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RADIOCARBON DATES FROM THE CATACOMBS OF ST. CALLIXTUS IN ROME

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ABSTRACT. This paper reports the first chronological assessment of the Christian catacombs of Rome by radiocarbon dating. The organic materials dated were found in a set of burial rooms in the so-called Liberian region of the catacombs of St. Callixtus on the Appian Way. ^{14}C dating of small samples by accelerator mass spectrometry (AMS) represents a major advance over traditional archaeological dating methods used in catacomb archaeology; however, AMS ^{14}C dating raises questions about sample reliability and chronological evaluation. We briefly explore these questions.

INTRODUCTION

Current studies on catacomb chronology are in a deadlock. Standard chronologies are usually based on archaeological findings with impressed age (coins and inscriptions), but these chronologies are problematic for various reasons. In an attempt to develop a verifiable chronology, we radiocarbon dated small charcoal fragments scattered in the mortar of one of the Jewish catacombs of Rome (Rutgers et al. 2002). In this paper, we focus on the Christian catacombs of Rome, specifically on the so-called Liberian region in the catacomb of St. Callixtus on the Appian Way.

The catacomb complex of St. Callixtus is one of the largest early Christian catacombs of Rome. It is regarded as the Christian catacomb par excellence. It was here that the first Christian communal underground cemetery originated in the early 3rd century AD, under deacon Callixtus (later to become pope, AD 217–222), and it was here, too, that many 3rd-century popes found their final resting place (Crypt of the Popes) (de Rossi 1864–1867; Baruffa 1991). The Liberian region is one of the more monumental areas of the Callixtus catacomb, consisting of a large number of rather big *cubicula* (burial rooms). It is believed to have originated in the second half of the 4th century AD. This date is based on inscriptions, 90% of which, however, are not located in situ (and therefore not chronologically indicative). The area's current name refers to Pope Liberius (AD 352–366), but this is a modern attribution. There are no ancient sources documenting an intervention by this pope in this area of the catacomb.

DESCRIPTION OF THE REGION AND THE METHOD

Near one of the main galleries in the Liberian region in Callixtus, there is a set of 2 interconnected burial rooms (rooms P and P') (Figure 1). The rooms contain a variety of materials that can be used for ^{14}C dating. The burial rooms are also important because in the second room (P), 2 fragmentary engraved inscriptions have survived that carry "consular" dates. Both of these inscriptions refer to Roman officials known to be in office in AD 374 (Ferrua 1964, nr 9566 and 9567). An accompanying XP-monogram (abbreviation for the name of Jesus) embellished with the letters A and Ω (a reference to the New Testament book of Revelation 1:8; 21:6; 22:13) confirms the Christian beliefs of those buried in the tomb.

In addition to several charcoal samples from the whitish stucco wash covering the walls of the burial rooms, we also collected samples of soot originating from the lamps used to light both burial rooms. One soot sample (UtC-13397) from a grayish surface layer on top of the stucco above the hole in Figure 2 was collected to test this type of sample material. The second soot sample (UtC-13406) from the inside of a small hole in room P (Figure 1, #7) consisted of identifiable black flakes on the

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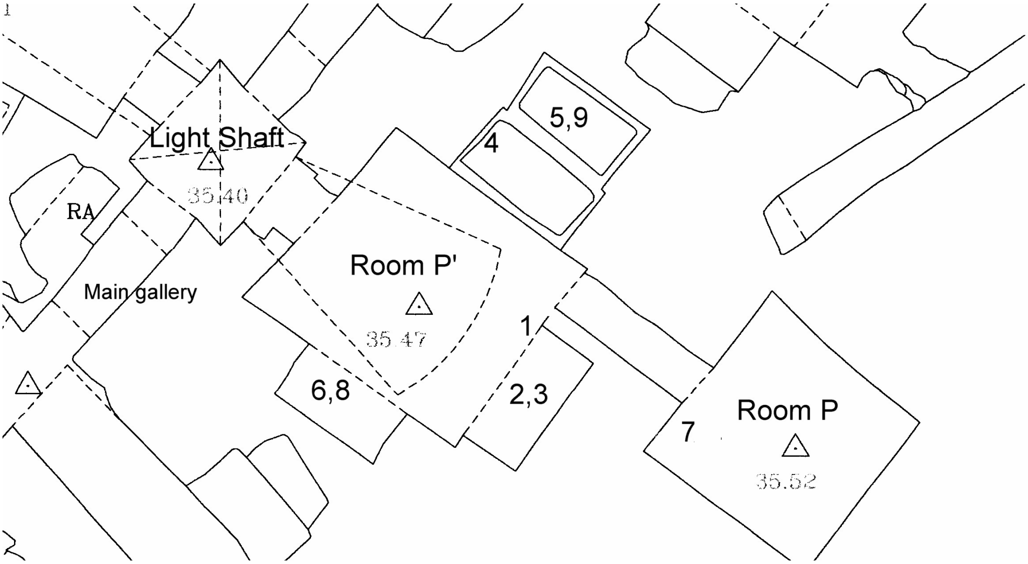

Figure 1 Plan of burial rooms P and P’ in the catacombs of Callixtus, with indication of sample origin

Figure 2 Back wall of burial room P' in the St. Callixtus catacombs, with indication of origin of sample 1A1P'wd.

ceiling of the hole just above the position of the lamp. We also collected a human bone sample from one of the graves in the first burial room, as well as 2 stucco samples from an *arcosolium* (arched grave) in room P’. The ^{14}C analysis was performed at the Accelerator Mass Spectrometry (AMS) facility of Utrecht University. Absolute ages were obtained for 2-σ ranges using Calib v 5.0 (http://calib.qub.ac.uk/calib/). The charcoal samples were pretreated by acid-alkali-acid, and collagen was prepared from the bone samples. The soot samples UtC-13406 and -13397 were carefully separated from bulk stucco and treated with 4% HCl to remove remaining carbonate. The fine white carbonate of the stucco fragments (samples 5A1P'wc and 9A1P'wc) was collected after removal of the surface layer. After HCl treatment and combustion of the samples, the evolved CO_2 was reduced to graphite and pressed into targets for AMS analysis.

RESULTS AND DISCUSSION

Table 1 lists the results of ^{14}C dating for the 9 samples, while Figure 3 compares the corresponding calendar age ranges. Eight out of 9 ages range from 1908 to 1664 BP, thus bracketing the calibrated time span of AD 25–528. The age of 3890 ± 90 BP, corresponding to 2618–2043 cal BC for sample UtC-13397, is obviously too old for the archaeological context in which it was found. Presumably, this aberrant age is due to an unidentified sample of only 0.06 mg, which could be an artifact.

Table 1 Data from cubicula P and P' in the catacombs of St. Callixtus.

Sample name	Analyzed fraction	Mass (mg C)	Lab code (UtC-)	δ^{13}C (‰)	Age ^{14}C (yr BP)	2-σ calendar age (yr)
1. A1P'wd	Soot	0.060	13397	–35.4	3890 ± 90	cal BC 2618–2611 2596–2594 2582–2129 2082–2043
2. A1P'wa	Charcoal	1.640	13398	–23.0	1908 ± 33	cal AD 25–43 47–180 189–214
3. A1P'wa	Charcoal	2.270	13399	–26.8	1664 ± 35	cal AD 258–301 319–440 450–466 484–487 503–507 518–528
4. A1P	Collagen	2.270	13400	–17.6	1729 ± 41	cal AD 225–417
5. A1P'wc	Carbonate	1.670	13401	–12.8	1842 ± 33	cal AD 81–244 314–315
6. A1P'wb	Charcoal	0.860	13405	–22.3	1892 ± 24	cal AD 34–36 62–181 188–215
7. A1Pwa	Soot	0.380	13406	–26.1	1771 ± 27	cal AD 135–160 169–197 210–343 373–377
8. A1P'wb	Charcoal	2.250	13407	–25.2	1804 ± 25	cal AD 132–258 283–288 300–320

Prior to discussing these results in detail, we need to establish the chronological value of the 2 inscriptions dating to AD 374. These have been preserved in situ in the second of the 2 burial rooms. It is important to stress that these inscriptions do not date the burial rooms in their entirety but only the *loculus* (recessed grave) on which they have been etched. The 2 burial rooms and the little gallery that connects them contain a total of at least 70 graves, and possibly even more (the rooms have not been excavated down to the original floor level). If we assume that these rooms were used for

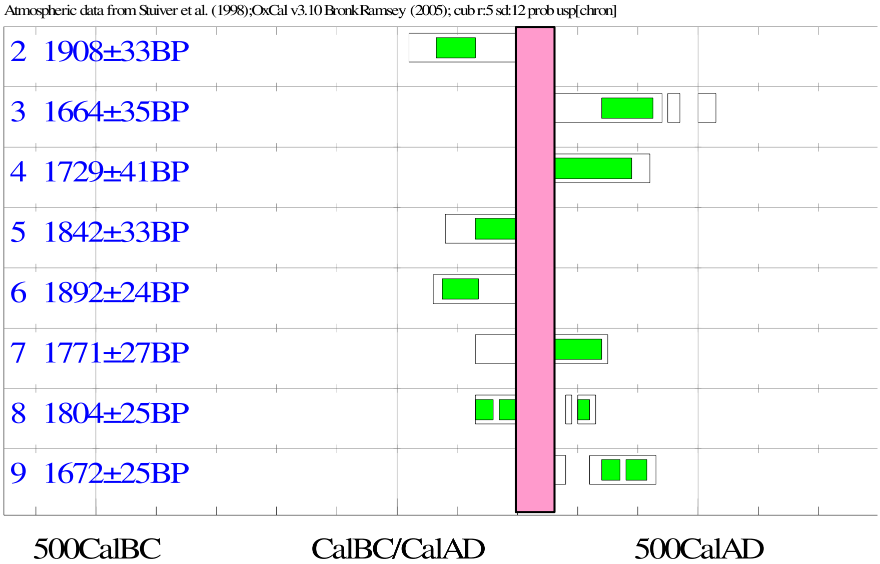

Figure 3 Graphical presentation of data in Table 1

burial by a nuclear family, and taking into account average family size (4.3), average life expectancy (e (0) 25), and average age at marriage (15–20) (Rutgers, forthcoming), it follows that it took at least 100 yr for these 2 burial rooms to fill up. Since the inscriptions are located in the back of the second burial room and thus relate to the latest chronological phase in the construction of this underground burial complex, it is likely that burial in the first burial room may have started around AD 274 or perhaps slightly earlier. All of this, of course, is based on the further assumption that the dated inscriptions represent primary burials (as opposed to secondary usage).

While it may be expected that the ^{14}C dates would fit roughly into the chronological framework provided by the archaeological evidence, the dates also help, in turn, to strengthen the chronological evidence provided by the dated inscriptions. Of particular interest here is 1 of the 2 soot samples, UtC-13406 (Figure 3, #7); the soot of this sample was preserved on the wall in the second burial room (P) inside a little niche in which a lamp was placed to light this burial room. The age of this sample corresponds to cal AD 135–377. This seems to confirm that the dated inscriptions—which were found in the same room—represent the latest phase in the construction history of this burial complex; from the late AD 370s onwards, the light literally went out in this part of the catacomb.

A similar date also resulted from another sample, UtC-13400 (Figure 3, #4), namely collagen from human bone preserved in one of the burial recesses in the first burial room. The age of this sample corresponds to cal AD 81–244, 314–315, which may be about 50 yr older due to aging effects (Geyh 2001). Still, the calibrated age falls quite neatly within the expected chronological range.

In the first of 2 burial rooms, we also retrieved 4 pieces of charcoal, which presumably originate from the firing of the limekiln and are relatively unaffected by "old wood" biases (Rutgers et al. 2002). The charcoal samples divide into 2 groups, one whose calendar ages correspond to what one would expect on archaeological grounds (UtC-13399, -13407: Figure 3, #3 and #8) and another group whose calendar ages tend to be a little too old (UtC-13398, -13405: Figure 3, #2 and #6).

We also dated 2 inorganic samples, UtC-13401 and -13433 (Figure 3, #5 and #9), collected from the white stucco covering of an arcosolium (arched) grave in the burial room. The calibrated age for the latter of these falls entirely within our chronological range. The former also falls within this range, although it tends to gravitate towards the earlier side of this scale. It is not clear why these samples that originate from the same stucco layer in a single arched grave provide us with divergent dates.

Within the framework of catacomb archaeology, these results are highly significant. Traditional dating methods in catacomb archaeology do not generally succeed in providing us with firm chronological data. As a result, it is impossible to date individual underground galleries, let alone to reconstruct the building history of a catacomb in its entirety.

By contrast, the materials analyzed in this paper (charcoal, bone, soot, and carbonate) occur in virtually every underground gallery of the catacombs. By carefully collecting such materials and by making use of ^{14}C dating of small samples by AMS, it becomes possible 1) to produce series of firm chronological data and 2) to produce data that derive from all over the catacomb. From the point of view of catacomb archaeology, this is a major step forwards.

At the same time, it is important to stress that in terms of chronological evaluation, the materials mentioned have their problems—at least potentially (the time span of the wood in the case of charcoal, the aging effects of collagen, and contamination in the case of carbonate). Therefore, it seems advisable to collect a consistent set of different kinds of materials.

To this it should be added that ^{14}C dating differs from traditional dating methods in catacomb archaeology in that it necessarily produces chronological ranges rather than single dates. Even so, in a field where good chronological data are so hard to come by, such ranges are of crucial importance. They provide catacomb archaeologists with something that, thus far, they have never had firm evidence regarding *termini post quem* and *termini ante quem*.

CONCLUSION

^{14}C dating of various materials deriving from a chronologically circumscribed area in the catacombs of St. Callixtus reveals that this is the only method currently capable of providing catacomb archaeologists with verifiable chronological data. AMS dating can be applied to materials deriving from different parts of a given catacomb, allowing archaeologists to determine the chronological ranges within which burial occurred in the catacombs of Rome. Thus, an AMS approach to catacomb archaeology has the advantage of producing chronologies that are no longer based on the accidental survival of coins or inscriptions. Instead, AMS dating produces chronologies that relate to the catacombs in all their chronological and architectural complexity.

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