Dating Gobekli Tepe

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Dating Gobekli Tepe: the evidence doesn't support a PPNB date, but instead a possibly much later one

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Gobekli Tepe pillar from Layer III, showing three purification symbols on top

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Abstract

The paper analyzes the evidence regarding the dating of the Gobekli Tepe complex. First, it examines the C14 dating information supplied by the archeologist in charge of the Gobekli Tepe excavation, Klaus Schmidt, and a number of others. This is claimed as evidence that Gobekli Tepe is of the at least PPNB period. The evidence they analyzed was obtained from both the fill, as well as from the plaster at the surface of certain Gobekli Tepe structures. The paper also examines the lithic based evidence regarding the fill at the site. Clear evidence that counters these claims is presented is presented in this paper. Although the Gobekli Tepe site can be shown to be of much later construction date than PPPNB, the paper sets as a modest aim to show that the structures at GT so far analyzed are of a later than PPNB date. Evidence covering both C14 dating, as well as architectural, urban design, urban planning, demography and art evidence is offered to back this argument. Extensive use is made of architectural elements from PPNA Natufian settlements, as well as PPNA/B settlements Hallan Cemi and Jerf el-Ahmar.

Introduction

In November 2008, a report was published in the Smithsonian Institution's monthly magazine, see [1], where the architect-in-charge of the excavation at Gobekli Tepe, Klaus Schmidt (1953-2014) in effect "presented" to the wide audience of the world's community his extraordinary findings. The site of Gobekli Tepe is indeed of significant interest for multiple reasons, ranging from Archeology to Architectural, from the Art and symbols it contains, as well as from an Urban and City Planning and Design viewpoint.

Because of the relatively advanced level of development it enjoys relative to other similar in dates durable settlements (both in pre-pottery Neolithic A, PPNA a period roughly covering the 12000 – 9000 BC period, and pre-pottery Neolithic B, PPNB, a time period covering the time 9000 – 7500 BC time frame), sophistication that characterizes its various components (stonemasonry construction), the excellent state of preservation and the crispness of its stone carvings, the variety of images and symbols it contains on its pillars, the spatial organization of its site plan and the expanse it commands on a number of hills and elevations at a landscape occupying a strategic location at the very top of the Fertile Crescent, and last and certainly not least because of its alleged age according to Schmidt (PPNB), this archeological site has been a strong attractor of interest far beyond Archeologists.

It has been invariably claimed as a site that has revolutionized not only Archeology but also our understanding of the human existence, history and experiences since the Upper Paleolithic (Late Stone Age), after the last glacial maximum (LGM) and the start of the Late Glacial Maximum or Tardiglacial. In effect it has been presented by some archeologists as potentially the most significant finding in the history of Archeology. The name of Klaus Schmidt has even eclipsed in

archeological circles that of Heinrich Schliemann and the uncovering of Gobekli Tepe has surpassed in legend already the discover of Troy.

21 years have elapsed since Schmidt led his team into the excavation at Gobekli Tepe. Sixteen years have passed since his first formal report on the subject, see [2], and eight years since his Smithsonian magazine appearance [1]. Henceforth, Gobekli Tepe has been a focal point for any study of the Mesolithic (12000 – 5000 BC for the purposes of this paper), certainly for the PPNA and PPNB human settlement literature. The Schmidt and GT-related work is becoming a chronological marker in Archeology. Any new discovery about PPNA and PPNB sites references the discovery by Schmidt of the site at Gobekli Tepe. In fact, dating of artifacts are now pegged to similarly looking items at Gobekli Tepe, see for example [3] and the dating of "T" shaped pillars at Sefer Tepe. In effect, Archeology, the Mesolithic (or largely the PPNA/B), and Human recorded History and humanity's historiography are looked now quite differently post Gobekli Tepe.

By all counts, this discovery has had a significant impact. The extraordinary claim that Gobekli Tepe's oldest Phase, Layer III, could possibly be of the 10000 BC age (and possibly earlier) is profound. UNESCO, in offering a justification as to why Gobekli Tepe is cited for "Outstanding Universal Value", states that "Gobekli Tepe delivers the data which re-writes the considered models and theories of the time period which is called Neolithic in the history of archeological research". Very few if any archeological claims can outdo such a profound proclamation by UNESCO. By all accounts, the current claims about Gobekli Tepe must be considered as representing the dominant, prevailing "insiders" or the "establishment" view.

But what exactly is this evidence which seemingly supports such absolutely astounding claims? One might think even assume that the evidence provided by Schmidt is at par with the claim, and in effect it is itself astounding, watertight, extraordinary, beyond reasonable doubt. This paper's aim is to, in some detail, examine precisely this evidence. It will be shown that the evidence presented to justify the PPNB dates on Gobekli Tepe falls far short of being "airtight" and in fact contains a number of weak points, that overall do not justify either the claims on Gobekli Tepe's dates, or the extraordinary claims requiring a "re-writing" of Neolithic History.

Thus, in questioning the claim about Gobekli Tepe's date (of PPNB, possibly earlier) one might think that the one who does the questioning must have extraordinary and abundant as well as "almost beyond reasonable doubt" convincing evidence to counter what the archeological establishment has claimed about Gobekli Tepe. In effect, it seems it is no longer asked that the agency who makes the extraordinary claims about Gobekli Tepe provides the extraordinary evidence. But instead, the burden of proof has shifted to those who tend to counter the claims. Be that as it may, the paper will proceed as if the burden of proof is on the counterclaim. The paper will be setting the most stringent of all arguments and criteria in an attempt to support the counter arguments, although it doesn't have to do so.

Gobekli Tepe's spatio-temporal setting

Given the current dating of the Layer III at Gobekli Tepe (PPNB, circa 10000 BC), one can sketch out its (claimed) immediate spatial and temporal milieu. Located in South-eastern current day Turkey and on top of the Fertile Crescent, the claimed PPNB (possibly PPNA) Gobekli Tepe finds itself having as its immediate spatial and temporal vicinity a number of Upper Paleolithic (also being referred to as Epi-Paleolithic, with the last period of the late Paleolithic coinciding with the Younger Dryas geological period 13000 – 11700 BC), Natufian (or early PPNA), PPNA (early Mesolithic, 12000 – 9000 BC here), and PPNB (middle Mesolithic, 9000 – 7500 BC, here), settlements.

Beyond that time frame, there are certain Fertile Crescent settlements of a late Mesolithic (7500 – 5000 BC here) post PPNA/B Mesolithic that is, cities and urban areas that GT can be comparatively analyzed (like for instance, Catalhohuk). Numerous post-Mesolithic (post 5000 BC here) Neolithic settlements and monuments that have been excavated over the past half century, with the vast majority of them in the past 25-year period, and more than half of them in the past decade (all within the broader region of the Fertile Crescent, as for example the recent excavations at Uruk), further offer grounds to view Gobekli Tepe in a comparative framework in reference to its Art and Architecture. However, the focus of this paper will be the PPNA and PPNB environment, since it is to that environment that Gobekli Tepe has been argued as belonging by among many, its excavator K. Schmidt.

In reference to that PPNA/B environment, see for a list of settlements reference [4]. This reference includes sites with some proto agriculture and early agriculture related carbon-14 dating. A number of sites (like Catalhoyuk) isn't listed there, since Catalhoyuk is considered a post PPNB site. The ones that are listed include settlements that have not undergone apparently the process that Gobekli Tepe has, namely their deliberate burial. Some of those sites will be briefly mentioned here, as they represent significant discoveries, as both the result of their dating and their contents. They are nodal in a comparative study of human settlements' evolution.

Upper Paleolithic settlements (nomadic, quasi-sedentary) include (dates are based on C-14 dating on agriculture related items): Abu Hureyra (see [5]) a settlement with initial phases of occupation in the 11220 BC to the 10750 BC period, and with later inhabitation in the 7450 – 7070 BC period; Mureybet (see [6]), a Natufian (we will examine this more extensively later) settlement of the 10000 – 9900 BC period, with a later post-Natufian phase reaching to the 8750 – 7950 BC period; Tell Qaramel, see [7], a site showing occupation in three phases, ranging from 10900 – 8850 BC; Hallan Cemi, see [8] and [9], in the 9660 – 9320 BC time period; Mureybet [10] a late Natufian settlement of the 9600 BC; Jerf el-Ahmar, see [11] and [17], with its various phases falling in the 9450 – 8600 BC period; Nemerik 9, see [12], a settlement also in the 9800 – 8270 BC period; and Aswad, see [15], in the period 8500 - 7850 BC. Some of these settlements are mentioned in the paper by Schmidt that we shall scrutinize momentarily.

All these settlements had undergone repeated habitation and abandonment phases. Their periodic (occasional over the longer term) inhabitants were residents (whether nomadic or sedentary isn't that important for the purposes here) that over the scale of a few centuries would occupy these sites for a certain period of time. Under a variety of forces (natural causes due to environmental changes, earthquakes etc., or human factors, such as outside invasions by different cultural groups, or due to internal strife, or because of demographic declines) these settlements would undergo cycles of recurring habitation and abandonment. Most would periodically be reconstructed and eventually abandoned. These cycles often include multiple phases, extending well into the post Mesolithic period; whereas some contain limited cyclical habitation only extending into the PPNA or PPNB period.

In all of these settlements some sort of (proto, pre- or mature and organized) agricultural activity has been recorded. And in fact, it is largely (although not exclusively) because of its agricultural residual (from plants or animals) that we are presently capable of obtaining their dating by C-14 methods, to the extent that residual organic material has been preserved. Of course, another significant source for obtaining their C14 dating is through residual carbon from their hearths.

In surveying these (arbitrarily) picked communities from a sample of 85 carbon dated PPNA/B settlements in [4], one can derive some commonalities, within which one can frame the spatial and temporal context of the Gobekli Tepe (to be referred to as GT thereon) site. This context will be analyzed in sections that follow, and some of the above settlements will be more extensively scrutinized, to place GT in its proper chronological framework. This will be done, once the evidence on C-14 dating available on GT is presented and discussed.

K. Schmidt's C-14 dating evidence

In [1] one is struck by a number of issues the report covers, none more impressive than the single reference to C-14 dating. It is a rather passing reference, a reference made in a type of "backhanded way", as if Schmidt didn't really want to address it in any detail, although it is a very critical component of his thesis about the GT dating. Here's the reference: "The archeologists did find evidence of tool use, including stone hammers and blades. And because those artifacts closely resemble others from nearby sites previously carbon dated to about 9000 BC Schmidt and co-workers estimate that Gobekli Tepe's stone structures are the same age. **Limited carbon dating undertaken by Schmidt at the site confirms this assessment**." (Emphasis by this author).

Of course this single short reference to carbon 14 dating in the Smithsonian report (appearing a good thirteen years after the start of the excavation at GT) is of interest. In spite the tremendously important subject of carbon-14 dating, as this is in effect the single factor determining the age of the structures at GT, given the extraordinary state of architectural and artistic development this site exhibits – a state of evolution that would otherwise place this complex at a far later date (as we shall see in a bit) – this is the woefully inadequate extent of the

evidence presented. It should be emphasized though that since then much of C-14 dating has in fact taken place on items from GT, and this evidence will be discussed shortly.

The November 2008 Smithsonian article comes after a preliminary report issued by Schmidt in 2000, cited in [2], where C-14 dating is also addressed. We now shall look at this report and its C-14 evidence in some detail. Before we do so however, it must be noted that since the eight whole years that had elapsed between the 2000 report and the 2008 Smithsonian interview (one would had expected) the hard core and critical C-14 evidence would had been enriched and strengthened, and as such it would (or should) had presented – solidifying the evidence from 2000. As the reader can infer from the quote supplied above, this was not done. It was not done for a good reason, as we shall see after we discuss at some length the 2000 report C-14 dating evidence.

It must be kept in mind while the C-14 evidence is presented about KT the intrinsic peculiarity of the site: it was buried (under yet unknown conditions regarding dates of burials, the agencies that undertook it, and their intent, whether benevolent or malevolent or simply ritualistic, thus neutral) by considerable amount of dirt (it will be later discussed extensively also). Thus, one is confronted with dating two different entities here: the GT structures, and the soil (and the soil contents) used as "fills" to bury the monument(s). They involve not only two distinctly different entities, but as we shall see some external effect – a very serious side effect as we shall show.

In [2], p. 49, and discussing some "sculptures found in the fill" of structure A, Schmidt notes: "Two 14C dates on the fill are around 9000 BC calibrated". Moreover, on p. 52 of [2], Schmidt comes back to this C14 dating, by stating in reference to some stone tool evidence, again found in the fill of the mound, which includes PPNA dates: "But the two radiocarbon dates of around 9000 BC (cal) mentioned earlier are well in accordance with the appearance of Helwan points".

This statement follows immediately a statement that asserts: "The presence of Helwan points should clearly attest the existence of PPNA layers in the lower part of the mound, but **it has not yet been possible** to show which building layers can be precisely dated to that period." (Emphasis by this author). Of course this is so, simply because a fill does not provide such dates. And this simple fact is not totally lost on Schmidt, who being well aware of this reality in Archeology, states in discussing the lithic evidence of the fill of structure C, on p. 51 in [2]: "Since several PPNA types such as el-Khiam, Helwan, and Aswad points are observable in the fill, a pre-PPNB date for the *temenoi* cannot be excluded: it even seems to be most probable. But a preliminary analysis of the lithics is impaired by the situation that no 'sealed deposits' had been unearthed so far. All the material belongs to the fill of the buildings, which **can not** be confidently attributed to a certain level or layer". (Emphasis by this author).

In summary, this is all the evidence Schmidt presented to date GT. Since then, others have augmented the C-14 evidence on the various items of the fill significantly, see for example ref. [14]. This is very valuable work in the sense that it documents beyond reasonable doubt that the fill of GT was done by using soil derived from sites (possibly around GT as we shall see) that fall

under PPNA and PPNB material. However, recently some GT analysts, cognizant of the fact that fills do not necessarily date monuments, have been discussing C14 dating on the very structures of GT, namely the plaster of some of its pillars, see [14], where preliminary evidence seems to suggest PPNB (at least and possibly PPNA) material. Reporting from C14 analysis from plaster in Enclosure D at GT, a 9745 – 9314 (calibrated) BC is offered with an impressive 95.4% confidence level. More on the Neolithic C14 dating on GT is also found in [16].

One would feel quite comfortable, it seems, with all these C14 based dating reports, and all with such high confidence levels, springing all around the literature on GT and its chronological documentation. Except that there is a fundamental flaw to all this parade of C14 dates, to which we come next.

The problem with Schmidt's C-14 evidence

We already discussed the problem with dating "fills" as opposed to dating "structures". A fill's date (no matter how confident we may fill about its actual date) in no way dates structures, as it simply can be coming from soil deposits that are either older or younger than the structure itself. You can fill your home with dirt from your yard, which could be from various geologic strata, some containing fossils from the Pleistocene. This will not make your home a Pleistocene Epoch home. Or you can currently fill a 4th century BC Temple with soil from riverbanks containing live exoskeletons; this will not render the Temple a 2000 AD structure.

In Archeology, this is referred to as an impossibility to obtain a *terminus post quem* (that is, setting an upper limit on when the structure was built as it means "not possible to having been constructed **before** a specific time period" in effect putting a limit on the earliest possible time an event occurred – in our case PPNA or PPNB); or obtaining a *terminus ante quem* (that is, setting a lower limit on when the structure was built, as it means "not possible to having been constructed **after** a specific time period" and in effect putting a limit on the latest possible time an event occurred, thus telling us in effect in this case that the monument is as old as at least PPNB. It will be scrutinized whether secure evidence exists from GT to argue for a pre-PPNB date.

Fill can't be used to date structures. This is evident from the fact that either lithic morphological evidence or C14 dating of stuff found in the fill of GT's structures comes from a wide range of periods, ranging from the PPNA to medieval times. Obviously, the burial of GT didn't occur in medieval times, but the point is quite clear: fills do not date structures. Later in the paper, the possible sources for the fill will be explored. However, this isn't the key factor here as "material from the structure itself" has been carbon dated, and preliminary indications seem to suggest a PPNB at least origin. This is the element that has excited archeologists and GT enthusiasts alike. This is the type of evidence which needs serious scrutiny. To do that, we need to go into the C14 dating process itself and specifically look at its limitations. Scientists are well aware and very cognizant of the fact that C14 dating process can be contaminated and thus give false readings.

There are four specific conditions which limit the validity of the C14 readings – and of course the reader should keep in mind that we are referring to "calibrated" C14 counts, that is counts which have accommodated differential C14 containment in the atmosphere currently and in the past (which by the way in this case, circa 10000 BC, is considerable and stretched well into the C14 50000-year span for its validity). This differential is well accounted in the readings, since all the readings come with "calibrated" dates, thus this limitation is not applicable here. And so are the two other limitations, the one called "isotopic fractionation" a process involving differential absorption rates of carbons with different isotopic composition, not of specific import here, thus not further to be discussed; and "differentials in the carbon isotopic composition in the sample", again, of no particular importance here, although the sampling process is.

Finally we come to the last factor which could potentially and significantly affect the C14 readings from a specimen (the plaster of the various structures in the different GT enclosures in this case): **contamination.** This is the Achilles heel for GT's chronology. For an extensive discussion of this issue see [18]. Contamination is a basic side effect of the fill with which a structure is buried, and it can render an artifact either older or younger than it is.

There are two issues that can be raised in reference to the C14 dating of **GT's structures**. First, the material used to make the plaster by which the stones were covered could be itself from lime that was of PPNB origin, thus not reflecting the time the structure was made. A second objection could draw from the contact the structure has been with the fill for now at least as many millennia as old is the filling of the structure event. What we are now analyzing from the plaster is the organic material that has permeated from the fill's soil onto the structure, after the structure was buried. This is the second key (negative for the case of GT's accurate dating) externality that has taken place, as all surface material (plaster) has been contaminated by the dirt from the fill and its contents. In fact that the plaster contains loam (a type of soil particularly amiable to absorbing nutrients and water) makes this contamination process even more prevalent and likely, thus more pervasive. This issue is extensively analyzed here [31]. So, due to either causes, no matter what samples we collect from anywhere at the surface of the structure, they will keep repeating the reading which we already know from the soil contents' carbon dating itself. Because these samples had been the victims of this very serious side effect: contamination.

Why Gobekli Tepe isn't a PPNA or s PPNB site

In fact, no matter what we find inside the structures of GT's currently having been excavated enclosures will not (and quite likely never will) give us the actual (or roughly approximate) dates on the structure(s), at least given the technology we currently possess. Only the morphology and the socio-economic-cultural-demographic milieu of the structure(s) at GT will be our guide as to when, possibly, GT and its various components were built – especially its Layer III complex. To that, we now turn.

GT, it can be asserted with relative confidence, is not a Pre-pottery Neolithic site. It can't be for a number of reasons. The reasons will be elaborated in turn, and they are based on the analysis of the PPNA and PPNB environment existing in that region, and then compare GT's morphology and likely socio-cultural milieu against that environment. It will be clearly shown that GT is subsequent (and possibly by a long shot) to that early environment. That early environment contains markers in terms of symbols, architecture and demography which we do not match GT's art, architecture, and possible demography. GT is **far more developed** in all these counts from a relatively "primitive" pre-development phase depicted by the art, architecture and demographic structure of the PPNA and PPNB spatial and temporal conditions.

Architecture and Urban Design

The Architecture and Urban Design environments of the PPNA and PPNB eras are characterized by particular Architecture structures and forms, which we will analyze in turn. Pre-PPNA (although the time limits are not sharp and certain overlap is present rendering them necessarily fuzzy) structures are those referred to as belonging to the Natufian Culture, see [19].

Figure 1. Natufian Culture circular home. Early PPNA period, Jordan River Valley.

Regarding the extensive literature on the Natufian period of the PPNA (and its extensions into the PPNB the reader is directed to [20]. On the Natufian culture's architecture, we have a number of examples where structures (both private and public) are shown. Most are situated along the so-called "Levantine corridor" (the western section of the Fertile Crescent landscape), along the River Jordan Valley, stretching along current day Israel, Lebanon and Jordan up to western Syria and southern Turkey. They contain some stone foundations, and no mud brick structures.

In these Natufian settlements, one comes across examples of pre systematic agriculture practices especially in animal husbandry and in cereals. Fisheries was an important part of their diet, and locations close to rivers were apparently at a premium. In fact their vulnerability to raids and periodic structural refurbishing could be directly linked to their accessibility and access to resources (river). Parenthetically, this "double-sword" (being simultaneously a blessing and a curse) on accessibility and access is a theme which this author has expanded on considerably in previous publications (see for instance those on Kasta Tumulus [23] and Alexander III cities [24]. Access is a basic factor in the evolution of human settlements. Further, their dating is largely based on the C14 dating derived from their cereals and specifically grains of rye, and animal bones, although dating related to their lithic contents is also possible.

Their construction details and morphology consists of relatively round or arch shaped small scale structures. One of these cases is shown in Figure 1. The bare stone foundations of an early PPNA, possibly in the 10000 BC period Natufian type house is presented. These type houses are apparently huts, made out of timber (branches from trees – usually oak) and clay plaster resting on roughly assembled unfinished stones from local origin or quarries. However, the relative permanency of the foundations may indicate that this was a structure belonging to a member of the upper class. Certainly, less durable homes were then in existence, non-durable huts belonging to the then plebeians.

A clear development in the Architecture of these cyclical in form houses is the case of Hallan Cemi, shown in Figure 2. Hallan Cemi is located at the very tip of the Fertile Crescent, north of GT, close to a tributary of the River Tigris, see [22]. The settlement is dated circa 9000 BC, and clearly it belongs to the late PPNA period. In this settlement we recognize a symmetric design in its construction, some indication that a compass of sorts has been used. Orientations seems to become an important factor, second of course to location and size of the structure. Density in residential land use (both in persons per square meter of livable space, as well as gross density for the settlement) start to define minimum levels in comfort for the living conditions in sedentary dwelling activity. These factors will be addressed in the next section.

Hallan Cemi is an important settlement in the evolution of PPNA/PPNB transition architecture. It was a sedentary settlement, where houses consisted of buried stone foundations supporting wattle (stakes intermingled with branches of native trees) and daub (plaster or clay) huts. The immediate outside area of the hut was plastered. Inside the hut, hearths were found made out of plaster. They also contained stone benches. In one of these huts, the skull of an ox was found,

presumed hanging from the hut's wall. It seems that animal husbandry, forestry and fisheries was the residents' occupation, not farming.

Figure 2. Hallan Cemi and the three stone foundations of three houses.

A significantly more developed specimen of late PPNA early PPNB construction is the Jerf el-Ahmar site in present day Syria, Figure 3.a, representing construction of the 9500 – 8700 (cal) BC period, see [21]. From the eight structures excavated (seven being apparently private houses, obviously associated with the settlement's elites, and one being a public space – possibly a temple) one can obtain a view of the construction type at the site. The site is situated on the left bank of the Euphrates River. The site plan has an interesting morphology, as it involves the residential quarters of different elite members of the settlement, as we shall see.

Remnants of habitation on the site trace back to 13000 BC. That habitation contained elements of proto-agriculture. Houses in the settlement evolved over the decades (or centuries) from elliptical or almost circular to rectangular. In Figure 3.b early elliptical and almost circular houses are shown, as they evolved from single-cell to multi-nucleated shapes. Rectangular houses are seen in Figure 3.a. They also show an evolution, as their interior space was gradually subdivided by internal masonry walls to an increasing number of rooms. These internal divisors take the shape of "T" walls. These internal stonemasonry dry walls are as wide as the exterior walls.

Figure 3.a. Jerf el-Ahmar (9500 – 8700 BC) in present day Syria: the elliptical in floor plan communal building and the eight excavated houses.

Figure 3.b. Single-cell and multi-nucleated circular houses at Jerf el-Ahmar, with stone hearths.

Proximity to the communal structure, associated thus with greater access to it, is also associated with a greater in size homes. Possibly, this size and proximity differential is further associated with a hierarchical structure within the ruling elites. The closer to the communal building, the higher-up in the hierarchy possibly the occupants of the houses, and the larger the area size of the home. If this is the case, the interesting proximity of a possible "ΜΕΓΑΡΟΝ" to a possible temple is noted.

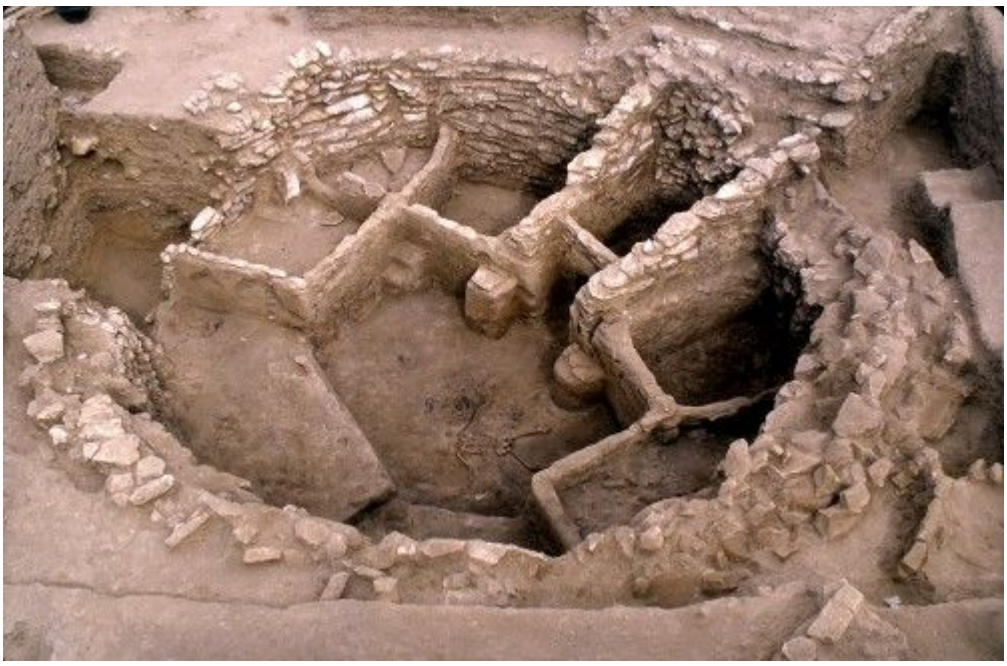

Figure 3.c. Jerf el-Ahmar, the elliptical communal structure.

However, again, these structures wee by no means the only structures in the community of Jerf el-Ahmar. These structures with durable masonry walls and stone based buildings represented the upper strata of the social fabric at the site. Very likely, many more homes made out of non-durable material were surrounding these durable residences. Possibly nomadic living or possibly "guest" workers were part of these communities as well. We shall return to this issue in the next section of the paper.

In Figure 3.c the communal building is shown. The floor plan of the structure indicates an ellipse with a 6-meter short axis and an 8-meter long axis. In its present condition, it is submerged underground by two to 2.50 meters. It must be noted that free standing stone structures were a few millennia away then (they appear first in the Malta Ggantija period of the 4th millennium BC. Back during the PPNA/B, stonemasonry walls needed support, and it got it by being submerged in the ground, as shown in Figure 3.c.of course, being submerged also provided extra protection

from the weather (heat/cold) as the ground level offered good year-round temperature and excellent insulation.

Jerf el-Ahmar's communal structure of Figure 3.c shows a morphology which is clearly reminiscent of the general morphology of Layer III (early Phase) in GT structures A and B. No matter the abstract and general resemblance however, it can also be concluded that in any case the communal building (possibly a temple, "ΤΕΜΕΝΟΣ") of Jerf el-Ahmar is a pre-GT type. In fact, one might be able to use this structure as a secure *terminus post quem* on GT.

Figure 3.d. The most recent almost circular structure at Jerf el-Ahmar, a (not yet dated) structure more primitive than GT, thus older.

This temporal sequence (Jerf el-Ahmar before GT) is further established by a closer look at a more recent (both excavation-wise and quite possibly in actual date, although not yet formally dated) circular structure at Jerf el-Ahmar, shown in Figure 3.d. The almost circular structure, with the recesses and the (small in height, judging from the size of the sole surviving) pillars is a primitive version of GT's structures A and B. In addition, however, Jerf el-Ahmar's almost equilateral hexagonal form (Figure 3.d) presents a slight advancement in geometry over GT's structures A, B and C. It must be noted though, that pending accurate measurements and excavation at other structures not yet looked at GT, some more advanced and complex geometry at GT might emerge.

That the almost circular structure of Figure 3.d is older than GT is obvious of course, given the level of sophistication and development in the size of the pillars. However, the fact that we do not yet have a secure date on it, prevents us from asserting it as *terminus post quem* on GT. We will analyze further this complex at Jerf el-Ahmar in the next section.

Urban Planning and Demography

An important message from the list of PPNA/B settlements provided in an earlier section on GT's possible "environment", and also evident in the comprehensive list of Neolithic settlements found in reference [4] is that settlements do not undergo a "parthenogenesis" of sorts; namely, at some point in time-space a single human settlement emerges (that may be called the "origin"), and then later on two may appear, to be succeeded by four and so on. This isn't how central place theory based schemes from the field of Economic Geography envisions how settlements undergo evolution.

Instead, a far more likely scenario must be the case, whereby a multiplicity of settlements appear at approximately the same time period (and of course, the theory critically depends on the actual length of that time period) over a wide region, coalescing from smaller spread out, clan-based, settlements. The central place theory (CPT) dynamic evolutionary framework has been discussed by the author in [23] and [24], and its (static, long term equilibrium in form) elaboration is found in [25] Chapter 12. Thus, one must expect a flurry of human settlements to have been around, by the time GT Layer III came into existence. And as we saw, there were numerous, representing different phases of the PPNA and PPNB periods.

A key attribute of these CPT type settlements is that they possess a hinterland, and that they are stratified according to a hierarchical structure, whereby a Zipf-type population size distribution governs their interactions.

Now, let us take a closer look into the area sizes of these settlements, their population estimates, and their densities. The size of houses during the Natufian, judging from the rough estimates of the house shown in Figure 1, is about 5 – 6 square meters. This represents a net residential density of about a square meter per person, considering about five persons per household in every hut type home of the Natufian period. In [24], population estimates are given of minimum size communities, allowing such communities to be viable (even in the relatively short term). These estimates range in the vicinity of about 75 – 100 persons per unit settlement on the average. Although we do not possess an age pyramid structure for the population then, it must be assumed that the average age hovered around 20 – 25 years. The subject of the world's possible population during the various BC millennia, and their likely inter-regional and intra-regional population distribution is addressed by the author (and references supplied) in [13].

That is, possibly a rudimentary hierarchy must have existed within a region, defined as an area that would allow economic and social interaction among its members (not necessarily all peaceful

interaction), where some small number of relatively high population levels (possibly around 300 individuals) would be on top of the hierarchy with exponentially decreasing in size settlements thereafter. Over time, millennia in this instance, larger communities would form, and communal buildings as well as other public spaces (such as paths or proto municipal roads) would appear. In that case, it may be more relevant to talk about gross residential population densities, whereby the total area of a settlement may have become of essence.

In the case of (the now inundated) Hallan Cemi, Figure 2, one encounters a settlement occupying an (excavated) area of about 50 meters by 35 meters (roughly 2000 square meters, or half an acre). It contains six houses with dry stone foundations, without this necessarily being an indication of the total number of homes there. It could be that these are the proto elites' more durable construction. A number of less durable (and more plentiful) homes, in a possibly apse-type ring surrounding this 6-house complex and away from the frontal side of the settlement, could complement the settlement. Considering about five persons per unit at the stonemasonry homes, this site likely corresponds to a community of about 500 inhabitants, presuming a 10:1 ratio of elites to the lower classes.

Figure 4. Sketch-drawing of the Jerf el-Ahmar urban settlement's site plan, showing the various elites' residences forming arches-rings surrounding the communal structure at bottom left. Source: reference [21]

Most likely this is an average size settlement for its era, as the settlement discussed earlier most probably also was. In a statistical sense, we possess no additional information to indicate a bias in the sampling, these settlements must be thought of as an "average" settlement in each case.

In absence of an age pyramid, it is safe to presume that the average age of the population increased at the margins between the settlement of Figure 1, and that of Figure 2. The Hallan Cemi average age must had been between 25 and 27 years. There's an inverse correlation between gross population density of a settlement and average age of its population stock, simply because lower gross residential densities reflect higher average wealth per capita, which in turn is positively linked to live expectancy and average age of a population group.

We now turn to the likely Urban Planning and Demography of the far more complex settlement at Jerf el-Ahmar. Here we come across a central communal structure, possibly the center of a trade and commerce activity, along with being a ceremonial center. In this structure, we have the beginning of a **Central Business District** (CBD). Immediately surrounding this CBD, a ring of very low density stonemasonry homes belonging to the uppermost social class is located. These homes are the rectangular houses of Figure 4.

This is in turn surrounded by another thicker in width ring (actually an arch within the excavated area) of a set of roundly shaped homes characterized by higher density (lower total covered area and possibly higher number of persons per household). These houses must have belonged to an elite (possibly the bureaucrats and hieratic corps of the settlement's social structure. All of these structures must had been surrounded by less durable housing units of a nomadic, periodically residing, visiting, or simply slave population, comprising the lower strata of the totem pole.

The area shown in the site plan of Figure 4, is simply an (excavated) slice of the total area of the settlement, the total extent of the settlement remaining still unknown. In terms of area size, the area shown in Figure 4 is approximately a 40mx30m (about 1200 square meters, or about quarter of an acre, and slightly more than a tenth of a hectare). Of course since the total area of the site hasn't been excavated yet, we do not know the total spatial extent of Jerf el-Ahmar. Given its topography (which indicates that the community extended to the upper left and lower right directions of Figure 4, as well as to the upper right, it may be presumed that about half to 75% of the area has been excavated, we are likely discussing a site of about a quarter to fifth of a hectare of buildings that a section at least of them contains stonemasonry construction.

Considering about an equal area taken by higher density temporary structures housing the lower classes, the total area of the settlement may have been close to one third or half a hectare. Again, assuming a 5-person households on average for the upper classes, these masonry houses could contain between 75 to 100 persons. Given a 10:1 ratio of elites to lower classes, the total population (resident, nomadic, slave) could reach at its peak between 750 and 1000 persons. The gross residential density would oscillate between 3.3 (3300/1000, that is the lowest area size divided by the highest population count) square meters per person and 6.7 (5000/750, that is the highest area size divided by the lowest population count) square meters per person. It is of interest that these counts are not far off those estimated in [26].

At around 1000 persons, very likely Jerf el-Ahmar would had been at the very top (or close to it) in the hierarchy of settlements at 8700 BC and the mid phases of PPNB. Thus, this is the

environment that would presumably be characterizing the CPT type scheme of which GT's would be part, if and only if GT was a PPNA/B complex. However, as we pointed out already, GT could not be a PPNB settlement. And here again, we point out why. The PPNB settlement of Jerf el-Ahmar contains a CBD which is at least one third the size of the GT CBD. GT has at least three enclaves of the type we see in Figure 3.c. That would require an urban settlement of at least 3000 persons, and in fact given that only 5-10% of the GT area has been excavated, it might turn out that such a settlement does surround GT.

A point of spatio-temporal interest to those familiar with the so called Alonso theory in the field of "New Urban Economics", where cities are shown to form in concentric rings (when isotropic – that is of equal transport rates in all directions – conditions hold) around a CBD, so that both residential densities and prices decline with distance, see [30] forming spatial gradients that can be approximated by a negative exponential form functions. Here we have a variant of this land use model, whereby densities increase initially away from a center and decrease thereafter.

Figure 5.a. Gobekli Tepe, Layer III, Phase one of construction.

The **scale** of GT is obviously different than that of Jerf el-Ahmar, and a simple glance at the photos of Figure 3.d and Figure 5.a, and a comparison between Figure 4 and Figure 5.b make that difference in scale abundantly clear. Jerf el-Ahmar probably was at the top of its regional hierarchy in PPNB. We can be confident of that because of two reasons. First, this is the largest in scale site that we have come across among those excavated that securely belong to the PPNB.

Second, it is very likely that this is the population level of a top in the hierarchy settlement during the PPNB phase of the Mesolithic, given the estimated world's population of the time, and what such population level would had implied for a regional human settlements CPT type structure, see [13], where a discussion and references on this demographic issue is given.

GT was also probably at the very top of its current hierarchy then. We do not possess any indication that the populations of the PPNB and that of the GT era were that different, see the US Bureau of the Census statistics in [13]. In the evolution of human settlements, a historical law governs development. Over time and given the overall increase (however large or small) in population size of a region, the top of an earlier CPT scheme would always be smaller in size than that of a later CPT. Top urban settlements are always succeeded by larger in population size top urban settlements *ceteris paribus*. Being larger in scale than Jerf el-Ahmar automatically sets GT at a later date.

Figure 5.b. Gobekli Tepe area under excavation; according to the archeologist in charge (Klaus Schmidt) only 5% of the total area has been excavated.

The difference in scale isn't only evident in population size, it is also evident in area size. Compare the two sites' areas from Figure 4 and Figure 5.c. GT's already excavated size covers an area far larger than 50m by 100m, by far larger already than the Jerf el-Ahmar excavated area size. And one must keep in mind that not even 10% of the GT site has been excavated. There are of course areas used as quarries in that area delineated by the grid's coordinates (J-N) and (7.5-11.5) of Figure 5.c. Although we do not yet know how much more of that quarry activity is included as

part of the site, it obviously can't be a considerable multiple of the site's built complex. That would be a very inefficient use of resources, both in terms of labor, as well as natural resource (limestone) and land, not to mention time spent on the production and consumption of the monument.

Besides, the already excavated site's size is larger than Jerf el-Ahmar by a ratio of at least 2:1 (depending on accurate measures on both, not yet available beyond a rough count). Indicatively, the GT's central structure A is about twice as large in length and height compared to Jerf el-Ahmar's communal structure's size; compare Figure 3.c. and Figures 5.a, b. Thus, on the basis of the Urban Planning and Demography stand points, GT's scale sends it on a far later time period that Jerf el-Ahmar's PPNB time frame.

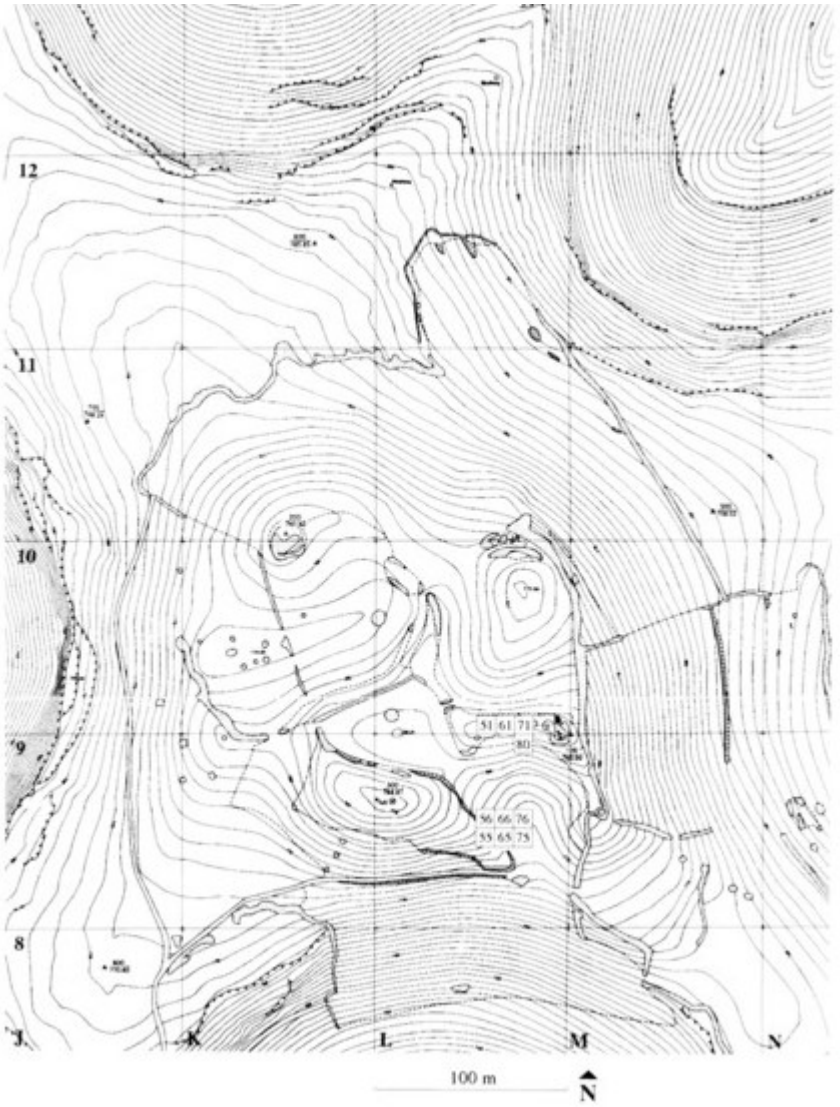

Figure 5.c. Gobekli Tepe topographical map and site plan of excavated area by Klaus Schmidt. Source [2].

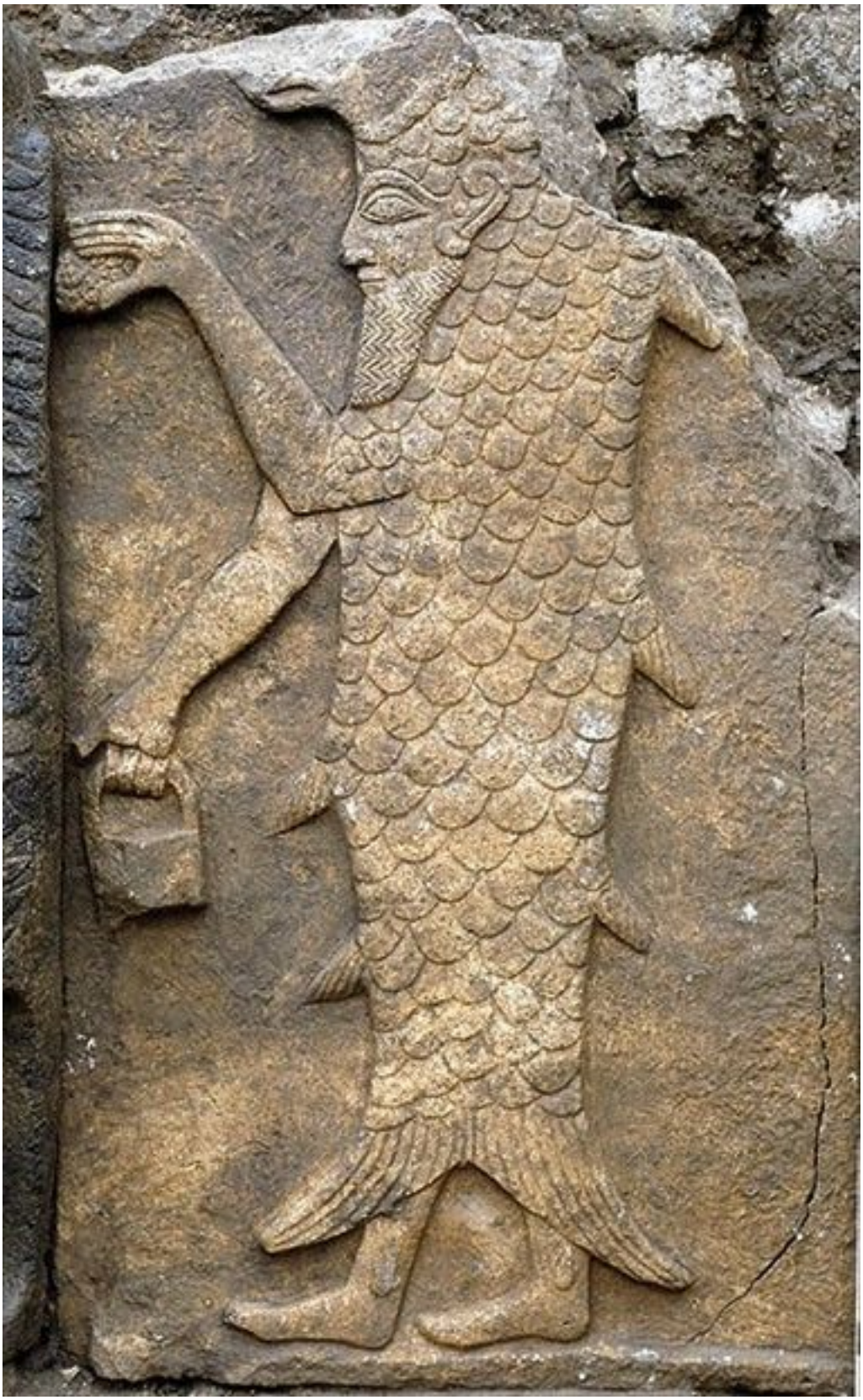

Figure 6. The purification symbol being carried by a priest (fish-man) as an offering to the "Storm god" in this 14th century BC rendition on a frieze at a palace at Uruk. Source: [29].

A close look at Figure 5.b may also reveal the source of all that fill for the GT Layers III, II and I structures: the very mining areas where the monoliths came from. It is quite apparent that at the time GT was constructed the Tepe's immediate vicinity was morphologically and topographically quite different. It is little doubt that older sections, going back to PPNA (as well as PPNB) settlement activity might had existed, albeit in different form, at GT's current site.

Art and Symbols

Last, we examine the artwork of GT, and especially a single symbol of it – shown at the preamble photo of this paper: the triple representation of the "handbag" symbol on top of a central pillar in a GT enclosure. It is beyond any doubt that GT's iconography is extraordinary, both in its variety and sophistication, as well as its state of preservation. The state of refinement (in sculpting and detail, as well as preservation of the fine detail in its carving) is indeed astonishing, no matter whether it is a PPNB or a much later (but none the less still Neolithic) monument.

The subject of symbolism in Art is of course a very involved and highly complex topic; it has been preoccupied the field of Art and its literature for millennia. It is by any means a huge topic and obviously this paper is not the appropriate forum to fully address it at any depth. It will be just touched upon. Further, since this isn't a paper on Art, some statements (on the basis of which the arguments will be formed) will be made in a summary manner. Moreover, since the main argument of this paper is to disprove the claim that GT is a PPNB (or older) monument, rather than trying to peg a specific later date on it, the arguments will be confined to simply the symbol already mentioned, showing it in its later (circa 1350 BC) version in Figure 6. It is enough to make the point.

Before we discuss the symbol, three general rules must be mentioned in summary, regarding the evolution of symbols. Rule #1: a symbol, in evolving, becomes more and not less complex in space-time. This rule simply stated implies that a late version of a symbol can't be simpler than an earlier version. Rule #2: symbols evolve, they do not stay static, and consistently with rule #1 they do not exhibit reverse evolution. Rule #3: symbols do not get "re-discovered", that is, symbols do not lie dormant for millennia. They do not appear in identical form way down the road from a single earlier and hidden from public view version. Let's analyze these rules in some detail in reference to Art and with the symbol under discussion here as a backdrop.

On the first rule, one recognizes that human experiences add to the meaning of a symbol, thus the symbolism (the symbolic essence) of a symbol in time undergoes change. In so doing, additional components and complexity are added to a symbol, once it first appears. "Reverse

evolution" is a term used in biology, and whether it has "standing" or not isn't an issue to be debated here. It suffices to say that the term reminds one the phrase "going back in time" from Cosmology and Physics, and its impossibility in these frames of reference.

Two striking examples (on which the author has spent considerable efforts in analyzing) are the spirals and the meanders as eternity symbols. In [13] this author has analyzed the spirals, and in [27] and [28] the meander. It is shown in [13] how the complexity of the sign representing the spiral eternity symbol has evolved over a time period of a few centuries from the simple spiral of the Hagar Qim Temple (circa 3700 BC) to that of triskelion at Newgrange passage tomb (circa 3200 BC) in complexity; whereas in [27] and [28] the author has demonstrated how the complexity of the meander eternity symbol has evolved from the 4th century BC at Kasta Tumulus' tomb to the 1st century BC at Ostia Antica. Both meander types are simply an evolution of the simple Greek eternity symbol "ΓΑΜΜΑΔΙΟΝ", which is a set of four letters representing the capital letter Gamma, "Γ", tied in a clockwise or counter-clockwise fashion from the tip of their legs – the longer of the two lines in the right angle.

Now the point might be made, that at times Art tends to simplicity rather than become more ornate; that is, evolve towards the less complex from a more complex design. For example, the Bauhaus movement in Architecture (and the International Style) was a movement towards simpler and thus more efficient construction and in its architectural and artistic forms and aesthetics. It, in effect, followed in succession the complex and elaborate Art and Architecture forms of the Romantic era and the Renaissance, not to mention Baroque and Rococo. One might argue that Courbet and the Impressionist, Art Nouveau and Cubist movements in Painting and Sculpture of the late 19th and early 20th century represented a "return" to simpler forms of Art. That for example, Piet Mondrian was simpler than Michelangelo, Botticelli or W. Gilpin.

This of course isn't so, and there are numerous reasons as to why. Picasso's return to "primordial" African simplicity doesn't make 20th century European Art "simpler" in its content than any prior century European Art. Trying to imitate or "create" older styles drawing from ancient African motifs doesn't set Art into a "reverse evolution" process. Picasso didn't "return" European Art into 8th century BC African Art. The Art and Architecture of "deconstruction" didn't regress Art and Architecture. It instead "evolved" it, as it attempted to "reconstruct" older forms and themes into new combinations of symbols and a higher level of complexity in both meaning and form, and the advanced materials, methods and artistic movement used to express these new (apparently "simpler", but not so in reality) forms make these points clear. In effect, a seeming (from a superficial phenomenological standpoint) "simplicity" in form rendered Art and Architecture quite more complex. The proof is inside a simple asymmetry: 8th century BC Micronesian artists could not produce the paintings of "Primitivism" and the synthesis achieved by Gauguin in his Tahiti stage.

With these brief comments in mind, let's take a look at the symbol, which the archeologist in charge of the recent excavation at Uruk, see [29], classified as a "purification" symbol. The

"handbag" or "basket" purification symbol, excavated at the site of Uruk belonging to the 14th century BC time period frieze is **an exact** replica of the symbol shown at the very top of the "T" shaped monolith at structure A of GT's Layer III. This symbol's form in fact clinches the case for a late date on Gobekli Tepe.

It is simply impossible a symbol to lay dormant (rule #3 above) for a period of more than eight millennia (if one assumes a PPNB date on GT) and then suddenly the same exact symbol to reappear intact in a location relatively close to the location in question (both GT and Uruk lie on the Fertile Crescent, and both have had extensive interactions over the millennia). One must accept an (at least) later (if not quite later) date for GT, just based on this symbol.

Reference must also be made, although it will not be extensively covered here, on another symbol also, namely the "H" symbol encountered at the pillars of GT. Such a symbol, it can be argued on its complexity, symmetry and later evolution into the letter "eta" (HTA) of the Greek (and many other) alphabets hints at a late date for GT as well. However, analysis of this and other symbols is left for future analysis and research.

Conclusions

The paper set the settlement at PPNB's Jerf el-Ahmar as a secure *terminus post quem* on Gobekli Tepe. It could be shown that even a later date could be easily set as an upper bound to when Gobekli Tepe could possibly be constructed. However this is left to future research. It was argued that all C14 evidence produced from either the fill or the plaster off the surface of Gobekli Tepe's pillars contains contaminated from PPNA and PPNB fill evidence, thus it consistently will provide inaccurate readings. Evidence from Architecture, Urban Design, Urban Planning, Demography and Art was used to place Gobekli Tepe's construction at a later than PPNB date.

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