FOCUSING ON THE OLD WOOD PROBLEM: A RESPONSE TO HART AND NOLAN

Robert A. Cook and Aaron R. Comstock

Our recent paper demonstrated that radiocarbon assays sampled from wood charcoal were not systematically skewed when compared to non-wood samples from the same site. This suggests that the "old wood" problem may not be quite as problematic in the temperate Middle Ohio Valley as many suspect. In their comment, Hart and Nolan missed our broader point and mischaracterized our findings. Specifically, we did not suggest that our findings apply to the entirety of eastern North America, nor did we make analytical errors. A thorough reading of our paper clearly supports the following rebuttal. Our main point is that scholars should think twice before discarding radiocarbon dates from wood charcoal, for in some contexts they are the most useful means of determining important chronological information. Despite the suggestion to the contrary, "old wood" concerns do form elements of several hygiene protocols, including Nolan's (2012).

Nuestro reciente trabajo demostró que las fechas de radiocarbono realizadas con madera carbonizada no son sistemáticamente sesgadas cuando son comparadas con las muestras sin madera que fueran recolectadas en el mismo sitio. Este resultado indica la posibilidad de que el problema de "madera vieja" no es tan problemático en la zona templada del medio del Valle de Ohio como muchos investigadores sospechan. En su comentario, Hart y Nolan no captaron bien nuestro argumento y malinterpretaron nuestras conclusiones. En concreto, no planteamos que nuestros resultados sean aplicables a la totalidad del este de América del Norte y tampoco cometimos errores en el análisis. Una lectura minuciosa de nuestro artículo apoya claramente la siguiente afirmación: los investigadores deben pensar dos veces antes de desechar las fechas de radiocarbono de madera carbonizada. Esto es debido a que en algunos contextos representa el medio más útil para determinar información cronológica relevante. A pesar de la sugerencia de que la preocupación con la "madera vieja" no forma parte de los protocolos higiénicos para el fechamiento de carbón, nosotros afirmamos que si es parte de algunos, incluyendo el de Nolan (2012).

Radiocarbon dating has come into critical focus in recent years and wood has become deeply questioned as a suitable source material. This was the general problem we addressed in our recent study (Cook and Comstock 2014). We undertook the investigation in response to the general climate of the discipline, based on recent publications and routine conversations with colleagues. We regularly hear fellow researchers refusing to date *any* wood samples if there are alternative materials that are shorter lived. For example, we have often heard that, because of the "old wood" issue, a nutshell fragment from a post-hole is preferred over wood charcoal from the same context. However, carbonized wood in such a feature likely represents the remains of a post, while it is impossible to tell how or when carbonized annuals came to be there. But the reverse has not been considered to our knowledge, that, in fact, many materials decompose slowly (including nut shells) and can also be subject to excessive antiquity. While we would not go so far as to claim we have an "old nut problem," our question and conclusion was that, in certain cases, wood is the most suitable material and that researchers in temperate climates should not disregard wood dates without due consideration.

We undertook a straightforward, first-step project to directly investigate the issue that was partly generated due to Nolan's (2012) dismissal of any of the wood dates from SunWatch and refusal to acknowledge the utility of a program that incorporates consideration of other lines of evidence (Cook 2007). We did not seek in our study to examine in detail the finer points raised by Hart and Nolan regarding sampling of wood itself. Fur-

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thermore, our study's use of all extant dates was intentional, given that information is typically lacking regarding specifics of the wood sample in question, with the result that the majority of the extant dates are cleansed. The main criticisms Hart and Nolan raise focus on what they see as our generalization of findings to the entirety of eastern North America (ENA) and on a few specific interpretive and analytical errors they claim to identify in our findings. As we detail below, this assessment of our study is completely off-base. We simply did not make the interpretive and analytical errors they claim.

Regarding the contention that we extend our findings to all of ENA, this is clearly not the case, given that we state in the discussion that "While our sample cannot be seen as being representative of the entirety of temperate climates, the results should encourage others to examine their regions before excluding dates on wood charcoal" (Cook and Comstock 2014:773). While this point was not acknowledged by Hart and Nolan, they emphasize the same point, that each region should be examined on its own, making it appear as if it was their own insight.

Alleged interpretive errors are focused on the suitability of wood in general, which they claim Nolan (2012) does not dismiss on the exclusive basis of material alone. Again, we never claimed this was the case and present Nolan's criteria (Cook and Comstock 2014: 765). It is the case, however, that Nolan's approach is heavily influenced by the old wood issue (Nolan 2012) and that, on this default basis, he excludes the vast majority of extant dates. So, old wood is one criterion that shapes the hygiene protocol Nolan developed.

Alleged analytical errors are likewise unfounded. Hart and Nolan claim that our findings contradict consideration of all the dates for each site (Cook and Comstock 2014:Table 1). However, we clearly state that we excluded outliers based on a step-wise comparison of dates (Cook and Comstock 2014:766). As to be expected, when they compare *all* dates from the sites, they come to different conclusions. They then were able to determine that we excluded these dates and produced identical results as we did. Therefore, there is simply no error on our part but rather another case of their failure to read the specific analytical methods we employed.

The final issue that Hart and Nolan raise concerns a single sample from the State Line site that is from multiple contexts and, hence, they imply that we should have omitted it. However, we never made a claim that such samples should be omitted outright. We would certainly not, and did not, claim that this is an ideal sample. This critique is not relevant to our study, as the issue we addressed is simply whether wood dates are consistently older than non-wood dates. Clearly we have found that they are not, at least in one small part of ENA, and Hart and Nolan are in agreement with our findings, although they never specifically address this central problem.

In conclusion, we appreciate the opportunity to clarify our position, to ensure that our points are not misconstrued, as Hart and Nolan have done. We maintain that our findings support the position that it is more productive to include any radiocarbon date unless there was a particular lab error or samples came from disturbed contexts. To this end, Cook and colleagues are using Bayesian modeling to examine dates for a single site, which is a statistically robust way to utilize dates in a given assemblage (Krus et al. 2015). In short, radiocarbon dating deserves to be closely scrutinized before omitting dates, as the extant database has been generated with enormous financial cost as well as the destruction of many samples.

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