The Carbon-14 Dating of the Amphipolis Tomb

By Andrew Chugg, 15th August 2015

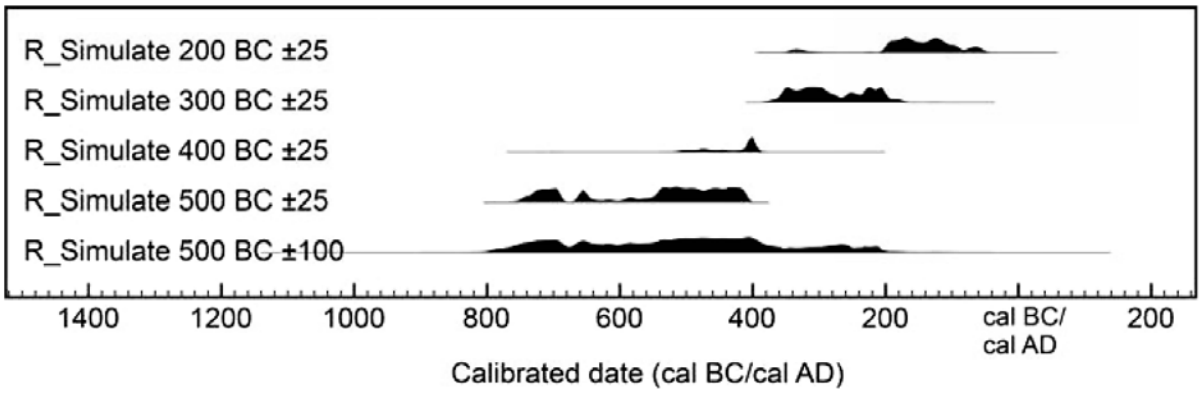
At the end of January this year the Greek Ministry of Culture commissioned various tests on the bones found in the burial chamber of the Amphipolis tomb. These were specified to include carbon-14 (radiocarbon) dating. Additionally, it is understood that carbon-14 dating of organic material found in the sand and gravel fill that was used to seal the tomb in ancient times was arranged.

It is very likely that the archaeological team from the Amphipolis dig has now received the results of this carbon-14 dating and now the head of the team, Katerina Peristeri, appears to have effectively revealed these results in a letter published in a Greek newspaper on 11th August (http://www.avgi.gr/article/5767313/epistoli-tis-katerinas-peristeri). She wrote that she believes the tomb to have been sealed "in the second century BC" and this assertion was very probably informed by the carbon-14 dates. Dates from testing the bones would suggest the period of burials and the dates from tests on organic material in the fill would suggest the sealing date.

It may therefore be inferred that the fill gave no carbon-14 dates later than 100BC and the bones will have yielded carbon-14 dates that were no later than those from the fill. These are very significant results. They immediately rule out previous speculation in some quarters about a Roman date for the tomb itself or for the sealing or for the burials. It is also clear that these results enhance the possibility that at least some of the bones may belong to the original occupants of the tomb and Katerina Peristeri also reasserted her team's dating of the construction of the tomb to the last quarter of the 4th century BC in her recent letter.

However, because of some slight, but significant, variations in the amount of carbon-14 in the Earth's atmosphere between the 4th and 2nd centuries BC, it may be necessary to revise the conclusion that the tomb was sealed in the 2nd century BC, even if that is where the carbon-14 date distributions end. The accompanying chart shows what carbon-14 dating results look like for samples from around 500BC, 400BC, 300BC and 200BC. Each graph shows the probability distribution for the date of the samples that the carbon-14 testing process would yield. Samples from around 300BC give a carbon-14 date distribution ranging from about 380BC forwards to about 170BC. But for samples from around 200BC almost the entire probability distribution falls on the more recent side of 200BC ranging forwards to about 50BC. That is because there was a small, but significant and rapid rise in the carbon-14 concentration in the atmosphere around 200BC, which means that things that died at that time have too much carbon-14 in them for them to appear to be much older than 200BC.

As a consequence of this anomaly in the carbon-14 dating record, virtually any sample that actually died in the 2nd century BC will yield a carbon-14 date distribution that extends well into the 1st century BC. Equally, anything that died anytime from Alexander's death (323BC) right up to the end of the 3rd century BC will yield a carbon-14 date range that extends into the early 2nd century BC. It may be that Katerina Peristeri is suggesting that the Amphipolis tomb was sealed in the 2nd century BC because the carbon-14 date distributions from the bones and the fill all end in the 2nd century BC. But in fact such distributions would imply a sealing before 200BC and the sealing could be as early as the time of Alexander's death. If the sealing did happen in the 2nd century BC, then the carbon-14 date distributions should extend well into the 1st century BC.



Carbon-14 date distributions for samples at one-century intervals between 500BC and 200BC

(Figure courtesy of William Derek Hamilton, Colin Haselgrove & Chris Gosden (2015): The impact of Bayesian chronologies on the British Iron Age, World Archaeology, DOI: 10.1080/00438243.2015.1053976)