Commentary Article

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Paradise Found or Common Sense Lost? Göbekli Tepe's Last Decade as a Pre-Farming Cult Centre

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Abstract: The spectacular finds at Turkey's Göbekli Tepe have fired the imaginations of archaeologists and the general public alike. Reflecting on developments at and about the site since the 2011 publication of a critique of the site's dominant interpretation as a hunter-gatherer cult centre, this article shows that some elements of that critique, including assertions about roofing and a residential population, have gained traction, while others have fallen on deaf ears. Göbekli Tepe has also become the locus of discussion and speculation in disciplines ranging from astronomy and religion to psychology and architectural history, while also inspiring pseudoscientific claims that associate the site with the Garden of Eden, a supposed technologically sophisticated pre-Holocene civilization or extraterrestrial visitors.

Keywords: Neolithic, Turkey, pseudoarchaeology, history of religion, cognitive archaeology

1 Introduction

Over the past two decades, no archaeological site has attracted more international attention than the early Neolithic site of Göbekli Tepe. More than 10 years after the publication of my critique of the prevailing and popular interpretation of the site as a hunter-gatherer pilgrimage centre filled with temples, and almost a decade after the untimely death of its excavation director, Klaus Schmidt, it seems time to review how continuing work at and about the site affects our current understanding. It will come as no surprise that my review of this evidence centres on what I view as the key controversy about this site: whether it was indeed an exceptional cluster of cultic buildings with little or no residential occupation or was an early Neolithic village with extremely large and elaborate houses that were the locus of both domestic and ritual activities (Banning, 2011; Gebel, 2014; Schmidt, 2006). When I published that 2011 article, I hoped to stimulate debate and discussion among the academic community, and I was disappointed that Dr. Schmidt never published a rebuttal before his passing. Aside from the original published reviewers' comments, the only explicit rebuttal has been by Dietrich and Notroff (2015).

In what follows, I consider Schmidt's interpretations and my alternative hypotheses (Banning, 2011) in light of evidence from more recent work at the site. I conclude with a section on the continuing impact of Göbekli Tepe on other fields and on the popular imagination, including as found in pseudoscientific speculations.

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2 Brief Overview and the Schmidt Hypothesis

While it seems unlikely that readers are unfamiliar with Göbekli Tepe, in brief, it is a Pre-Pottery Neolithic (PPN) site on a high ridge northeast of Urfa, Turkey, usually described as having two main Neolithic strata plus one rather enigmatic one. Level II, the stratigraphically upper one, exhibits large numbers of tightly packed, rectilinear buildings. Some of these have limestone-slab pillars less than 2 m in height, and the two pillars in one such building exhibit bas-reliefs of rearing lions. The more renowned Level III that predates it has at least nine and probably many more large, generally oval buildings with large, and sometimes enormous, T-shaped stone pillars that often exhibit carved anthropomorphic details and animal reliefs (Schmidt, 2003, 2005, 2006, 2010). Although the site chronology is still a work in progress (Dietrich, Köksal-Schmidt, Notroff, & Schmidt, 2013; Kinzel & Clare, 2020), Level III is usually attributed to the latter part of Pre-Pottery Neolithic A (PPNA, ca. 10000–8800 cal BC) or early Pre-Pottery Neolithic B (EPPNB, ca. 8800–8000 cal BC), while Level II has been associated with Middle Pre-Pottery Neolithic B (MPPNB, ca. 8000–7500 cal BC). One further Neolithic level in the original Schmidt schema, variously described as Level IIB or Level II/III, has rather flimsy, curvilinear buildings, and Schmidt thought these dated later than Level III but earlier than Level II. However, these received little or no attention in the publications by Schmidt or other Göbekli team members until quite recently, when new insights have begun to appear and the stratigraphy has become more refined.

On the basis of his excavations since 1995, the late Dr. Schmidt interpreted the site as a cultic centre or site of pilgrimage for hunter-gatherers who converged from a large territory at intervals to raise the structures and carry out rituals (Schmidt, 2005, 2006; 2012, pp. 234–242). To support this interpretation, he claimed that there was no residential occupation at the site, that it lacked evidence for farming or ordinary domestic activities, and that the lack of a water source at the site's hilltop location made human habitation impossible there. He also claimed that the Level III structures were unroofed "enclosures," or "open *temenoi* without roofs" (Schmidt, 2001, p. 51), using the rather leading Greek term for the enclosure of a sacred precinct, and that quarrying, carving, movement, and erection of the large Level III pillars would have required the labour of hundreds of workers, only satisfied if large numbers of hunter-gatherers congregated there. Schmidt extended his interpretation of the site to argue more broadly that Göbekli Tepe demonstrates that religion – possibly even priesthoods – preceded sedentism, villages, and agriculture, sometimes referring to a Stone Age *amphictyonia* (Schmidt, 2000; 2005, pp. 14, 15, 19; 2012, p. 238), using the Greek term for a sacred league that designedly evokes Apollo's temple at Delphi. Most importantly, Schmidt used this interpretation to upend the conventional view that organized religion first arose in agricultural societies; Göbekli Tepe became the "instantiation" of Cauvin's "revolution of symbols" and the new mantra became that "the birth of religion" at Göbekli Tepe was a precondition for rather than a result of village life and civilization (Cauvin, 1997; Connelly, 2021).

This provocative hypothesis that focused on "the world's first temple" captured the imaginations of archaeologists, social scientists, and the broader public around the world (e.g., Curry, 2008; Mann, 2011). It also attracted a following of individuals eager to push the hypothesis uncritically in directions that Schmidt did not anticipate, including deeply into the realms of pseudoscience and conspiracy theory.

3 So Fair a House: An Alternative Hypothesis

Briefly, my rebuttal to the Schmidt hypothesis (Banning, 2011) countered specific aspects of Schmidt's framing and presented the alternative that the Level III structures may have been unusually large houses, possibly representing a precocious example of a "House Society" (Lévi-Strauss, 1982). I also argued that it was not appropriate to draw strong distinctions between "sacred" and "profane" in the use of space in the Neolithic (see also Boyd, 2005). Here, I review some of the specific points of difference between Schmidt's and my takes on the site in the light of new evidence or interpretations that may bear on these, with particular focus on publications by members of the Göbekli team.

3.1 Göbekli Stratigraphy and Settlement Pattern

One element of my 2011 critique involved the consensus at the time that all Level III buildings across the site, as far as available exposures could show, were very similar large structures with massive pillars. I noted that, at most other archaeological sites, "special" buildings that could be cult buildings, meeting halls, or some other kind of non-residential structures stood out among "ordinary" houses that were generally smaller and less elaborate (see also Baird, 2011). In other words, the claim that these buildings were temples or "special buildings" would be stronger if there were other kinds of contemporary buildings at the site, and I drew attention to the enigmatic Level II/III buildings, which resemble PPNA houses, as possible candidates for "ordinary" residences (Baird, 2011, p. 642; Banning, 2011, pp. 632, 640, 654; Rosenberg, 2011, p. 649). The possibility that some of the II/III buildings have been truncated either by excavation of pits for the Level III buildings or by construction of a Level II terrace wall (Figure 1) suggests that they may be contemporary with, or predecessors of, their more impressive cousins. Some of the Göbekli team also acknowledged that these structures could be "considerably older" than Level II (Dietrich & Notroff, 2015, p. 87), while more recent deep soundings and new stratigraphic analyses not only indicate that these small structures most likely belong to PPNA, but also suggest that they may be contemporary with some phases of the Level III structures (Clare, 2020; Kinzel & Clare, 2020). However, to date, no stratigraphic evidence has been offered to demonstrate the precise relationships between these simple buildings and their monumental neighbours.

This more recent research has, however, revealed that the stratigraphy of Göbekli Tepe is much more intricate than the simple III/II/I layer model can capture. As at some other early Neolithic sites in the Near East (Banning & Byrd, 1987), its buildings show evidence of numerous renovations and remodelling over long use-lives, and the revised chronology envisages at least eight phases instead of three or four (Kinzel & Clare, 2020). According to this new interpretation, not only might the Level III buildings be contemporary with some of the small Level II/III ones, some of them may even have continued in use after construction of the Level II rectangular ones began.

Continued excavation and remote sensing at the site still suggest that the large Level III buildings are at least somewhat widespread at the site. A long trench excavated westward from the original excavation area and excavations in the northwestern part of the site have increased the number of known large buildings at the site to nine (Dietrich, Dietrich, & Notroff, 2017, p. 16), while "geophysical survey showed that the older,

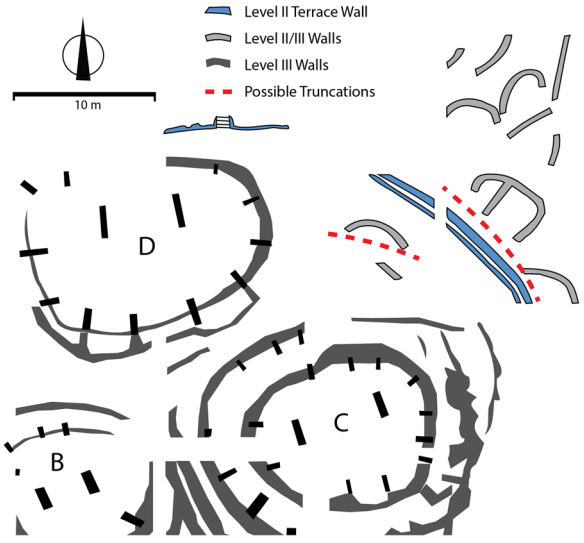

Figure 1: Map of the southern excavations at Göbekli Tepe, showing the three identified stratigraphic phases (after Schmidt, 2006, p. 168). Note the small oval and subrectangular structures northeast of buildings C and D, which appear similar to common PPNA buildings at sites such as Jerf al-Ahmar, and the fact that several of them are truncated where we might expect there to have been ancient excavations either to found the PPNB terrace wall or to build Level III semi-subterranean structures.

round megalithic enclosures were not restricted to a specific part of the mound but existed all over the site, … at least 20 enclosures in total" (Dietrich, Heun, Notroff, Schmidt, & Zarnkow, 2012, p. 675; also Dietrich et al., 2016).

Meanwhile, Level II/III or IIB remained ignored and enigmatic until deep soundings for the footings of a roof structure in 2015 and 2016 provided new evidence (Dietrich et al., 2014). None of the publications until then place any emphasis at all on evidence from those modest buildings with plausible PPNA parallels. However, more recent research acknowledges the presence of "small non-monumental buildings, associated middens and activity areas," including hearths, of PPNA date that suggest the site "had a clear domestic component" (Braun, Clare, Knitter, & Schütt, 2018; also Clare, 2020; Kinzel & Clare, 2020). This evidence pertains to the Level II/III buildings, most now dated to the new Phase 2. This under-investigated aspect of the site still deserves a lot more attention, as it may be key to the interpretation of the site more generally. If the Level II buildings overlapped chronologically with the latest uses of the Level III ones, as some of this research suggests (Dietrich et al., 2019, pp. 6/34–7/34; Kinzel & Clare, 2020), and the Level II/III ones were also partly contemporary with Level III, this would indicate that two distinct building types coexisted at the site. It is also explicitly relevant to our next topic.

3.2 Residential Occupation of the Site

As support for the hypothesis that Göbekli Tepe was a specialized pilgrimage or cultic site, Schmidt (2006; 2010, pp. 240–241; 2012, pp. 10, 93, 217–218) argued that there was no evidence for a permanent residential occupation in either Level III or II, that a lack of water would have made it unsuitable for habitation in any period, and that the Göbekli buildings could not be houses because "we know what the settlements and houses look like from this period" (Schmidt, 2005, p. 14). By contrast, I pointed out that there was abundant material culture that, at any other site, archaeologists would accept as unproblematic evidence of everyday domestic activities, including tons of lithic tools and debitage, butchered animal remains, some charcoal and plant food remains, and grinding stones (Banning, 2011, pp. 633–634). I return to the water issue below. I would also suggest that it was premature to assume that we knew everything about Neolithic domestic architecture in Anatolia and the northern Levant. Considering how much inter-site variability there was in the Neolithic, there is no good reason to assume that houses at Göbekli Tepe should look the same as ones at Çayönü, some 120 km away, for example, while, until recently, we knew relatively little about the Neolithic sites in Göbekli Tepe's more immediate vicinity. In any case, Göbekli's small Level II/III buildings do look very similar to PPNA buildings interpreted as houses in Jerf al-Ahmar, and more broadly similar to ones at Nemrik 9, Qermez Dere, and even basal Çayönü (Kozlowski, 2002; Kozlowski & Kempisti, 1990; Schirmer, 1990; Stordeur, 2015; Watkins, 1990).

Having committed himself to the claim that Göbekli Tepe was not a settlement, Schmidt (2003, p. 7) was at a loss to explain "where the enormous amount of debris had been taken from." It is not very plausible, after all, that hunter-gatherer visitors to the site would have trucked in thousands of cubic meters of fill, presumably on their backs, from some unidentified settlement, unknown kilometres away. Later, Schmidt (2009, pp. 201–202; 2012, p. 218) conceded that there could have been a small resident population, perhaps consisting of religious specialists.

In one of the comments on my article, Goring-Morris and Belfer-Cohen (2011) note that the presence of domestic debris does not rule out the interpretation of the Level III buildings as exclusively cultic as "it would have required lots of lunch bags to feed the laborers and guardians during the building and use of the structures." This would be a lot of lunch bags indeed, given the thousands of cubic metres of such debris at the site. However, this line of reasoning gained some traction for a few years as the idea that the fill was not indigenous to the site became increasingly untenable.

In the years after 2011, however, the persistent trend was to attribute the refuse from domestic activities and consumption to feasting. Dietrich et al. (2012, p. 690) say that "surprisingly large amounts of animal bones" in the site's fills, "clearly the remains of meals," occur in an amount that "exceeds everything known from contemporary settlements, and can be taken as a strong indication of large-scale feasting." The bones also come from a wide diversity of hunted animals (Notroff, Dietrich, Peters, Pzuollath, & Köksal-Schmidt, 2015, p. 41).

Some recent evidence consists of calcium oxalate residues in large stone vats found at the site, indicating the possibility that the vats were used to brew beer (Dietrich et al., 2012, p. 687; 2020). However, no one has picked up on my suggestion (Banning, 2011, p. 633) that the so-called "door-hole stones" and "stone plates," none found in their original locations, might be monumental hearth borders, an ideal focus for feasting (Figure 2). Kurapkat (2015, p. 145) notes that some of these have masses as high as 1,000 kg, making them rather poor choices for roof entries, and Kinzel and Clare (2020) hint that they agree.

In addition, Kinzel and Clare (2020) now question whether any of this is convincing evidence for feasting anyway. While I would not dispute that some feasting (however defined) occurred at the site, it seems perverse to attribute all the domestic debris to feasting in an attempt to evade the simplest, most obvious interpretation: that there were simply large numbers of residents pursuing their daily lives at the site.

Even more perversely, Dietrich et al. (2019) argue that the very high frequency of grinding equipment at Göbekli Tepe demonstrates that it could *not* be a settlement site. Their thoroughly researched article presents a typology and strong evidence for the uses of several thousand grinding stones from the site. Use wear indicates that "cereal processing was the most important task performed" with these tools (Dietrich et al., 2019, p. 18/34; see also Dietrich, 2021), while a small sample from grinding tools and a larger sample of sediments indicate phytoliths from husks and culms of Pooideae, which include wheat and barley. Some Level III tools also show traces of ochre. Remarkably, however, the authors conclude that "the overall quantity of 7,268 analyzed grinding tools from Göbekli Tepe appears to be too high for simple daily use" (Dietrich et al., 2019, p. 25/34). Apparently, we have gone from "no evidence for domestic activities" to "too much evidence for domestic activities" in the desperation to defend the thesis that the site was only a cultic centre.

Even in 2011, not everyone agreed that there was no residential occupation at Göbekli Tepe or was willing to go to such lengths to defend that position (e.g., Özdoğan, 2011).

> Arguments for the domestic use of the site are evident. The abundant animal bones found in the fill of the enclosures cannot be only the remnants of ritual meetings where amounts of roast venison were consumed. Stone mortars and tools attest to food processing, and the lack of fireplaces and ovens in the enclosures can be explained by their location in Nevalı Çori III. There, only house 6 contained two hearths and a "roasting pit," which normally were found outside the houses. (Hauptmann, 2011, p. 644)

One could similarly point to the fact that hearths are absent from most of the buildings usually interpreted as houses at other early Neolithic sites, such as the circular buildings with clay pillars at Nemrik 9 or PPNA houses at Jerf al-Ahmar, where most fire installations occurred outdoors (Kozlowski, 2002, p. 30; Kozlowski & Kempisti, 1990, p. 361; Stordeur, 2015, pp. 198–205).

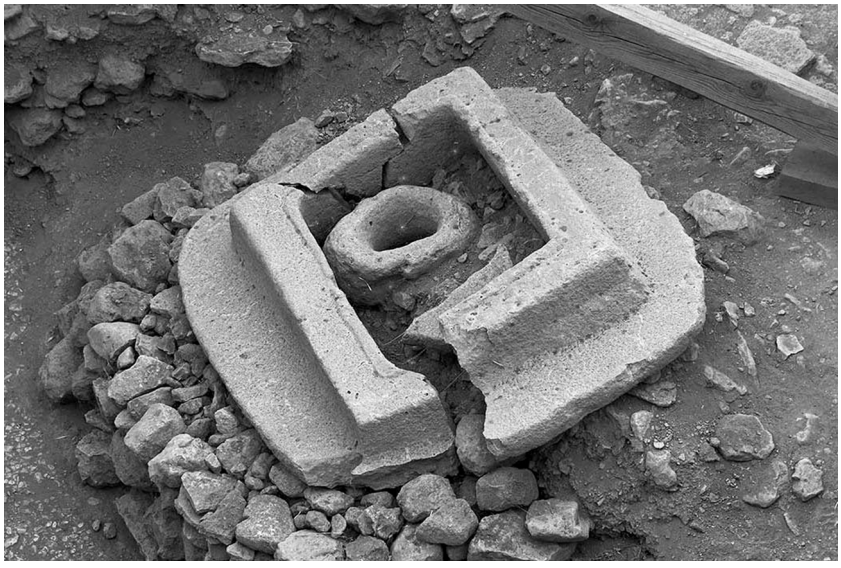

Figure 2: View of a "door-hole stone" placed in the fill of Building B at Göbekli Tepe. Although none of these have so far been found in their use contexts, they could have served as monumental hearths (by Dick Osseman, cropped, CC BY-SA 4.0).

Some years on, there was an acknowledgement of at least some domestic occupation at the site, even by the Göbekli team itself (Braun et al., 2018; Clare, 2020; Clare, Dietrich, Notroff, & Sönmez, 2018, p. 119, Dietrich et al., 2019, p. 6/34; Peters et al., 2020). In fact, recognition that Level II represents a residential occupation is widespread (Baird, 2011, p. 642; Dietrich et al., 2019, p. 6/34; Kinzel & Clare 2020), and evidence for domestic occupation in PPNA and Early PPNB is also now well attested (Clare, 2020; Kinzel & Clare, 2020; Hodder, 2020, p. 50; Peters et al., 2020). As I previously pointed out, admission that residential occupation was possible in any period undermines Schmidt's assertion that its location was uninhabitable (Banning, 2011, p. 236). However, this shift in the site's interpretation has had little impact on the broader narrative that Göbekli Tepe was "the first temple," which both academic and popular authors continue to perpetuate. Even authors who seem receptive to acknowledging at least some residential population in one publication ignore this possibility in others (e.g., Clare et al., 2019).

3.3 Labour Requirements

The sheer scale of some of the Göbekli monoliths had been a central feature of Schmidt's argument. Schmidt (2005, p. 14; 2006, pp. 108–109, 252) drew on selective ethnographic examples and unsupported estimates of pillar mass as "up to ten metric tons" to claim that it would have taken hundreds of people to quarry, move, and erect each of the large T-pillars. While I took pains not to trivialize the amount of effort required in my 2011 article, I used standard engineering criteria and conservative measures of pillar mass, rather than just "guesstimates," to calculate how much effort it would take to move pillars horizontally across the ground, without rollers. These indicated that less than 20 adults could move all but the largest pillar (Banning, 2011, pp. 622–623). Undoubtedly, this is a significant labour requirement, but not the massive one that Schmidt assumed, and would have been well within the capability of the adult residents of a Neolithic village. As it turned out, I actually overestimated these labour requirements; at the time, I was unaware that the large pillars were set only a few centimetres into their base sockets and assumed that about one-quarter of their height was set into the ground (Banning, 2011, p. 623). I thus overestimated their mass by as much as 20%.

I have to say that this part of my argument has had much less impact than I expected. In a comment on my article, Goring-Morris and Belfer-Cohen (2011) go so far as to claim that I ignored or belittled "the scale and scope of the endeavors involved," despite the fact that, even now, I am the only one to have offered explicit calculations of the labour requirements for moving the T-pillars. Watkins (2020a, p. 22) says "even if there were a permanently resident community at Göbekli Tepe, there would not have been the labour force required for creating the great circular structures," without providing any evidence to support this statement by estimating either the site's population size or the labour required for each structure.

Dietrich and Notroff (2015) and Notroff et al. (2015, p. 44) simply continue to employ Schmidt's selective analogy to the labour costs of monuments on Easter Island and at Nias (Schmidt, 2009, p. 213; 2012, p. 102). They cite Thor Heyerdahl (1958) for statue-raising teams of 180–700 people without acknowledging Heyerdahl's (1976, pp. 204–241) later demonstration that work parties of only 16–18 men could move and raise Easter Island statues when they employed indigenous traditional knowledge rather than follow Heyerdahl's Egypt-inspired instructions. They do not attempt to challenge (or even mention) my calculations based on engineering principles (Banning, 2011, pp. 632–633) and claim that I denied "high effort," when I only denied it was as high as Schmidt had claimed. Kinzel and Clare (2020) now cite 2019 experiments that show that very small teams could have constructed the stone walls at Göbekli Tepe in relatively little time, but do not discuss the labour requirements for quarrying, moving, or raising the pillars.

3.4 Roofed or Unroofed?

Schmidt (2001, p. 51) usually described the Level III structures as unroofed "enclosures," presumably to strengthen the argument that they could not be houses. In my (2011) article, I presented several lines of evidence that the buildings were roofed and speculated about the arrangement of the roof beams (Banning,

2011, pp. 629–630, see also Hauptmann, 1999). Many authors, especially those espousing archaeoastronomical interpretations, who treat the enclosures as observatories (e.g., Sweatman & Tsikritsis, 2017), continue to assume they were unroofed. However, a growing group of authors favour the likelihood of roofing (Hauptmann, 2011, p. 644; Hodder, 2011, p. 646; Kinzel & Clare, 2020; Kurapkat, 2012, 2014; McBride, 2014, p. 352; Wunn & Grojnowski, 2016) or indicate some ambivalence on the issue (Dietrich et al., 2017, p. 16; 2019, p. 4/34; Notroff et al., 2017, p. 60). In one place, members of the Göbekli team echo my argument (Banning, 2011, pp. 629, 644) for the need for roofing by noting that "the well-preserved mud plaster … would have been washed away by rain if the buildings had remained open for a longer period of time" (Dietrich, Notroff, & Dietrich, 2018, pp. 9–10). In another, Kinzel and Clare (2020) mirror my suggestion (Banning, 2011, pp. 629, 634) that the trees evidenced in the site's archaeobotanical remains would have been adequate for supplying timbers of sufficient length. Most tellingly, the fact that the central pillars are too unstable to stand up on their own – the excavated ones now have to be supported by beams and cables – demonstrates that they must have depended on a roof structure to stabilize them.

Kurapkat (2012, 2014, 2015) independently concluded that the structures were roofed and went further than I did to reconstruct and justify their likely framing. Like me, he conjectured that the two central pillars supported two ridge poles, resulting in a very similar reconstruction.

I am gratified that the Göbekli team itself has come around to entertaining the possibility that these structures were roofed. Notroff et al. (2017, p. 60) cite Kurapkat (2014) for "the significant possibility that we are dealing with roofed structures" (see also Dietrich & Notroff, 2016, p. 25), while ignoring both my and Hauptmann's (1999, 2011) earlier suggestions on roofing, of which they were undoubtedly aware.

3.5 The "Purses" on Pillar 43

In connection with those roofs, I argued (Banning, 2011, pp. 629–631, 640) that the upper portion of pillar 43, with its depictions of enigmatic "box-like objects with handle-like attachments" (Schmidt, 2006, p. 39), may depict three of the pillar-buildings with vaulted or domed roofs, while small animal icons next to each may indicate the House, lineage, or clan associated with each building (Figure 3). Dietrich and Notroff (2017; Dietrich, 2021, p. 166; Notroff et al., 2017, p. 60) now appear to accept this hypothesis as a possibility:

Figure 3: The "boxes with handle attachments" on a field of alternating chevrons at the top of pillar 43 (cropped from *Vulture Stone, Gobekli Tepe, Sanliurfa, South-east Anatolia, Turkey* [Photograph], by Sue Fleckney, 2015, Flickr, https://www.flickr.com/photos/96594331@N03/20385309880/, CC BY-SA 2.0). A plausible interpretation of this iconography is that these represent three of Göbekli Tepe's buildings, either shown with domed or vaulted roofs, or as a hybrid between side-view and top-view as an early form of perspective. The small animal icons (crane, boar and possibly spider) to upper right of each could indicate each building's lineage or House.

> On the uppermost part of Pillar 43, a row of three rectangular objects with cupola-like 'arches' on their tops can be seen… Each of these objects is accompanied by an animal added on the 'arch'. The meaning of these images is hard to fathom, but they might represent the enclosures during their time of use, seen from the side. The rectangular part would represent the perimeter walls, while the cupolas may indicate roofs. As usually depictions of one animal species seem to dominate every enclosure…, it is an intriguing thought that buildings of different groups are depicted here with the emblematic animals of these groups added for recognition. (Dietrich & Notroff, 2016, pp. 25–26)

They go on to indicate some difficulties with this scenario, but their words eerily echo my own interpretation of this iconography, despite their failure to cite my article in this context.

3.6 Sources of Water and the Claim That the Site was Uninhabitable

Schmidt's argument that Göbekli Tepe could not be a residential settlement gained some credibility from the idea that the hilltop lacked a water source. I disputed this in 2011, noting that falling water tables have likely caused many of the region's springs to disappear, that some of the rock cuttings at the site could be cisterns, and that residential occupation at any time (such as in Level II or II/III) would falsify the argument that lack of water made settlement there impossible (Banning, 2011, pp. 634–636).

Since 2011, just as many authors have come to acknowledge the presence of at least some Neolithic residents at the site, there has been growing acceptance that some of the rock-cut features there may be cisterns (Çelik, 2016; Clare, 2020, pp. 84–85; Dietrich et al., 2014; Hauptman, 2011, p. 644).

Dietrich and Notroff (2015, p. 83) say that a geological survey has not found evidence of any ancient springs in the site's vicinity, but "a group of pits at Göbekli's western slope could represent rain water cisterns with a total capacity of 15,312 m^3 … accumulating enough water for people to stay for longer periods of time." Dietrich et al. (2019, p. 26/34) refer to "a system of possibly Neolithic cisterns on the limestone plateaus to the west of the site" but this time mention a volume of only 153 m^3, too little to support much of a population, and implying that one of these estimates must be a miscalculation, out by two orders of magnitude. Excavations in the northwest depression of the site have also yielded "PPN features (channels for water?) carved into the natural bedrock" (Dietrich, Notroff, & Schmidt, 2014, p. 5). A rock-carved pit east of structure H reportedly has a volume of about 140 m^3 while channels carved into the bedrock of the adjacent plateau may be part of a rainwater-harvesting system (Clare, 2020, pp. 84–85). At present, it is too early to know if there was enough cistern capacity at the site to sustain a substantial population in the Neolithic, but the evidence appears to be growing.

However, an acknowledgement that the Level II buildings probably pertain to a residential population has become uncontroversial (Dietrich et al., 2019, p. 6/34; Peters et al., 2020), while the newer evidence points to residential occupation in PPNA. If the hilltop at Göbekli Tepe had sufficient accessible water to support populations in those periods, then it must also have been habitable when the Level III buildings were constructed and used, since all occurred in the Pre-Boreal period when the climate was wetter than that of today (Knitter et al., 2019, p. 6).

3.7 Pre-Agricultural: Why Does This Matter?

Schmidt (2001, p. 48; 2002, p. 12; 2012, pp. 194, 240, 243, 256) repeatedly described Göbekli's builders as hunter-gatherers or hunters, contributing to his broader and bolder argument that religion preceded agriculture and temples preceded villages. In my 2011 challenge, I pointed out that a lack of direct evidence for morphological domestication of plants and animals was actually the norm for early Neolithic villages, as only very few PPNA and not all PPNB villages provide evidence for domesticated crops, although they did exploit wild cereals (Banning, 2011, p. 636; Colledge, Conolly, & Shennan, 2005). Poor preservation or low retrieval rates at many sites, probably including Göbekli Tepe, have also diminished the probability of recovering evidence for early domesticates. Furthermore, the presence of thousands of sickle blades at the site indicates that people at Göbekli Tepe, as at these other Neolithic sites, were at least harvesting, if not planting and tending, cereals or

other seed-bearing plants (Banning, 2011, p. 636). Those thousands of ground-stone tools also indicate a high probability that people at the site were processing large amounts of plant foods harvested in the vicinity.

Overall, it is too simplistic and essentialist to use "hunter-gatherer" and "agricultural" as a dichotomy, especially in this period. Early Neolithic villagers, for many centuries, employed varying degrees of hunting, gathering, crop tending, and animal management in complex, mixed economies that often did not yet include domesticates (Redding, 2005; Willcox, 2013; Willcox & Stordeur, 2012). Arguably, developments in harvesting methods, storage facilities (Kuijt, 2015), and water management are more significant aspects of the Neolithic revolution than the mere presence of morphologically domesticated grain.

The view that only hunter-gatherers used the site is losing ground in the academic literature. Not only the abundance of sickle blades and grinding stones, but also the botanical evidence now leans in that direction. The morphometric characteristics of some phytoliths from the site "could indicate the presence of T. monococcum …, H. spontaneum … and H. vulgare …, both in layer II and layer III structures. This contrasts with earlier studies, which emphasized that no domestication markers were visible at Göbekli Tepe" (Dietrich et al., 2019, p. 20/34). These results are not definitive but, if further research backs them up, would contradict a key element of the popular thesis that Göbekli reverses the causality of religious and agricultural origins. The fact that grinding equipment appears to have been more common in Level II than in Level III (Dietrich et al., 2019) is consistent with the growing importance of cereals and perhaps other seed crops in the site's Neolithic economy. However, this evidence appears to have had no impact at all on popular reports about the site.

3.8 Göbekli Tepe as a Centre of Ritual Activity?

One aspect that I mentioned only briefly in my article (Banning, 2011, pp. 638–639) is that Schmidt and his adherents had provided no real evidence for what transpired during the ritual use of Göbekli buildings. To be fair, they did make reference to performance, for which peripheral benches could have served to seat an audience, but there are now indications that these benches may have been later modifications to the buildings (Kinzel & Clare, 2020). The Göbekli team offered no evidence for structured deposition, musical instruments, ritual paraphernalia, or psychoactive substances, for example.

To some extent, they have rectified this in their more recent research. As already mentioned, they have argued that the stone vats were used to make beer for feasting (Dietrich et al., 2012). They have also published on masks that were plausibly used in rituals (Dietrich et al., 2018, p. 201). Although most of the latter are either too small or too heavy for human performers to have worn, they may be tangible imitations of perishable masks that ritual practitioners used. They are also right to call attention to images of birds with human legs that could represent costumed performers (Dietrich et al., 2018, p. 15). In one article, Dietrich and Notroff (2016, pp. 28–29) even refer to the possibility that bone "spatulas" at the site could be bull roarers, a type of wind instrument. This is a research direction that I specifically advocated (Banning, 2011, p. 639). However welcome these lines of research are, the presence of beer, masks, or even bull roarers may support the idea that there were rituals at the site – just as there were at all or nearly all Neolithic villages – but does not prove that there was no residential occupation or that the Göbekli buildings were temples or even "special buildings."

3.9 Mortuary Activities: If This was a Mortuary Site, Then Where are the Dead?

Much of the literature treats Göbekli Tepe as a mortuary centre (e.g., Clare et al., 2019; Notroff, Dietrich, & Schmidt, 2016; Schmidt, 2006, p. 122). Paradoxically, however, no human burials appeared in any of the excavations until very recently. It is true that more than 600 isolated fragments of human remains occurred in the fill deposits, including many fragments of skulls, and three of these last exhibit incisions and one a drilled perforation (Gresky, Haelm, & Clare, 2017). These indicate that skulls experienced modification and curation, plausibly including display. This strongly suggests that some activities – including rituals – at the site involved manipulation or curation of human remains. In 2017, excavation in the southeastern part of the site finally discovered a sub-floor burial that contained the remains of at least three individuals (Clare, 2020, p. 84).

These finds do not make the site a mortuary centre or focus of a "death cult," however, because human remains and mortuary rituals typically occurred within all Neolithic villages in southwest Asia (e.g., Guerrero, Molist, Kuijt, & Anfruns, 2009; Santana et al., 2015). Special human skull treatments, in fact, are one of the hallmarks of the early Neolithic in much of the Near East (Kuijt, 2008).

3.10 Göbekli Tepe: A Unique Ritual Centre?

Schmidt (2002; 2005, p. 14; 2012, p. 237) assumed that "we know what the settlements and houses look like from this period," and saw Göbekli Tepe as a unique place that drew on hunter-gatherer populations over a large region as the focus of a Neolithic "amphictyony." By contrast, I speculated that sites that had barely seen any investigation before 2011 would eventually show that the large oval buildings with T-shaped pillars were simply the "normal" early Neolithic building type in the vicinity of Göbekli Tepe, with the implication that they could be houses that differ from the ones that "we know" so well (Banning, 2011, p. 632; see also Hauptmann, 2011, p. 644).

There has been at least some progress in our understanding of other Neolithic sites in the region surrounding Göbekli, and growing consensus that Göbekli Tepe, while perhaps the grandest of these sites, was far from alone. Even before 2011, T-shaped pillars were known to occur at Nevalı Çori, Hamzan Tepe, Karahan Tepe, Adıyaman-Kilisik, and Sefer Tepe. Now, so many such sites are known in the region that the Turkish Department of Antiquities has given it a new name, *Taş Tepeler* (the Stone Hills; Yaşar, 2021).

Our best new evidence comes from Karahan Tepe, where recent work has documented some 250 pillars and many sculpted stones. Most notably, excavation there since 2019 has revealed a PPNA or early PPNB building complex that in many ways resembles the Level III buildings at Göbekli, while differing in others (Karul, 2021; Yaşar, 2021). The largest element of this complex is a subrectangular structure some 23 m in width, its floor and some of its side-benches cut into bedrock. As at Göbekli, small peripheral pillars are engaged with stone walls, and two large pillars flank the centre of the floor. One remarkable adjoining structure in the complex is smaller and features multiple pillars, carved out of the bedrock. Its function is not yet determined, but it seems possible that this could be a large silo with raised floor (note sockets in the walls at the same height as the tops of the pillars) or, more plausibly, a cistern (a rock-cut channel leads into it), although its excavator assumes that it had a ritual function (Karul, 2022). As at Göbekli Tepe, the complex was filled with rubble after its abandonment. It is too early to know if complexes like this are the normal architectural form at Karahan Tepe or if some other type of building accompanied them; some of the images that have appeared seem to show small, rounded buildings around the big one. The research team notes spatial variation across the site, with T-pillars in its west, north, and east sectors but apparently only domestic debris in the south sector (Karul, 2021, p. 22).

The list of apparently similar sites is growing in the *Taş Tepeler* region, with at least 12 sites that appear similar to Göbeki Tepe, including Harbetsuvan, Gürcütepe, Kurttepesi, Taşlıtepe, Sefertepe, Ayanlarhöyük, Yoğunburç, Sayburç, Çakmaktepe, and Yenimahalle (Caletti, 2020; Çelik, 2015, 2018; Notroff et al., 2015, p. 40; Özdoğan, 2022; Yaşar, 2021). Recent work at Sayburç, in particular, appears to have exposed part of a building very similar to Göbekli's Level III ones (Özdoğan, 2022). Referring to sites with circular buildings and T-pillars, "the number of examples of this architectural tradition … is gradually rising every day" (Çelik, 2015, p. 358). While some authors will argue that at least some of these are also cultic centres, Occam's razor would favour interpreting all of them as Neolithic villages, each with spaces for both cultic and "ordinary" activities.

3.11 Dietrich and Notroff's Rebuttal

As mentioned above, the only explicit rebuttal of my 2011 article of which I am aware is by Dietrich and Notroff (2015). They acknowledge that, in many societies, there is no strong sacred-profane dichotomy and that ritual and spirituality can occur in domestic spaces, but also point out, as did I, that such distinctions can occur in others. Overall, their rebuttal only reiterates Schmidt's claims about there being "no traces of the well-known

PPN domestic architecture" just because none of the buildings at Göbekli Tepe look like houses at Çayönü or Nevalı Çori, and that "the spot is hostile to settlement" and "no springs are known in the vicinity," all points addressed above. A new element is that they employ some of Renfrew's (1994) indicators of ritual, with particular emphasis on foci of attention (mountaintop location, sculpted pillars, and benches), repeated symbols and iconography (the animal motifs), and public display and expenditure (the scale of the buildings and sculptures). I would counter that all of these things can also be found in houses in many cultures. They do not attempt to rebut my calculations of labour requirements or to account for the plainly enormous quantities of domestic rubbish at the site except by reference to feasting.

3.12 Summary of Updated Understandings

To summarize briefly, many of the individual speculations and predictions I made in 2011 have gained support among professional archaeologists, but have had little or no impact on the more general thesis that Göbekli Tepe was a regional cult centre or that the level III buildings were "special buildings" (e.g., Arponen & Ribeiro, 2014, p. 175). For example, Kornienko (2021) still repeats the doubtful claim that Göbekli was distant from water sources and the now debated one that its Level III buildings were ritually filled but compromises to accept at least "scanty remains of daily living activities." Without citing my article, she says "it is hard not to notice" that Göbekli's buildings are similar in many ways to houses at other sites in Upper Mesopotamia but then suggests, without irony, that this indicates that they were "dwellings of deities."

Even among the Göbekli team, there is growing acceptance that the buildings were roofed and that there was much (or even too much) domestic activity at the site. There is some indication that domesticated plants, notably wheat and barley, may have been on the menu or used to brew beer. Further fieldwork has confirmed that the large pillar buildings are at least fairly widespread at the site, and not only in the original excavation area, and we are finally getting glimpses of evidence for the nature of the mysterious Level II/III, which does indeed seem to include "ordinary" PPNA houses, as I conjectured (Banning, 2011, p. 632). Stratigraphic studies have finally appeared that document long use-lives and suggest the possibility of multiple fill episodes in Level III structures rather than the single ritual fillings as previously understood (Clare et al., 2018, pp. 125–126; Dietrich et al., 2019; Kinzel & Clare, 2020). We also have new stratigraphic phasing that implies that the enigmatic Level II/III buildings may be at least partly contemporary with the big Level III ones and that the latter were even still in use during the construction of some of the later rectangular structures (Kinzel & Clare, 2020). However, we still lack detailed published evidence for these stratigraphic relationships. If these new stratigraphic interpretations are substantially correct, they would strengthen the argument that the large buildings are "special," whether or not they were communal (Hodder, 2020). We await a fuller presentation of the stratigraphic evidence to see if it confirms this. Only Jeunesse (2020) publicly endorses a view, with the Level III buildings as "origin houses," that is similar to the one I advocated in 2011.

4 The Broader Influence of Göbekli Tepe

Göbekli Tepe's spectacular ruins and Schmidt's interpretation of them as the world's "first temples" attracted a huge audience and drew a considerable following in several fields of inquiry – as far removed from archaeology as comic books and sexual medicine (Dinç & Alaca, 2021; Verit & Verit, 2020) – as well as among the broader public. Its impact has ranged from creative re-interpretation to wild speculation.

4.1 Psychology and Study of Religion

The interpretation of Göbekli Tepe as a cult site has had considerable impact in the fields of religion and psychology, where most authors appear to accept most or all of Schmidt's hypothesis with little reflection or critical evaluation.

McVeigh (2016, pp. 9–10) accepts that the site was a "purely ceremonial centre" with "no sign of habitation" and that its significance lies in its challenge to conventional views about the timing of organized religion by suggesting that "organized religion gave rise to farming." "Religion may not be a *product* of civilization but rather its *cause*" (italics in original). This interpretation contributes to his more general thesis that religion arose to address the need for social control rather than as a response to ecological or economic forces.

Connelly (2021) uses Göbekli Tepe to promote Maurice Blondel and French spiritualism as alternatives to materialism for understanding how ritual and engagement with material culture interact with structures of human consciousness. Beginning with Cauvin's (1997) attempt to turn the materialist argument – that village life was a precondition for the rise of social complexity and organized religion – on its head, he claims that Göbekli shows that Cauvin "won out" because its impressive structures conclusively predate agriculture. As already noted above, this is not as conclusive as he suggests.

Krech (2021, p. 176) accepts Schmidt's view that the Göbekli buildings were unroofed structures in a cult place, but is selective about other aspects of the Schmidt interpretation. He accepts that it functioned at least partially as a place of ritual, but not that the site was a temple. Rather, he sees it as multifunctional and with an economy that included hunting, agriculture, and cattle breeding, only citing Parzinger (2014), a secondary source, for the Neolithic economy of the site. He goes on to cite recent claims for the use of stone vats at the site for making and serving beer as evidence for feasts involving 500–1,000 people, estimates that he does not substantiate with any evidence. The implication is that demand for intoxicants at such feasts was a stimulus for agriculture while intoxication was an element of religious experience. He speculates that the signs carved on the pillars are examples of Indo-European "dyadic deities" of three types (Krech, 2021, p. 177): twin creator-deities, deities representing heaven and earth, and twin brothers or sisters. To Krech, the pairing of the central pillars is supposed to symbolize these dyadic qualities and their reliefs to constitute a pre-writing form of religious communication. However, he does not think that the animal symbols represent deities (Krech, 2021, p. 179). Rather, he associates them with animism and apotropaic magic. He also suggests that some symbols found there may have cosmological character, citing Magli's (2015) article on Sirius. Pillar 43 in this context is a "mythogram," and Krech describes what I have interpreted as buildings on it as "baskets" and the scorpion and spider as symbols of danger or death.

Özalp (2019, p. 162) accepts Schmidt's interpretation without reservation, referring to "open-top megalithic structures with no residential purposes," although also with some misconception. He asks why "Göbekli Tepe people buried these structures in a calculated manner and then left," apparently ignoring that site abandonment may have occurred centuries after the structures' infilling. Özalp accepts that benches around the periphery of the buildings allowed them to operate much like theatres and suggests that the imagery could have celestial or astronomical significance. He draws what are surely anachronistic connections to the Prophets Abraham and Amos, while acknowledging their great chronological separation (Özalp, 2019, pp. 165–166). He also commits a philosophical fallacy by assuming that the "liquid proof" floors show "that a ceremony was performed involving a sacrifice in which a liquid (e.g., blood, water, wine) was possibly used" (Özalp, 2019, p. 167). In reality, plaster or "terrazzo" floors are a ubiquitous feature of Neolithic buildings, including ordinary houses, and while they may have facilitated hygiene and maintenance (Miller, 1980, p. 335), their use was certainly not restricted to libations, rituals, or symbolically charged liquids. In any case, many of the floors in Level III buildings are not plastered, but simply the result of cutting down into the bedrock. He closely follows Schmidt in interpreting a variety of material culture, including channels and cavities, as evidence for ritual activities rather than mundane ones, such as collection of rainwater or food preparation. He reviews a variety of interpretations of the site's symbolism, mainly following Schmidt in his agnosticism as to the symbols' meanings, and concludes by reiterating Schmidt's main thesis that Göbekli demonstrates that religion led to agriculture and village life, rather than the reverse (Özalp, 2019, pp. 173–174).

Tracy Henley (2018, p. 477), a psychologist, generally accepts Schmidt's assertion that Göbekli was a "temple" rather than a settlement and that its hilltop location would have allowed it to "be seen for miles." However, she qualifies this by echoing my critique of the sacred/profane distinction in the Neolithic: "calling Göbekli Tepe a temple is likely accurate, but perhaps also misleading" because "any permanent structure built in the Neolithic almost certainly would have blurred the lines between a secular and sacred place" (Henley, 2018, p. 480). She nonetheless reiterates Schmidt's view that, contrary to previous belief, the site indicates that

temples came before agriculture, (Henley, 2020, p. 214). The site's significance for psychologists is that, rather than material factors triggering social and ideological change in the early Holocene, the site allegedly provides evidence that "psychological factors such as community building and symbol systems … emerged as a new cognitive revolution" (Henley, 2018, p. 478; see also Henley & Reysen, 2023). She focusses on several aspects of this. First, the engineering capabilities and social organization responsible for such a site substantially exceed those that psychologists and anthropologists typically associate with hunter-gatherers. She discusses the possible roles of aggrandizement and storytelling in this connection. Second, the site's interpretation advances the idea of a "revolutionary change in human psychology" (Henley, 2018, p. 481). Third, this revolution need not have depended on material means for storing meaning, such as writing (e.g., Donald, 1991; Mithen, 2007; Morenz, 2014), but on ceremony and storytelling (Henley, 2018, p. 481). However, the possibility that the symbolism at Göbekli records stories suggests "some type of purposeful semasiographic communication," and "a step toward a textual proto-writing" (Henley, 2018, p. 482). Later, Henley and Reysen (2023) discuss the utility of Social Identity Theory and Terror Management Theory for our understanding of the roles of group membership, leadership, and attitudes to death at Göbekli Tepe. According to Henley, Göbekli will force psychologists not only to reconsider the relationship of religion to the Neolithic revolution and early cities but even the origins of writing.

Trevor Watkins, although an archaeologist, has been instrumental in disseminating, in much the same vein as Henley, psychological theorists' arguments that there was a cognitive revolution before the Neolithic, for which Göbekli Tepe provides an important demonstration. With influences from Donald (1991, 2001) and Pinker (2010), among others, he discusses the role of the Göbekli imagery as semasiographic communication as he had previously discussed the architecture itself as a form of external symbolic storage in this revolution (Watkins, 2006, 2020b).

Although Watkins's application of psychologists' theories to the Epipalaeolithic–Neolithic transition does not depend on Schmidt's hypotheses and in fact Watkins (2006, p. 23) refers to the built environments that he says provided symbolic storage as "worlds of the imagination that they could inhabit and in which their children grew up," in general, he accepts that in the Göbekli case, this was a world of ritual and drama, with communal buildings for hunter-gatherers who converged there from the surrounding region. This monumental material culture yielded a "cognitive-cultural feedback loop" that "enhanced a runaway process of demographic growth and social evolution" (Watkins, 2020b, p. 32). Like Schmidt, Jacques Cauvin, and several of the psychologists and philosophers of religion just mentioned, Watkins is right to emphasize that the people who built Göbekli Tepe were more sophisticated than the traditional materialist paradigm of egalitarian bands evolving into complex states accommodates. However, this does not mean that the rest of the Schmidt hypothesis is correct.

Benz and Bauer (2013), like Watkins, are archaeologists with interests in psychological approaches. They draw on ethnography and archaeological cases that include Göbekli Tepe to argue that the figurative art with its focus on certain animals indicates shamanistic practices. However, some aspects of the art, particularly its expression in monuments and the aggressive expressions of many of the animals, seem out of place. This leads them to suggest that their "fixation … in stone is a first step toward institutionalized hierarchies and dogma … earlier than has been previously believed, … before permanent farming and herding were established" (2013, p. 14). Once again, this reflects both Cauvin's and Schmidt's narratives about the "unexpected" rise of religion before farming.

Wunn and Grojnowski (2016) take an explicitly evolutionary approach to the development of religion, on a global scale and from the Palaeolithic onward, but without recourse to memes. They also reject the idea favoured by Henley and Watkins that there was a major cognitive change about the end of the Pleistocene. In their discussion of Göbekli Tepe, they are among very few authors who explicitly accept the hypothesis that the large Level III buildings were residential, and not temples (2016, p. 132). They see the sculpted imagery on the site's pillars as reminiscent of Palaeolithic cave paintings and suggest that their focus on dangerous or intimidating animals was to protect their households.

4.2 Architecture, Geometry, and Planning

Haklay and Gopher (2020) use a formal analysis in an attempt to identify geometrical principles, potential planning, and the *chaîne opératoire* of the constructions in Göbekli Tepe's Level III. Specifically, they use an algorithm to identify the geometrical centres of buildings B, C, and D and then geometrical principles that would indicate whether there was "a pre-planned schema" in the architecture. Their results call attention to triangular geometry in these buildings (Figure 4), which, they argue, indicates "that the three enclosures B, C and D were planned and initially built as a complex" (Haklay & Gopher, 2020, p. 351).

That the centre-points of these buildings are at the apices of a nearly equilateral triangle is undeniable, and forming equilateral triangles on the ground is quite straightforward. However, that in itself does not demonstrate pre-planning. It also appears that they did not have access to the newer stratigraphic analysis of the site, which may challenge the contention that these buildings were built at the same time (Kinzel & Clare, 2020). Furthermore, what do we mean by "pre-planning"? Some kind of planning is routine in both hunter-gatherer and agricultural societies, but it does not have to involve formal leadership or hierarchical decision-making (Banning, 1996).

Furthermore, triangular geometry abounds in both nature and culture. Equilateral triangles and hexagons result whenever we pack together circles of closely similar size, whether these circles are city territories (Christaller, 1933), beehive cells (Nazzi, 2016), or soap bubbles (Figure 5, Almgren & Taylor, 1976). This by no means excludes the possibility that the triangular arrangement was intentional but highlights that an isolated example of such a pattern, on its own, does not demonstrate intentionality. Furthermore, can we really conclude that the intention was to create a geometrical pattern, as viewed from above? Or were the builder's

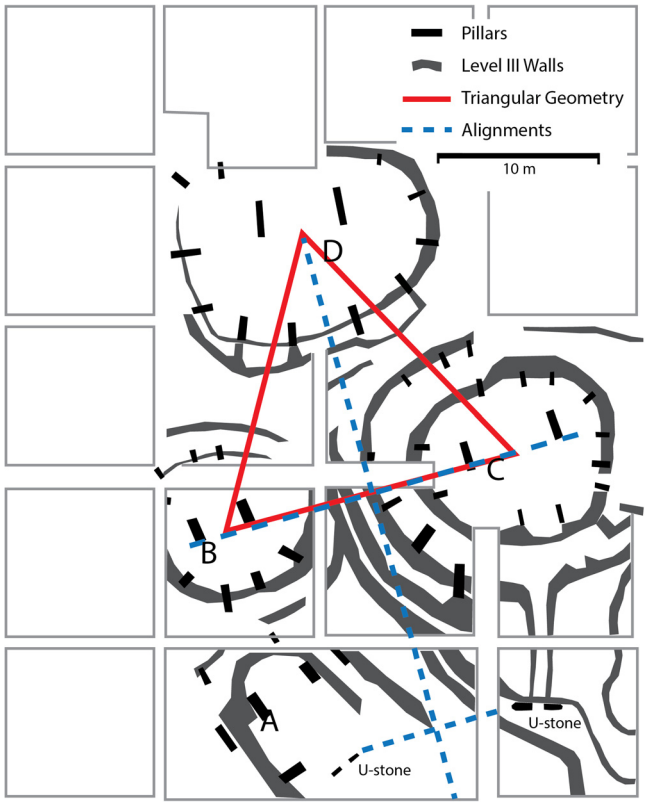

Figure 4: Map of structures B, C, and D of Göbekli Tepe's Level III, demonstrating the triangular geometry of the buildings, with equilateral triangle with apices at the building centres, bisecting axis, and alignment of the main pillars in structures B and C (after Haklay & Gopher, 2020, omitting Level II architecture).

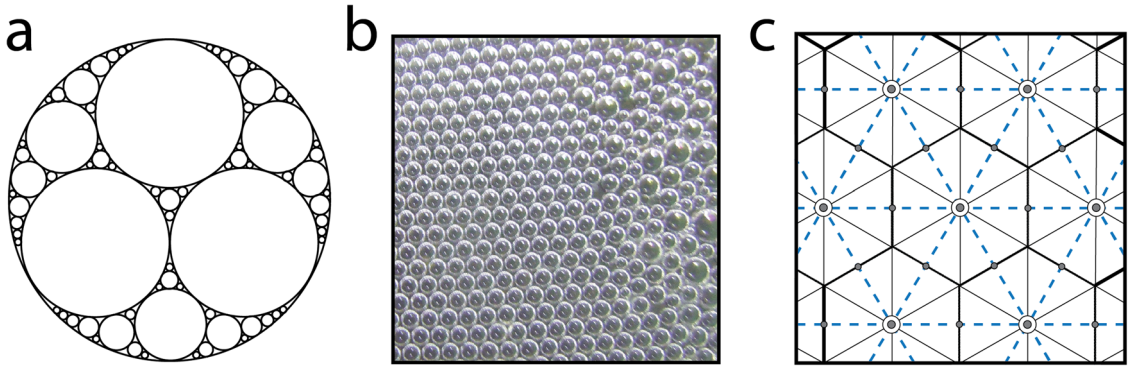

Figure 5: A fractal of tangent circles called an Apollonian gasket (a), tightly packed bubbles (b) (cropped from *Order and Chaos* [Image], by E. K. Kempf, 2014, Wikimedia, https://commons.wikimedia.org/wiki/File:Order_and_Chaos.tif, CC BY 4.0), and a Christalleran settlement lattice (c) (after Christaller, 1933). All exhibit arrangements of equilateral or near-equilateral triangles.

intentions something like minimizing the distance between neighbouring structures or influencing the access routes among structures?

Notably, a true *chaîne opératoire* approach to this architecture would also require a highly detailed analysis of the construction and remodelling episodes in the buildings, among other things, which no one has yet accomplished, although Kinzel and Clare's (2020) new analysis begins to approach that. Laying out equilateral triangles intentionally would have been a lot more difficult if there were pre-existing walls or buildings in the way.

Tobolczyk (2016) employs an ontogenesis-of-architecture approach to the Göbekli Tepe and other Neolithic buildings. She begins with the conjecture that "nomads used to worship and offer sacrifices to their gods on the natural heights" (Tobolczyk, 2016, p. 1399) and makes some other assumptions about prehistoric religion, clearly taking as given Schmidt's interpretation of the site as a cult centre. She describes even Level II's "lion building" as "undoubtedly a sanctuary" and accepts that the "enclosures" were unroofed. She highlights the change from circular to rectangular architecture and sees the Level II "lion building" as evidence for the "transition from open air ritual enclosures to the roofed temples" (Tobolczyk, 2016, p. 1401). She then makes comparisons to Nevalı Çori, reiterating comparisons by Schmidt and others, and concludes that the well-known Shrine 13 there exhibits the same design principles as the "archetypal form" found in Level III at Göbekli Tepe.

4.3 Archaeoastronomy

Several authors (Collins, 2014; Collins & Hale, 2013; De Lorenzis & Orofino, 2015; Magli, 2015; Schoch, 2012) have explored the possibility that the Göbekli architecture has astronomical significance. Magli suggests that the architecture was oriented on Sirius, Schoch claims alignments that pointed toward the constellation of Taurus or Orion, and Collins (2014, pp. 78–85) argues that the central pillars in structures B, C, D, and E were aligned with the setting of Deneb, once you account for apparent stellar movements over the past ten millennia.

De Lorenzis and Orofino (2015) tested several of these propositions, with a particular focus on Deneb (formerly a North star), using the azimuth orientations that Collins published for the central pillars in buildings B, C, D, and E, which range from 337° to 353°. Using *Cartes du Ciel* software (CDC, 2006), they took not only precession into account but also atmospheric extinction – the phenomenon that a star only becomes visible once it is slightly above the horizon. Their results appear to confirm Collins's suggestion that these structures were aligned with the setting of Deneb, but with slightly different dates for the structures.

It is important to point out several things about this research. First, the dates offered for construction of the buildings vary over a span of almost 1,200 years, almost certainly too long to be "realistic," even given the longer durations for buildings that the newer stratigraphy suggests (Collins, 2014, p. 82; Kinzel & Clare, 2020). Nor are they based on information, such as radiocarbon or stratigraphic analysis, independent of astronomy.

Rather, they were selected in order to make the alignments fit the astronomical data and only subsequently compared with the dates of the site to see if they broadly fit. Second, readers are expected to agree that these researchers have correctly identified the specific, meaningful alignments among the thousands, perhaps millions, of potential alignments in the structures, of which they have only eliminated a selection of what may be the most obvious candidates. Third, we could well ask why anyone would locate buildings on the site's southern slope if they meant them to align with northern astronomical bodies, such as Deneb. Finally, the alignments of buildings A and F are major outliers and could not possibly have pointed to the setting of Deneb at any time. The wide variation in alignments is notable, and none of these authors adequately address it.

If alignment to the heavens was an important consideration to Göbekli's builders, we have to ask why these alignments are not more consistent (Figure 6). As just noted, most authors attempt to account for this variation by assuming different construction dates. With respect to the anomalous alignment of pillars in Structure A, Collins (2014, p. 78) just says, "whatever it was they were oriented toward had little to do with the primary alignments of the larger enclosures," betraying his unwillingness to consider the possibility that there were no intentional alignments at all.

De Lorenzis and Orofino (2015, pp. 43–44) explored a hypothesis they attribute to Collins that structure F was aligned to sunrise at the summer solstice or sunset at the winter solstice. They instead determined that it was aligned to sunrise on the 41st day *after* the summer solstice. They take this to be a significant date, nearly halfway between the solstice and the fall equinox, that might mark the beginning of harvest, the Irish

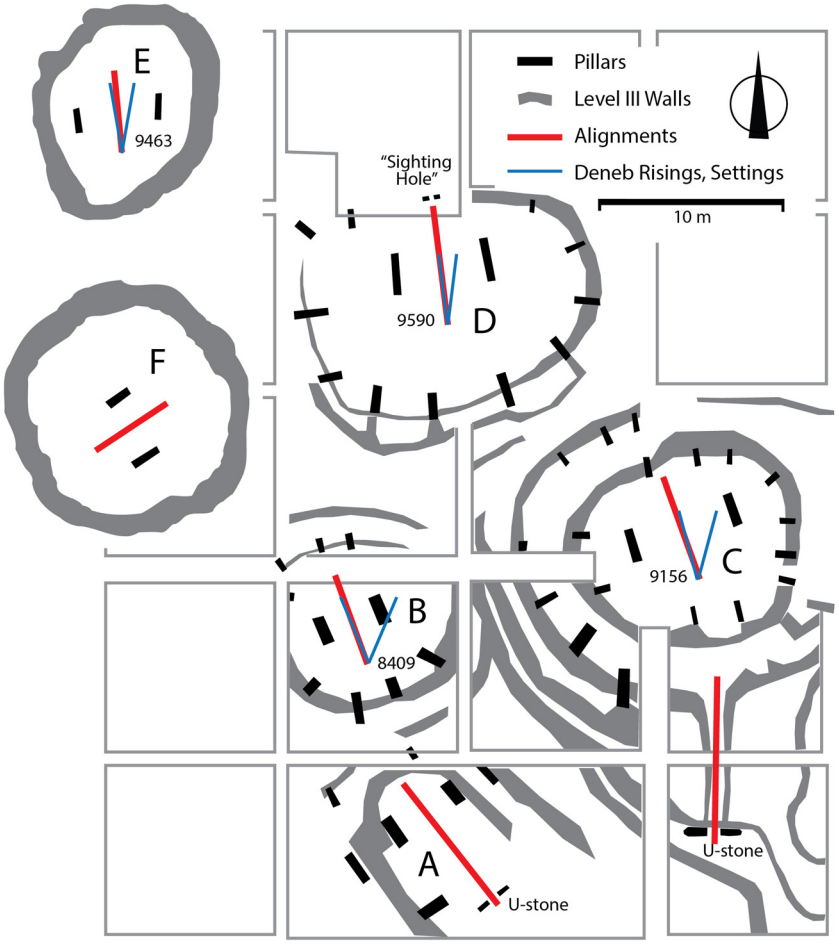

Figure 6: The central alignments of Göbekli Tepe's main Level III structures along with the risings and settings of Deneb at the BC dates indicated (after De Lorenzis & Orofino, 2015). Note that the alignments of buildings A and F do not come close to any Deneb sightings in this date range.

Lughnasadh. However, they appear to be unaware that the beginning of harvest in Ireland has no plausible correspondence with southern Turkey. In most of the fertile crescent, the harvest of grain would be in May or June, *not* August. This 41st-day alignment, if you will excuse the pun, is grasping at straws. All of this "cherry-picking" of dates and astronomical events to fit alignments is highly questionable and suggests a desperate attempt to find patterns that are not really there.

Confirming any of these alignments requires independent evidence for construction dates and, for that matter, more accurate plans of the architecture itself[1] than the plans on which these authors depended. The newer chronologies that are becoming available (Clare, 2020, p. 85) suggest that the Level III buildings were longer-lived than previously believed and might soon provide reliable independent dating evidence to test these alignment theories more convincingly. It is reasonable to infer that the axis that bisects the two central pillars would be a good candidate for an intentional alignment, but it is also true that many other alignments – and even no intentional alignment at all – are plausible alternatives until this independent assessment is done.

Sweatman and Tsikritsis (2017) provide a different kind of archaeoastronomical analysis that focusses on pillar 43 in structure D (Figure 3). They view the iconography of this pillar as a document of a comet impact about 10,900 BC (cf. Collins, 2014, pp. 102, 162–163). According to them, the creatures depicted on this pillar – a duck or goose, a vulture or eagle, a crane, a snake, a scorpion, and a headless man – are star constellations (cf. Collins & Hale, 2013), the "handbags" at the top of the relief are symbols of sunrises or sunsets, and the circular object seemingly balanced on one of the vulture's wings is the sun. Suggesting that the scorpion could represent the constellation Scorpius, they attempt to associate the other imagery with constellations in Scorpius' celestial neighbourhood. On this basis, they associate the vulture with Sagittarius, the goose or duck with Libra, and the "bent bird" and snake with Ophiuchus. Although they admit that placement of the last, at least, is "not very accurate," they find them a "reasonably good match with their corresponding asterisms" (Sweatman & Tsikritsis, 2017, p. 237). They go on to interpret the pillar as a "date stamp," representing the date when the sun was in the indicated position, relative to these constellations, at one of the equinoxes or solstices. Among several alternatives, they find that the sun would have been in this position at the summer solstice of 10950 BC. As this date appears to agree well with the beginning of the Younger Dryas climate event, they view the pillar as commemorating a celestial event, such as a cometary burst, that could have triggered that event and would have had a memorable impact on Göbekli Tepe's builders' ancestors.

Notroff et al. (2017) vigorously responded to Sweatman and Tsikritsis's analysis. They question the assumption that asterisms, which, after all, are rather arbitrary groupings of stars, could be so stable for more than ten millennia, and the selection of certain iconography from the site, divorced from its context, while largely ignoring others. They also emphasize that the proposed "date stamp" is implausibly early. To be fair, Sweatman and Tsikritsis do not explicitly say that pillar 43 was carved about 10950 BC, only that it commemorates that date. However, this seems a very weak hypothesis. Why would anyone preserve the specific date of a comet impact in oral tradition for more than a millennium yet make no iconographic reference, on this or any other of the dozens of pillars currently known, to the comet impact itself?

In his review of Hancock's (2015) *Magicians of the Gods*, which draws on Sweatman's and Tsikitsis's efforts, Defant (2017) levels much of these same criticisms. He questions why they focus on pillar 43 and none of the many other pillars that exhibit several animals, and especially their assumption that late Pleistocene people would have employed asterisms anything like the ones we use today. He also demonstrates that there is little or no resemblance between the images on pillar 43 and the constellations that Sweatman and Tsikritsis claim they represent, that several asterisms are omitted, and that one bird image does not correspond to any star cluster. He ridicules the inference that the "belt buckle" symbol at Göbekli represents the bow shock of a meteor entering the atmosphere (Collins, 2014, pp. 120–122), and asks, if the builders of Göbekli Tepe were such knowledgeable observers of the heavens, why would they not indicate the stars and the comet themselves?

1 Note that various plans of the architecture in publications differ in their details, some of these variations probably due to parallax in aerial views used as their basis, while others might be based on total station measurements, but with some uncertainty as to which stones belong to which walls. For this article, I have attempted to compromise among these plans, but prepared my figures before finding the new plan by Kinzel and Clare (2020).

The problem with many of these archaeoastronomical arguments is that their promoters present data, particularly from alignments, that appear to support them and ignore inconsistencies, alternative interpretations, and any evidence that might contradict their interpretations. For example, as of 2022, no two Level III buildings share exactly the same orientation (Figure 6), and explaining this away by dating them differently is tautological. Second, while the buildings are broadly similar, they do have distinctive variations in shape and pillar arrangement, and some of the pillars are not even in their original positions (Notroff et al., 2017, p. 59), yet these archaeoastronomers ignore this variability. Furthermore, with so many alignments from which to choose, so many celestial bodies and potential celestial events, and so many ways to define an alignment, it would be surprising if there were no astronomical alignments at all, just by accident, especially considering the chronological uncertainties. There is also so much iconography, providing so many images from which to choose, that one might argue for correspondence with almost any constellation. We as yet find no consistent, repeated, or internally coherent pattern of plausible astronomical indicators that would strengthen a hypothesis for astronomical significance.

Dolan (2021) devotes a large part of her chapter on astronomy in Neolithic architecture to Göbekli Tepe. She accepts the bulk of the Schmidt hypothesis about the lack of domestic occupation or a local water source and that the Level III buildings were ritual spaces. While she applauds Hawkins (1965) for his statistical demonstration that the astronomical alignments at Stonehenge could not be by chance, for Göbekli Tepe, she just says "there can be no doubt that astronomy was a major factor in the construction, orientation and decorative artwork of Göbekli Tepe" (Dolan, 2021, p. 44), with no indication of any statistical support for this. She reviews many of the arguments mentioned above with favour and without even hinting that they have been subject to criticism or that they fail to identify a consistent system of alignments like those that Hawkins identified at Stonehenge. For her, the site "proves that astronomy and geometry have played a key cultural role in human populations from the first evidence of sanctuaries" (Dolan, 2021, p. 46).

4.4 The Dawn of Everything

In their popular book, *The Dawn of Everything*, Graeber and Wengrow (2021) make several references to Göbekli Tepe. At the risk of oversimplifying, a main thread of this book is that the traditional "evolutionary" story of "complex societies" emerging from egalitarian ones is fundamentally flawed. Consequently, they not only contradict the economic-ecological paradigms but also some of the psychological ones, like those mentioned above, that call for a cognitive revolution quite late in human history.

Considering how critical they are – and rightly so – of many anthropological and archaeological assumptions in other contexts, it is curious how uncritically they accept Schmidt's interpretation of Göbekli Tepe and ignore any literature that revises or raises concerns about that view. They accept that it was a hunter-gatherer cult centre that was occupied seasonally (Graeber & Wengrow, 2021, pp. 90, 104–105), that the buildings there were "stone temples" (2021, p. 104), and that the site demonstrates that complex hierarchies can precede agriculture (Wengrow & Graeber, 2015, p. 602; Graeber & Wengrow, 2021, pp. 90, 201–202, 242). They also elaborate on Schmidt's interpretation by suggesting that the site illustrates seasonality in social organization: there could have been "complex" or even authoritarian social conventions when hunter-gatherers converged on the site for rituals, but some other kind of social organization the rest of the year (2021, pp. 102–111).

Although they make a persuasive argument that Pleistocene hunter-gatherers were sophisticated people who at least sometimes had social hierarchies and some kind of religion, a different narrative about Göbekli Tepe could have been just as compelling. For example, the alternative I proposed that Göbekli Tepe's inhabitants had a precocious "House Society" could have resonated just as well. Unfortunately, nothing Graeber and Wengrow say about the site removes the chief obstacles to the interpretation of Göbekli Tepe as a pre-agricultural cult centre with no residential occupation. They just replace one flawed narrative with another one: it makes a good story to portray Göbekli Tepe as an anomalous site with no agriculture or even "proto-farmers" (Graeber & Wengrow, 2021, p. 90), in sharp contrast to surrounding early farming societies. But this is simply a false dichotomy, and there is no reason to view Göbekli Tepe's economy as substantially different

from that of any of its contemporaries in the region. And that economy would certainly have included a strong reliance on the harvest, and probably tending, of morphologically wild cereals and legumes, and apparently even some domesticated ones, whether or not we label that with the problematic and ironically progressivist term, "proto-farming."

4.5 Pseudoscience: Eden, Comets, Gods, and Extraterrestrials

While authors like Graeber and Wengrow use the Göbekli evidence to make the case that pre-agricultural people were more sophisticated than many people have assumed, the Göbekli-as-temple hypothesis has inspired others to push Göbekli Tepe into realms that I'm sure would have horrified Klaus Schmidt in that they promote the assumption that most Pleistocene and early Holocene humans were dull-witted primitives.

The writings and video works of Andrew Collins are a good example. Collins (2014) presents himself as an expert on Göbekli Tepe and has garnered a large public following with pseudoscientific claims about Giza, Eden, Atlantis, and the mysterious "watchers" of the Books of Enoch and Daniel. In the tradition of von Däniken long before him, much of his "argument" consists of leading questions, such as

> Is it possible that some memory of the prime movers or driving elite behind this great transition in technology and innovation is recalled in the stories of the Watchers providing mortal kind with the rudiments of civilization? Is this what these human angels are—instigators of the Neolithic revolution? (Collins, 2014, p. 13)

According to Collins, Göbekli Tepe was associated with the Biblical garden of Eden, a comet impact and associated floods that allegedly preceded it inspired the story of Noah's flood, and Göbekli's builders were the *Annunaki* of Sumerian mythology (following Sitchen, 1978) or the "Watchers" of *Enoch*.

As Cline (2015) aptly points out, authors like Collins "cannot accept the fact that mere humans might have come up with great innovations … on their own." To account for impressive early monuments, including the Göbekli buildings, Collins conjures a fictitious advanced Pleistocene civilization that somehow left no trace other than these monuments, as though, while fleeing a major disaster, they had nothing better to do than create mysteries for future generations to solve. We are expected to believe that the planetary disaster erased all evidence of the cities, industries, or economies of this civilization, even though the material culture of Pleistocene hunter-gatherers, including fragile bones and shells, is widespread, and decades of research have shown that there was no substantial use of domesticated crops or livestock prior to the Younger Dryas that could have supported the nutritional needs of such a civilization.

Göbekli Tepe also looms large in Hancock's (2015) *Magicians of the Gods*, which complements Collins's account. Like Collins, Hancock has long popularized the theory that there was an advanced civilization, the legendary Atlanteans, millennia before the rise of state societies in Egypt or Mesopotamia and that a comet impact wiped it out, without a trace, about 13,000 years ago, at the beginning of the Younger Dryas.

Hancock (2015, p. 152) sees the technical requirements of erecting Göbekli Tepe's pillars as beyond the capability of hunter-gatherers, arguing that it would have required the expertise of technologically sophisticated Atlanteans whose civilization fell victim to catastrophic floods that the comet impact allegedly caused. Hancock (1996; 2015, pp. 200–202) also redates Giza's great sphinx by several millennia to fit the narrative of this ancient civilization and now to connect it with Göbekli Tepe.

Science journalist Shermer (2017) aptly describes Hancock's approach as a combination of "argument from ignorance" and "argument from personal incredulity." Just because scientists do not agree on an explanation does not mean that just any speculative interpretation is as valid. And just because someone like Hancock cannot understand something doesn't mean that his own speculation constitutes a reasonable explanation. I would add that, like many pseudoscientists, Hancock makes his "arguments" in the form of rhetorical questions – "Is it possible that some Pleistocene civilization….?" – rather than statements backed by evidence.

Recently, Seyfzadeh and Schoch (2019) have suggested not only that some of the images at Göbekli Tepe are writing but also that they can read some of it. In this highly speculative article, they follow up Schmidt's (2006, pp. 209, 239) hint to associate symbols often found on Göbekli pillars with the determinative for "god" in

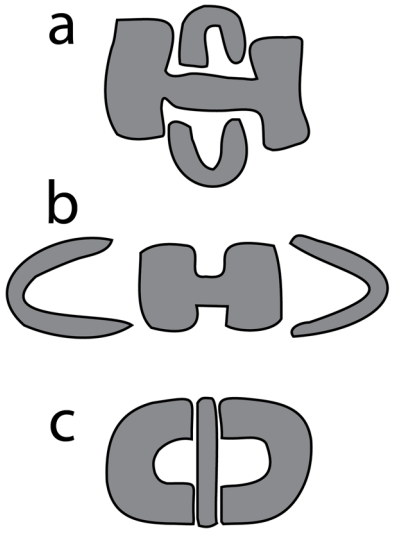

Figure 7: Comparison of Göbekli Tepe symbols (a) and (b) with the determinitive for "divine" or "god" (c) in Luwian hieroglyphs found on inscriptions of the Late Bronze and early Iron Ages in Turkey (last after Laroche, 1960, p. 187).

Luwian hieroglyphs that date ca. 1000 BC. In their view, this "confirms what others have long suspected: That Göbekli Tepe, at least in part, served as a temple site" (Seyfzadeh & Schoch, 2019, p. 49). They admit that "the Luwian 'god' symbol is not perfectly identical though close to the 'H'-shaped symbol inside two semi-circles" (2019, p. 42), but this similarity is superficial at best (Figure 7). Really, the only points of similarity are the parenthetical semicircles. That six millennia or more separate the use of these symbols is also problematic.

Finally, Göbekli Tepe has attracted a large following among "Ancient Aliens" enthusiasts. It featured prominently in at least three episodes of this History Channel programme from 2010 to 2017. Like the theories that posit a pre-Holocene lost civilization, those that call on extraterrestrials to account for the building of Göbekli Tepe's structures depend on the quasi-racist assumption that ancient humans were simply too unintelligent or unsophisticated to have accomplished such feats on their own (Shermer, 2017).

Of course, it is easy to level criticism at these pseudoscientific theories because their "evidence" is mostly argument from silence, ignorance, or coincidence. However, the much-publicized interpretation of Göbekli Tepe as the centre of a completely unsuspected and sophisticated religion has provided fertile ground for charlatans to flourish. Would they have exploited Göbekli Tepe to sell books and television rights had Schmidt instead interpreted the site as just a very impressive Neolithic village? Perhaps. But the temple narrative was too tempting for these authors or their audiences to resist.

5 Conclusions

While there has been some movement over details of Göbekli Tepe's interpretation over the last dozen years, including the increasing acceptance that its buildings were roofed and there was at least some residential occupation of the site, the overall thesis that the site was a hunter-gatherer cult centre and not a Neolithic village has largely persisted (e.g., Fagan, 2017; Graeber & Wengrow, 2021). More nuanced or reasoned claims that some members of the Göbekli team are willing to make in technical articles for an archaeological audience (e.g., Kinzel & Clare, 2020) are hard to find in literature they aim at public or more general audiences (e.g., Dietrich et al., 2017). These latter perpetuate the narrative that Göbekli Tepe was a shining temple on a hill and the focus for the devotions of hunter-gatherers in the surrounding region. For example, a recent encyclopaedia entry (Peters et al., 2020) blends these narratives. It acknowledges PPNA domestic settlement, and the domestic nature of Level II yet continues to present the Level III buildings as devoid of domestic activities. Although it puts less emphasis on the narrative of hunter-gatherer amphictyony, it fails to acknowledge that there is any debate over the site's interpretation.

When we turn to the broader literature in non-archaeological fields or that appeals to the general public, we find almost no such qualifications. Instead, we find elaborations built on the Schmidt hypothesis that emphasize the site's spectacular architecture, build on the "religion-before-civilization" narrative, and extend to quasi-racist claims that indigenous hunter-gatherers were incapable of erecting such buildings, what Shermer (2017) calls "the bigotry of low expectations." This leads to the almost inevitable call on lost civilizations or extraterrestrials to supply the necessary expertise and technology. While Klaus Schmidt would have viewed, and I am sure the current Göbekli team does view, such developments with a certain horror (e.g., Notroff, 2017), this Pandora's box may never close.

Some members of the Göbekli team recognize that this is a real problem:

> The interpretation of Göbekli Tepe as a mountaintop sanctuary ... [and] the special buildings ... as a series of religiously-motivated events has featured in innumerable publications by members of the research team. Therefore, it was the archaeologists themselves who delivered and subsequently cultivated the now popular opinion that Göbekli Tepe is the site of the "World's First Temples".... This paradigm will doubtlessly prove difficult to dispel, especially given its prominence in current marketing strategies around the UNESCO World Heritage Site. (Clare, 2020, pp. 82–83)

Difficult to dispel indeed.

Abbreviations

CDC	*Cartes du Ciel* (Sky Maps)
PPN	Pre-Pottery Neolithic
PPNA	Pre-Pottery Neolithic A
PPNB	Pre-Pottery Neolithic B
EPPNB	Early Pre-Pottery Neolithic B

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