REVISITING SUN PYRAMID CERAMIC AND RADIOCARBON DATES FROM TEOTIHUACAN: COMMENT ON SLOAD

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Sload (2015) disregards stratigraphic data from the Sun Pyramid and misinterprets our radiocarbon dates that re-evaluates Teotihuacan ceramic chronology.

Sload (2015) ignora datos estratigráficos de la Pirámide del Sol e interpreta de forma errónea nuestros datos de radiocarbono que reevalúala la cronología cerámica de Teotihuacán.

This comment is in response to "When Was the Sun Pyramid Built? Maintaining the Status Quo at Teotihuacan, Mexico" (Sload 2015), which argues that traditional models of Teotihuacan chronology must be maintained despite new radiocarbon dates from primary contexts (Sugiyama et al. 2013). Here we evaluate the dating of two contested features: the Sun Pyramid and the subterranean tunnel located below it.

In our original article (Sugiyama et al. 2013), we discussed two kinds of chronological data: relative dates based on ceramic classifications of 37,746 sherds analyzed at that time and absolute dates of seven radiocarbon samples obtained from primary contexts. Sload (2015:224–225) introduces a "conundrum" posed by these two datasets. The majority (94.7%) of sherds from the pyramid fill are classified as Tzacualli types traditionally dated to AD 1–150 (Rattray 2001:53–57), but the radiocarbon dates indicate that the construction of the pyramid took place later, between AD 170 and 310.

We have already considered this seeming conundrum (Sugiyama et al. 2013:429). First, we note that older ceramics could have been incorporated from distinct fill sources. Our second hypothesis is that "the chronological ranges that can be defined with radiocarbon dating span much longer periods than the ceramic phases themselves. . . . This is the result of the relatively few radiocarbon dates available from secure primary contexts in comparison to the ceramic chronology based on a robust sample" (Sugiyama et al. 2013:429). Sload does not discuss this second possibility.

Here is the bottom line: radiocarbon dating is *absolute* while ceramic chronologies are *relative*. A relative ceramic chronology is anchored to and calibrated by its correspondence with absolute dates. This is why robust Bayesian statistical models utilizing radiocarbon samples from primary contexts are necessary to refine the dating of ceramic phases. We do not question the validity of the ceramic phases themselves, but instead call for a reevaluation of the traditional

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absolute dates to which they are tethered by incorporating new absolute dates from primary contexts.

We present a Bayesian statistical model using primary contexts from the subterranean tunnel (Sugiyama et al. 2013:Figure 14b). We excluded all samples from fill layers added during termination activities because they are notorious for the "old wood" problem, "biasing archaeological chronologies towards excessive antiquity" (Schiffer 1986:19). We argue that ordering the samples based on the radiocarbon results and labeling them arbitrarily as reflecting "creation," "use," and "termination" (Sload 2015:Table 1), without explanation of how this was determined, is problematic. Standard archaeological practice places the context of the sample itself, not the radiocarbon result, as the principal criterion determining whether the sample reflects creation, use, or termination.

Here we highlight only a couple of examples to demonstrate the hazardous and circular consequences of disregarding stratigraphic and contextual data (see Supplemental Table 1). In several cases, samples are classified by Sload differently yet come from similar contexts. Even worse, samples from lower layers are classified as coming from "termination" contexts while more superficial layers are classified as "creation" simply because they have older radiocarbon dates (e.g., Beta 220743, 220744, and 220745). It is telling that the majority of the dates ($n = 11$) are considered to reflect "termination" events, but only four samples, exclusively from fill layers, coincide with "creation" dates. Such conflicting radiocarbon results from fill layers are precisely why such tertiary fill contexts (as opposed to primary or even secondary contexts) should be excluded from consideration.

Sload (2015) recognizes that the dates she associates with "termination" events overlap significantly with the Sun Pyramid dates. She hypothesizes that these "late" dates correspond to a mid-third-century tunneling operation rather than pyramid construction. This hypothetical tunnel scenario is inconsistent with rigorous stratigraphic documentation and context-driven interpretation of the primary radiocarbon dates. The Sun Pyramid radiocarbon samples come from primary contexts up to 110 m inside the pyramid including bones from burials, organic material in offerings, and a hearth placed on top of an intact floor that was burned in situ (Sugiyama et al. 2013:423–425). Despite these secure contexts, it is argued that our "scant" data from Noguera's 1.2 m wide tunnel was too narrow to capture the distinction between a third-century tunnel and the original Sun Pyramid fill (Sload 2015:236).

The Sun Pyramid has been explored extensively for over a century (see summary in Sugiyama et al. 2013). Intrusive tunnels are readily recognized by properly trained archaeologists (e.g., Sugiyama 1998). We described multiple undisturbed pre-Sun Pyramid structures. These were encased in a compact and homogeneous matrix consistent with original fill sampled from 60 pits and three tunnels: an exploration that extended both north–south and east–west. This article does not recognize that excavations would have breached the extent of Noguera's tunnel on multiple occasions.

Yet the conundrum persists despite an attempt to explain it away. The fill of this hypothetical third-century tunnel continues to hold exclusively Tzacualli ceramics. Similarly, despite describing many "termination" walls and floors, Miccaotli and Early Tlamimilolpa sherds have not been found in the subterranean tunnel.

A rigorous evaluation of excavation data is a necessary practice in archaeology. We must recognize and correct confirmation biases, including making data fit a conclusion. The archaeological legacies from a century of Teotihuacan exploration continue to form the building blocks for a refined chronology of the site. Nonetheless, each new dataset can only better contextualize these early finds.

Supplemental Material. Supplemental materials are linked to the online version of the manuscript, accessible via the SAA member login at https://doi.org/10.1017/laq.2017.68.

Supplemental Table 1. List of subterranean tunnel radiocarbon samples presented by Sload (2007, 2015) with the context and inconsistencies in interpretation.

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