to the few dates previously available from this site.

The samples used for AMS dating were obtained from a meticulously excavated, 3 m deep stratigraphic test in the site's north midden, completed under Linda Cordell's direction in 1979 (Cordell 1980; Cordell et al. 2008). While Frank Hibben's students excavated at least two stratigraphic tests at Pottery Mound in the 1950s, those collections apparently no longer exist, so Cordell's collections constitute the only available stratigraphic sample from the site.

The samples were analyzed by Beta Analytic, Inc. Funding for the AMS dating was provided by the Maxwell Museum of Anthropology, University of New Mexico and the New Mexico Archeological Council. Lisa Huckell, ethnobotanist, examined the maize cobs before the samples were sent away.

## Background

Pottery Mound is prehistoric pueblo on the bank of the Rio Puerco west of Los Lunas, Valencia County, New Mexico. The site was occupied during the Pueblo IV (Classic) period and while it was far from the largest of the villages of its time, it probably had a population of several hundred. The site is best known for the number and variety of its kiva murals (Hibben 1975, 1987; P. Schaafsma 2007). Here, the focus will be on the dating of the site.

Compared to some other sites in the Rio Grande district, Pottery Mound is poorly dated. The biggest problem has been the lack of wood samples suitable for tree-ring dating, due to the species used for roof beams. In contrast, LA 5, a large Pueblo IV village just west of Santa Fe, yielded about 100 tree-ring dates, many of which were cutting dates (Franklin and Snow 2007). Thus far Pottery Mound has yielded only four tree-ring dates, none of them outer ring dates. The four samples were dated by Florence Hawley Ellis and published by Hibben (1975:10), Eckert (2003:37), and most recently by P. Schaafsma (2007:2). They are:

1381v, pinyon from trash  
1411v and 1427v, pine from Kiva 6  
1418v, pinyon from Kiva 10

The location of these samples is unknown, so they cannot be re-checked. In addition, an archaeomagnetic date of A.D. 1400  $\pm$  33 was reported by Hibben (1987:4; cited in P. Schaafsma 2007:2), but cannot be verified.

To make up for the lack of absolute dates, archaeologists interested in the site have relied on ceramic cross-dating. Compendiums of relevant pottery type descriptions and dates include those by the Eighth Southwestern Ceramic Seminar (1966), by Oppelt (2002), and by Wilson (2005).

These studies build on the sequences of bowl rim forms defined by Kidder and Shepard (1936) and modified by Mera (1933, 1935, 1940). At Pottery Mound, ceramic cross-dating is assisted by the abundance of Hopi, Zuni, and Acoma ceramics, along with smaller amounts of Biscuitware and the occasional glazeware from the northern part of the Rio Grande district. More details on these various imports are available in Eckert (2003, 2007), Franklin (2007), and P. Schaafsma (2007).

### **Previous Dating Estimates**

The individual who led most of the work at Pottery Mound, Frank Hibben, based his dates for the site on the tree-ring samples just mentioned and on pottery. Based on the styles of pottery found at Pottery Mound, and the dates assigned to such types elsewhere, Hibben believed that the site lasted from ca. 1300 to 1475 (Glaze I period) (Hibben 1975:10).

Studies by graduate students at the University of New Mexico contributed to a growing understanding of the site's ceramic assemblage (Brody 1964; Voll 1961). While Brody's study focused on design styles and decorative influences, Voll's work was the first detailed look at ceramic typology and dating at the site. Noting the presence of known types and rim forms, Voll described a stratigraphic sample (apparently later discarded by Hibben) and estimated the site's time span as from roughly 1325 to between 1450 and 1490 (Voll 1961:53).

Studies of the site's ceramics and dating then languished for many years, as the emphasis shifted to the kiva murals and their iconography. It was not until Eckert's (2003) dissertation research that work on the ceramics resumed. Although Eckert was interested mainly in ceramic diversity and its sociocultural implications, she also developed a temporal framework based on median ceramic dates. Her Phase 2 mean date of 1387 and Phase 3 mean date of 1417 became the cornerstones of her chronology (Eckert 2003:52).

In the recent volume of collected papers on Pottery Mound, Polly Schaafsma (2007:2) summarizes the dating evidence and concludes, "It is generally conceded that Pottery Mound was occupied roughly between ca. A.D. 1370 and 1450–1475." In the same volume, Curtis Schaafsma reviews earlier ceramic collections and concludes that Pottery Mound is essentially a Glaze A site. His estimate for site dating is 1370 to 1450 (C. Schaafsma 2007:293).

David Snow (2007), on the other hand, argues that there may have been a relict population at the village in early historic times, and that the site may have been mentioned in Spanish chronicles.

My own interest in the site began in 2004. After analyzing more than 38,000 sherds from the 1979 test unit, I concluded that the site dates, more or less, from 1325–1350 to 1500 (Franklin 2007). The basis for this proposed span can be summarized below.

#### *Glazeware Types in the 1979 Stratigraphic Sample*

The Rio Grande glazeware types form a known continuum based on changes in slips, paint styles, and rim shapes (Eighth Ceramic Seminar 1966; Kidder and Shepard 1936; Mera 1933,

1935, 1940). At Pottery Mound, small amounts of Los Padillas and Arenal Glaze Polychrome, as well as early Acoma-Zuni imports, hint that the site was founded by 1350. Once established, Pottery Mound yields large amounts of Glaze A (Agua Fria Glaze-on-red, Cieneguilla Glaze-on-yellow, and San Clemente Glaze Polychrome), very little Glaze B (Largo Glaze-on-red and Glaze-on-yellow), and some Glaze C (Espinoso Glaze Polychrome). Together, these types suggest a site occupation between A.D. 1325 to 1475, based on known dates.

Additional evidence comes from the rim forms on the local bowls. Examination of the Agua Fria Glaze-on-red, Cieneguilla Glaze-on-yellow, and San Clemente and Pottery Mound Glaze Polychrome revealed that rim forms changed within the types over time. All four of these dominant types yield mostly A rims, a few B rims, and substantial number of C rims. When the 2,420 bowl rims from these four types are combined, 82.1 percent are A rims, 3.3 percent are B rims, and 14.6 percent are C rims. A breakdown of these rims by type shows that the percentage of C rims increases dramatically from Agua Fria Glaze-on-red to Pottery Mound Glaze Polychrome (Table 1 and Figure 1). By the time of Pottery Mound Polychrome, 40 percent of the rims from that type are C rims. In other words, the rims of locally produced bowls show a progression toward C rims as glaze-on-red designs evolved into polychrome designs.

A few sherds with D rims (San Lazaro Glaze Polychrome) were found in the uppermost levels of the 1979 test trench. Since then, almost 50 more Glaze D rim sherds and several Glaze E rim sherds have been found on the surface of Pottery Mound. Glaze D begins at ca. 1490 (Eighth Southwestern Ceramic Seminar 1966), and lasted until roughly 1525. The late rim forms indicate that at least a few people remained at the site until close to A.D. 1500.

#### *Imported Ceramics in the 1979 Stratigraphic Sample*

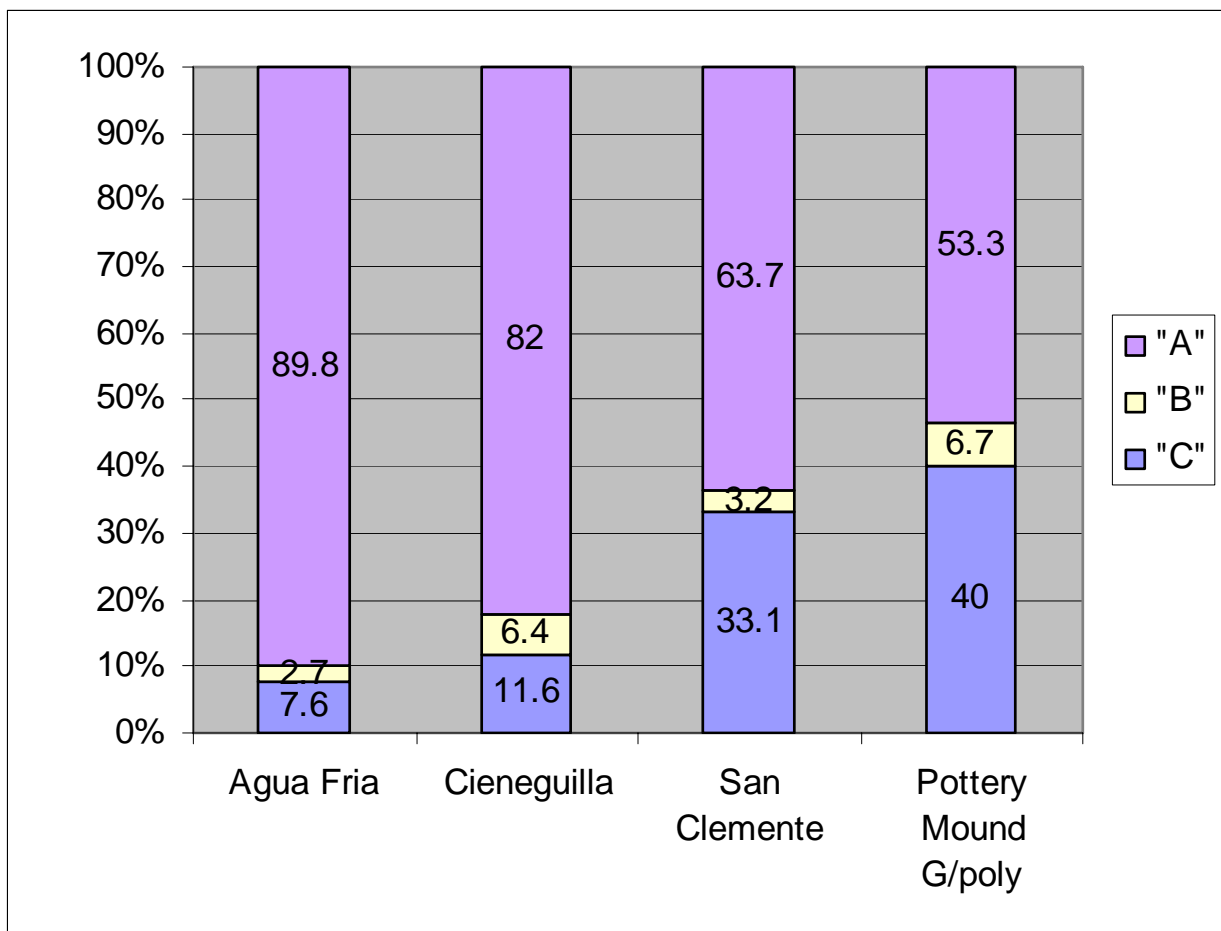
Besides looking at local glazewares, we can estimate the age of the site by examining dated intrusive types. These include two Hopi area types, Jeddito Black-on-yellow (1350–1450) and Sikyatki Glaze Polychrome (1400–1625); two types from the Acoma-Zuni region, Kwakina Glaze Polychrome (1275–1425), Pinnawa Glaze-on-white (1375–1450), and Kechipawan Glaze Polychrome (1375–1475), and three types from the northern Rio Grande area, Biscuit A (1375–1450) and Biscuit B (1425–1550). The end dates of some of these types are also consistent with an occupation lasting as late as roughly 1500.

#### *Stratigraphic Trends in the 1979 Sample*

The impressions provided by the sample from the 1979 test are corroborated by the stratigraphic trends within that sample. Specifically, we may look at the progression of decorative types and rim forms through the 17 levels of the 1979 test (Franklin 2007:57). The changes in popularity of types and rims are consistent with prior studies of the Rio Grande glazeware sequence, but also indicate temporal overlaps in many of the local types. It is now clear that the forcing of decorative styles (such as Agua Fria Glaze-on-red) into neat categories based on rim forms (such as the A form) can no longer be justified—at least in this part of the Rio Grande glazeware production area. Instead, cross-cutting of decorative styles and rim forms is apparent.

**Table 1. Pottery Types by Rim Shapes.**  
(from Franklin 2007, Table 8)

| Rim Shape | Agua Fria<br>Glaze-on-red |       | Cieneguilla<br>Glaze-on-yellow |       | San Clemente<br>Glaze Poly. |       | Pottery Mound<br>Glaze Poly. |       | Total |       |
|-----------|---------------------------|-------|--------------------------------|-------|-----------------------------|-------|------------------------------|-------|-------|-------|
|           | n                         | %     | n                              | %     | n                           | %     | n                            | %     | n     | %     |
| C         | 120                       | 7.6   | 27                             | 11.6  | 176                         | 33.1  | 30                           | 40    | 353   | 14.6  |
| B         | 42                        | 2.7   | 15                             | 6.4   | 17                          | 3.2   | 5                            | 6.7   | 79    | 3.3   |
| A         | 1418                      | 89.8  | 191                            | 82    | 339                         | 63.7  | 40                           | 53.3  | 1988  | 82.1  |
| Total     | 1580                      | 100.0 | 233                            | 100.0 | 532                         | 100.0 | 75                           | 100.0 | 2420  | 100.0 |



**Figure 1.** Rim percentages by rim shape.

The synchronous production and use of multiple types is noteworthy, and indicates an internal diversity of production that has social-functional implications (Eckert 2007). Nor was Agua Fria Glaze-on-red with A rims ever completely replaced by types with B and C rims. Instead, the B and C types and rims were added to (and augmented) the ceramic complex through time. This is, apparently, a common phenomenon at many other glazeware sites in the middle Rio Grande area. Nevertheless, the few Glaze B rims, more common Glaze C rims, and occasional D rims appeared in their correct order, based on the numerical data from the stratigraphic test.(Franklin 2007:57). Finally, there was no discernible break in ceramic production and consumption over the life of the midden.

### **The New Dates**

When the decision was made to seek additional dates from Pottery Mound, the obvious course of action was to obtain AMS dates on maize cobs from the 1979 stratigraphic test. Maize cobs, being grown and harvested in a single year, avoid problems associated with tree wood, such as discrepancies between the age of the wood cells' growth and the date of human use. Fortunately, the 1979 excavators, supervised by Kit Sargeant, recovered many charred cobs during the fieldwork, providing a very adequate sample. In addition, the 1979 cobs represented the best-controlled sample of datable material from the site.

The selection of specific samples was based on the assumption that the most pressing chronological issue at Pottery Mound, at least for the moment, is knowing how late the site was occupied. The dates already available shed no light on this issue. As a consequence, the first samples for AMS dating were selected from Levels 2, 3, and 4. Level 1 was bypassed because surface and near-surface disturbance of the site might have affected the sample (including by the introduction of cob fragments from other, earlier parts of the site). The selected levels appeared to be intact and were late in the sequence of 17 excavated levels (Cordell et al. 2008; Franklin 2007).

After being examined by Lisa Huckell, the three cob fragments were submitted to Beta Analytic. Table 2 summarizes these results in stratigraphic order; the data sheets are included in the Appendix. The samples were also evaluated using the CALIB 5.0.1 computer program (Stuiver and Reimer (2005), with assistance from David Phillips. The date ranges calculated by that program were not identical, but quite close, to those reported by Beta Analytic.

Table 2 reveals a fairly tight clustering of the dates. There is extensive overlap in both their two sigma (95 percent interval) and 1 sigma (67 percent confidence interval) ranges.

Calculation of the midpoints, based on the two-sigma intervals, yield dates of 1450, 1460 and 1475, all clustered within the same 25 year period. In other words, the dates are internally consistent. The midpoints did not fall in exact order by level: the samples from Levels 2 and 3 are in the expected date order but the one from Level 4 is slightly later. This is unsurprising, given the associated sigma values.

**Table 2. AMS Dates from Beta Analytic.**

| <b>Level (from top of unit)</b> | <b>Maxwell Number</b> | <b>Beta Number</b> | <b>2 Sigma Range</b> | <b>1 Sigma Range</b> | <b>Midpoint of 2 Sigma Range</b> | <b>Conventional Date</b> |
|---------------------------------|-----------------------|--------------------|----------------------|----------------------|----------------------------------|--------------------------|
| level 2                         | 416-18-1              | 242555             | 1420–1500            | 1440–1460            | 1460                             | 1520 ± 40                |
| level 3                         | 416-20-3              | 242557             | 1420–1480            | 1430–1450            | 1450                             | 1500 ± 40                |
| level 4                         | 416-04-2              | 242556             | 1430–1520            | 1440–1470            | 1475                             | 1530 ± 40                |

Interpretation of the results depends on the degree of confidence desired. The 2 sigma ranges for the three samples fall between 1420 and 1520, that is, we can be 95 percent certain that Levels 2–4 of the tested deposits date to that time range. Ceramically, this time range extends from the end of Glaze A (1425) through Glaze B and C (1425–1490) and into Glaze D (post-1490).

A 1 sigma range is “tighter” but the probability of the date’s being correct falls to 67 percent. Taking that risk, we can see that the date range reaches as late as 1470—late Glaze C. In sum, the new dates are consistent with each other, and together are consistent with continued occupation of the site well into the fifteenth century.

**Direct Ceramic Associations**

As was known before the dates were run, the pottery in Levels 2, 3, and 4 are from the late end of the occupation. of Pottery Mound (Franklin 2007:Table 5). Pottery Mound and San Clemente Glaze Polychrome are abundant, albeit Agua Fria Glaze-on-red continued in use. Bowls increasingly display Glaze C rim forms. Some figures may be extracted from the original study to show the relative lateness of the associated ceramics. Several key types, both local and imported, were recovered from the newly dated levels (Table 3). The agreement between the two sets of dates—radiocarbon and ceramic—reinforces the pattern drawn from each alone.

**Discussion**

Three new radiocarbon assays allow more precise dating of the end of the occupation at Pottery Mound. The samples are from a carefully excavated stratigraphic test of a long-lived midden. They are consistent with each other and with the results of ceramic cross-dating.

In addition to clarifying the dating of Pottery Mound, these new results will also date ceramic production in the southern Rio Grande area as a whole. For such work, independent dates are in short supply.



**Table 3. Key Late Types found in Levels 1–4 of the 1979 Test.**

|                                                     | Number in<br>Levels 1–4 | Number in<br>all Levels | Percentage* |
|-----------------------------------------------------|-------------------------|-------------------------|-------------|
| <b>Rio Grande Glazeware Types</b>                   |                         |                         |             |
| Pottery Mound Glaze Poly.                           | 453                     | 697                     | 65          |
| Espinoso Glaze Poly. (intrusive), Glaze C           | 1                       | 1                       | 100         |
| San Lazaro Glaze Poly., Glaze D                     | 3                       | 4                       | 75          |
| Kuaua Glaze Poly.                                   | 12                      | 16                      | 75          |
| Largo series, Glaze B                               | 4                       | 8                       | 50          |
| <b>Types from outside the Rio Grande Glaze Area</b> |                         |                         |             |
| Biscuit A                                           | 9                       | 22                      | 41          |
| Biscuit B                                           | 13                      | 20                      | 65          |
| Red-on-tan                                          | 3                       | 4                       | 75          |
| Sapawe Micaceous                                    | 1                       | 1                       | 100         |
| Sikyatki Polychrome                                 | 7                       | 10                      | 75          |

\*Percentage of sherds in Levels 1–4, measured against the total for the test.

In 2007, based on ceramic analysis alone, I proposed that the last villagers left Pottery Mound about 1500. Given the presence of small amounts of Glaze D pottery in the upper levels of the 1979 test (and elsewhere on the site), there seems little doubt that at least some residents were present after 1490. The Glaze D pottery contains local paste and temper, so was made at Pottery Mound—indicating continuity of occupation. Based on the amount of Glaze D pottery, however, the late occupation consisted of a few families at most, compared to the several hundred people present earlier.

It is possible, though far from proven, that the surviving contingent held on after 1500. Past analysts have rarely identified Glaze D and E sherds in collections from the site. Glaze E is present in Mera’s LA 416 collection (stored at the Laboratory of Anthropology in Santa Fe). The discovery of a fragment of chain mail armor near the site (Ellis 1956) further hints that a few Pueblo Indians lived on (or at least used) the lower Rio Puerco in the 1500s.

The three new radiocarbon dates do not prove the site’s occupation into the 1490s or even the 1500s. They do indicate two things, however. First, the results are consistent enough with the ceramic data that radiocarbon dating of the entire stratigraphic sample (including Level 1) seems worthwhile. Second, the site of Pottery Mound was occupied well into the 1400s. By not contradicting the ceramic dates from the literature, the radiocarbon dates allow us to continue to rely on the ceramic data. We therefore continue to predict that with more independent dates, the end of the site will prove to fall much closer to 1500 than to 1400 or even 1450.

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## **Appendix: Data Sheets From Beta Analytic**

FROM: Darden Hood, Director (mailto:<mailto:dhood@radiocarbon.com>)  
**(This is a copy of the letter being mailed. Invoices/receipts follow only by mail.)**

April 15, 2008

Mr. Hayward H. Franklin  
Maxwell Museum of Anthropology  
1127 Marigold Drive N.E.  
Albuquerque, NM 87122  
USA

RE: Radiocarbon Dating Results For Samples 416-18-1, 416-04-2, 416-20-3

Dear Mr. Franklin:

Enclosed are the radiocarbon dating results for three samples recently sent to us. They each provided plenty of carbon for accurate measurements and all the analyses proceeded normally. The report sheet contains the dating result, method used, material type, applied pretreatment and two-sigma calendar calibration result (where applicable) for each sample.

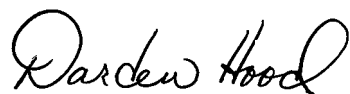
This report has been both mailed and sent electronically, along with a separate publication quality calendar calibration page. This is useful for incorporating directly into your reports. It is also digitally available in Windows metafile (.wmf) format upon request. Calibrations are calculated using the newest (2004) calibration database. References are quoted on the bottom of each calibration page. Multiple probability ranges may appear in some cases, due to short-term variations in the atmospheric  $^{14}\text{C}$  contents at certain time periods. Examining the calibration graphs will help you understand this phenomenon. Calibrations may not be included with all analyses. The upper limit is about 20,000 years, the lower limit is about 250 years and some material types are not suitable for calibration (e.g. water).

We analyzed these samples on a sole priority basis. No students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analyses. We analyzed them with the combined attention of our entire professional staff.

Information pages are enclosed with the mailed copy of this report. They should answer most of questions you may have. If they do not, or if you have specific questions about the analyses, please do not hesitate to contact us. Someone is always available to answer your questions.

Our invoices have been sent separately. Copies are enclosed. Thank you for your prior efforts in arranging payment. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,



Mr. Hayward H. Franklin

Report Date: 4/15/2008

Maxwell Museum of Anthropology

Material Received: 3/14/2008

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| Sample Data                                                                                                                                                                                                                                         | Measured Radiocarbon Age | $^{13}\text{C}/^{12}\text{C}$ Ratio | Conventional Radiocarbon Age(*) |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|---------------------------------|
| Beta - 242555<br>SAMPLE : 416-18-1<br>ANALYSIS : AMS-Standard delivery<br>MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid<br>2 SIGMA CALIBRATION : Cal AD 1420 to 1500 (Cal BP 530 to 440) AND Cal AD 1600 to 1610 (Cal BP 350 to 340) | 220 +/- 40 BP            | -12.1 o/oo                          | 430 +/- 40 BP                   |
| Beta - 242556<br>SAMPLE : 416-04-2<br>ANALYSIS : AMS-Standard delivery<br>MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid<br>2 SIGMA CALIBRATION : Cal AD 1430 to 1520 (Cal BP 520 to 430) AND Cal AD 1590 to 1620 (Cal BP 360 to 330) | 160 +/- 40 BP            | -9.4 o/oo                           | 420 +/- 40 BP                   |
| Beta - 242557<br>SAMPLE : 416-20-3<br>ANALYSIS : AMS-Standard delivery<br>MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid<br>2 SIGMA CALIBRATION : Cal AD 1420 to 1480 (Cal BP 540 to 470)                                             | 210 +/- 40 BP            | -10.3 o/oo                          | 450 +/- 40 BP                   |

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# CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-12.1:lab. mult=1)

Laboratory number: **Beta-242555**

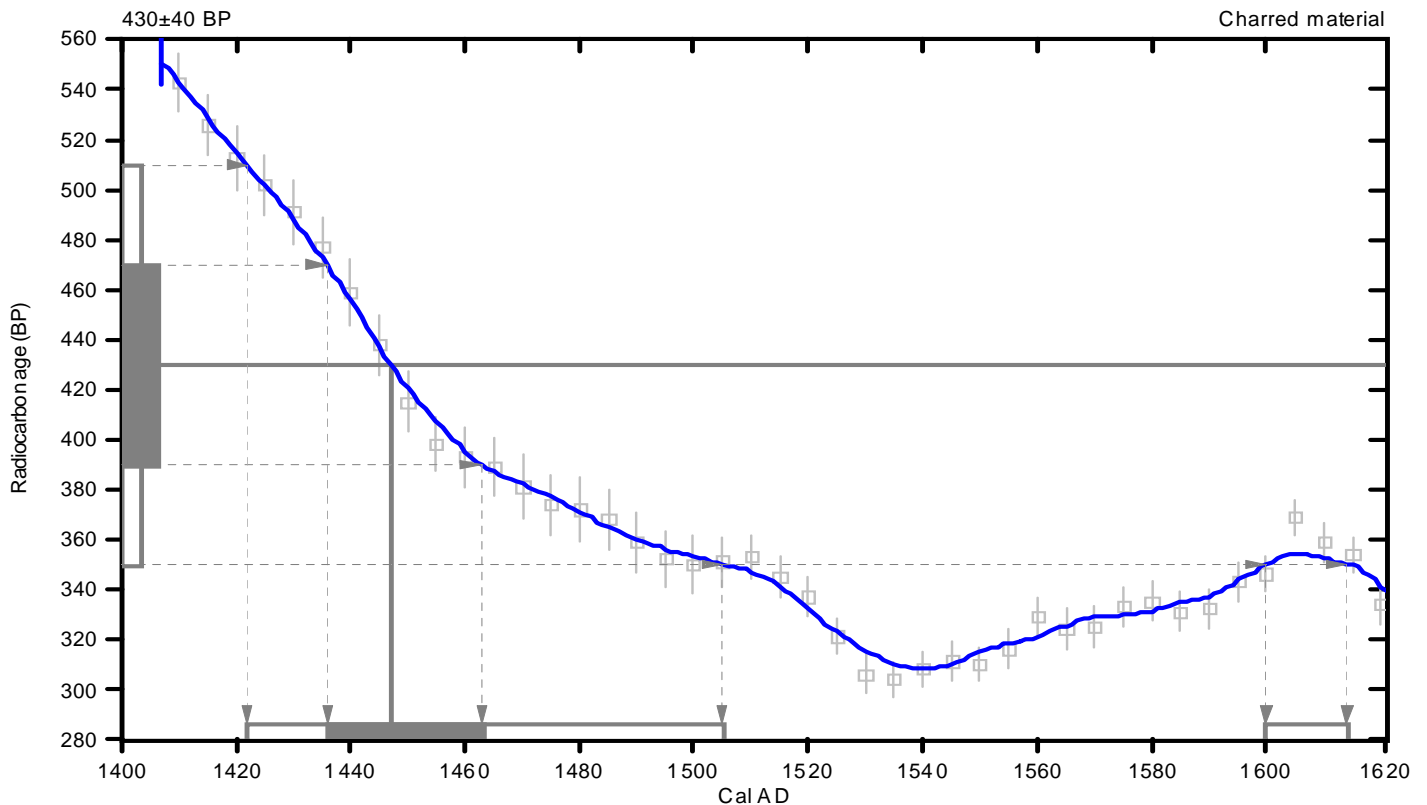
Conventional radiocarbon age: **430±40 BP**

**2 Sigma calibrated results: Cal AD 1420 to 1500 (Cal BP 530 to 440) and  
(95% probability) Cal AD 1600 to 1610 (Cal BP 350 to 340)**

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD 1450 (Cal BP 500)

1 Sigma calibrated result: Cal AD 1440 to 1460 (Cal BP 510 to 490)  
(68% probability)



## References:

### Database used

INTCAL04

### Calibration Database

### INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

### Mathematics

### A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

## Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • E-Mail: beta@radiocarbon.com

# CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-9.4:lab. mult=1)

Laboratory number: **Beta-242556**

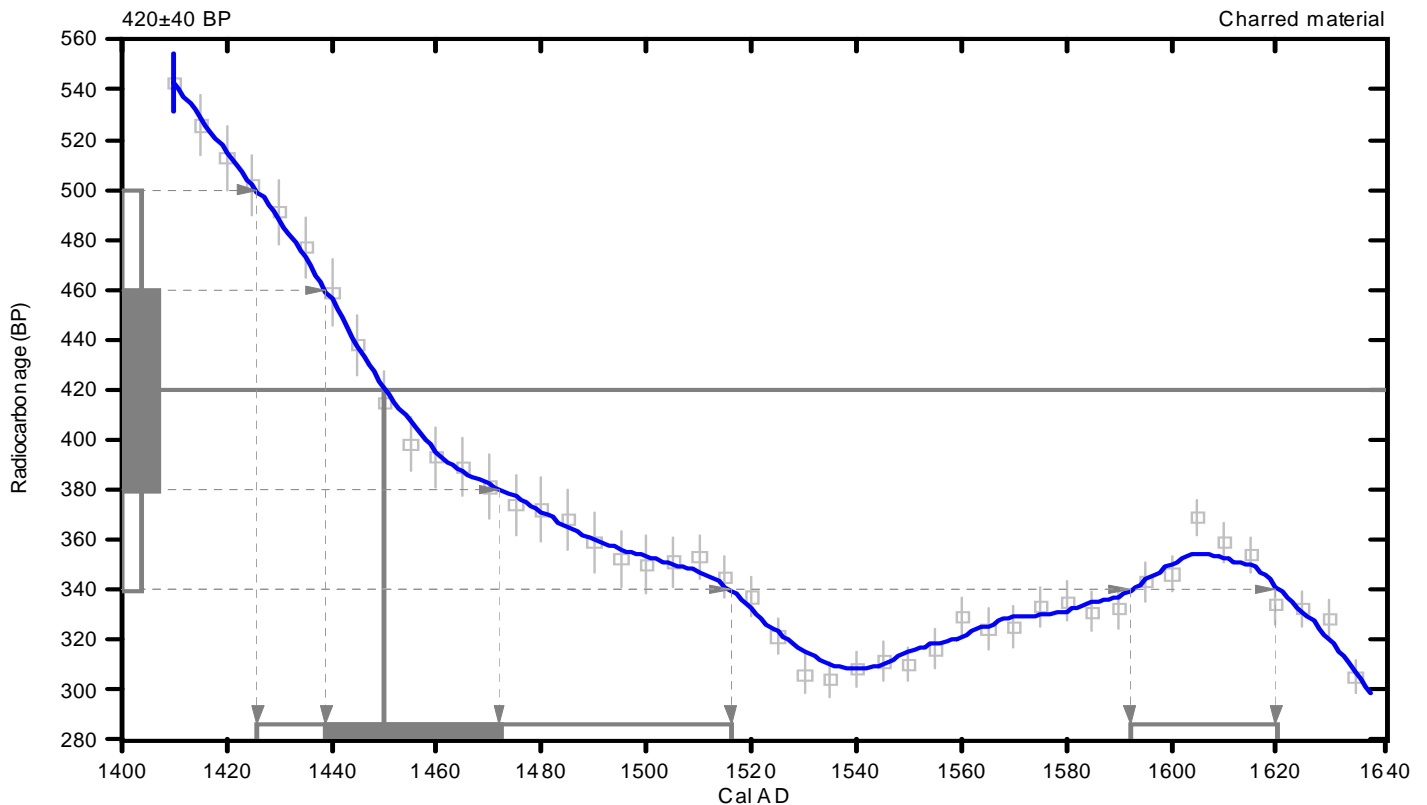
Conventional radiocarbon age: **420±40 BP**

**2 Sigma calibrated results: Cal AD 1430 to 1520 (Cal BP 520 to 430) and  
(95% probability) Cal AD 1590 to 1620 (Cal BP 360 to 330)**

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD 1450 (Cal BP 500)

1 Sigma calibrated result: Cal AD 1440 to 1470 (Cal BP 510 to 480)  
(68% probability)



## References:

### Database used

INTCAL04

### Calibration Database

### INTCAL04 Radiocarbon Age Calibration

IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

### Mathematics

### A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

## Beta Analytic Radiocarbon Dating Laboratory

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# CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-10.3:lab. mult=1)

Laboratory number: **Beta-242557**

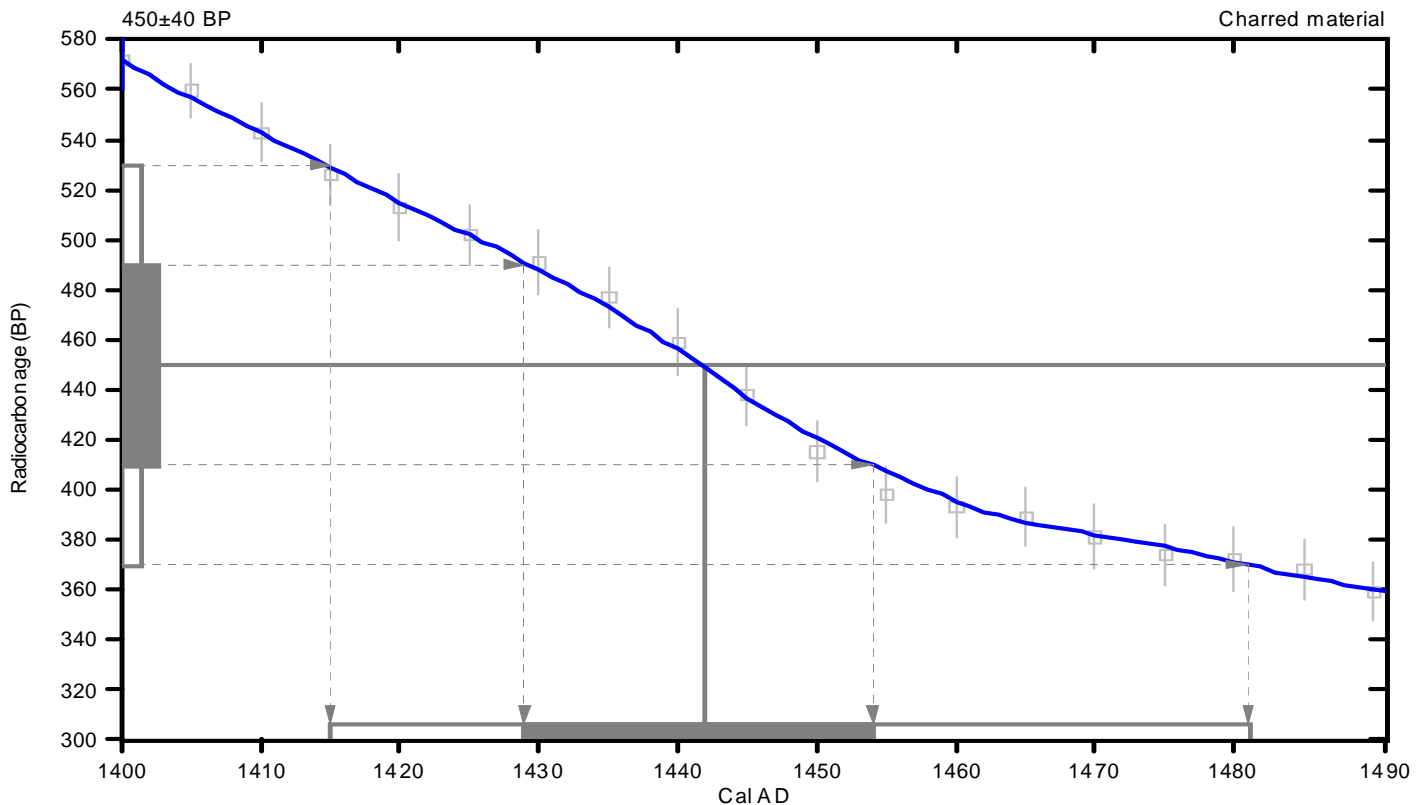
Conventional radiocarbon age: **450±40 BP**

**2 Sigma calibrated result: Cal AD 1420 to 1480 (Cal BP 540 to 470)  
(95% probability)**

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD 1440 (Cal BP 510)

**1 Sigma calibrated result: Cal AD 1430 to 1450 (Cal BP 520 to 500)  
(68% probability)**



## References:

*Database used*

*INTCAL04*

*Calibration Database*

*INTCAL04 Radiocarbon Age Calibration*

*IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).*

*Mathematics*

*A Simplified Approach to Calibrating C14 Dates*

*Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322*

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