

# A note on domestic vs communal grain storage in the Early Helladic period

## Abstract\*

This paper sets out to propose an alternative model of economic management at settlements of Early Helladic I–II date, where evidence of socio-economic hierarchies is not prominent in the archaeological material. It is suggested here that the remains of certain original structures within the boundaries of settlements were once granaries which served the whole community. If this reading of the material is accepted, then communal storage seems to have supplemented domestic storage or constituted the sole method of grain keeping at a number of settlements during the initial stages of the EH period. The practice was then abandoned and, with one exception, after the EH II–III break there is instead a strong case for domestic storage only. A potential EH I–II communal management of basic food supplies thus carries wider implications for the interpretation of the general management of settlements.

*Keywords:* Early Bronze Age, granary, grain, storage, pithos, *bothroi*, communal, distribution, *Rundbau*

## Introduction

“I think it not an overstatement to maintain that, since at least the Late Neolithic (and in most cases before), there ceased to be egalitarian societies throughout the Aegean.”<sup>1</sup> Speaking on “transegalitarian” societies, where equality is insincerely claimed since the reality behind the words proves the

opposite,<sup>2</sup> Wright delineates how competitive factions of such societies, and their leaders, affected Aegean populations and eventually transformed them into more complex societies.<sup>3</sup> When dealing with the supposedly last groups of egalitarian society, i.e. where inequalities are temporarily achieved—not institutionalized—Halstead notes that cooking and, by extension, ingestion are tasks acted out openly and probably communally.<sup>4</sup> Food is central to the understanding of the dynamics in a society: How was it produced? How was it stored? How was it cooked? How was it eaten? These questions are simplified, but in order to grasp the character of the organization and structure in any population, be it village or state, one should always look to how the basic resources are handled. In this paper, the focus is on storage and particularly the access to storage.

During the Early Helladic (EH) period, large, underground, rock-cut spaces and some odd architectural structures (a few of which are situated distinctly in the centre of the settlement) were in use. They do not appear to have served as dwellings and, although site-specific and singular in execution, it is clear that they are not contemporaneous with the preserved evidence for widespread domestic storage at those particular sites. There are few finds to indicate their function,

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<sup>1</sup> Wright 2004, 68.

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<sup>2</sup> Definition by Hayden 2001, 580. Hayden states that although relative poverty and low status could be a lifestyle choice, implying that the choice is based on a lack of readiness or laziness on the individual's part, it is probably the recognition that attempting to upgrade status is a lost cause which prevents that individual from even trying. However, is there and has there always been a universal desire for wealth and power? Just as some are either trained or genetically disposed to be ambitious, others are not. Other values in life could be chosen by some individuals or groups as more treasured than materialistic status, in addition to an individual's worth as a community member.

<sup>3</sup> Wright 2004, 70–76.

<sup>4</sup> The egalitarian groups referred to are the people of Early–Middle Neolithic Thessaly (Halstead 1995, 16–17).

but I shall propose that these exceptional features of certain settlements were communal granaries. Unfortunately, the full context of the structures in question cannot be reconstructed because neither the contemporaneous architectural milieu nor the preceding/succeeding phases are fully understood. Yet, certain general patterns, which I demonstrate below, appear in the archaeological records from a number of sites.

## The storage of grain in theory

Subsistence storage and surplus storage appear to be two fundamentally different economic strategies. However, Halstead rectified the earlier commonly held view that the notion of surplus production developed under some very specific and favourable circumstances to become the foundation of social complexity, and has shown that agricultural surplus was the objective of agricultural strategy in Greece from the Early Neolithic onwards, whether large-scale or not.<sup>5</sup> Overproduction is simply a natural response to avoid scarcity in times of crop failure or other environmental adversities.<sup>6</sup> Thus, there is a thin line between bulk storage for annual consumption and surplus storage, even in subsistence societies, which could be used for other purposes. Archaeologically the distinction would be next to impossible to identify in most contexts.

Studies of Greek Bronze Age storage strategy and capacity are strongly associated with economic and socio-political change, and with particular focus on the palace economies and the development preceding them.<sup>7</sup> “What is being stored, how and where stores are housed, and who controls access to storage facilities are crucial questions for understanding complexity.”<sup>8</sup> Smyth identifies three storage systems—a central system, a community system, and a domestic system—which reflect the political and socioeconomic organization of any given society.<sup>9</sup> In the central storage model, bulk food is held under authority control and deposited in a centrally placed and often large structure; in the community storage model (later referred to as peripheral or regional storage),<sup>10</sup> bulk food is still under authority control but delegated to a local level; and in the domestic storage model, the individual

household remains in control of its resources. Aegean Bronze Age contexts only testify to the domestic and the central/palatial storage models. These two types of storage control would normally reflect the individual’s degree of dependence and obligation in relation to the community. In the first case, there appears to be independence but vulnerability, and in the second, security but also dependency;<sup>11</sup> belonging to an authoritarian economic system, however, does not guarantee relief in times of crisis.<sup>12</sup> In fact, in weak or poor states, retaining autonomy and self-sufficiency is perhaps the least risky option.<sup>13</sup>

Social storage, as a means of “banking” by offering food in exchange for tokens or expectations of future reciprocals, is another dimension of storage.<sup>14</sup> It can be a clever way to show off generosity at a time when you can afford to be generous—the recipient feels and perhaps is seen by others as the indebted, and the debt can then be cashed in during times of austerity. This practice can be carried out on all levels of relationships, both intra- and inter-community.

An oft-cited study by Hendon concerns Mesoamerican customs of exposing versus hiding storage and what those acts signify: a community which appears socioeconomically homogenous used outdoor pits for storage, which in size and number were apparent to all; the lower-middle strata of a more differentiated community used buildings, which were also outside of the dwellings; the higher status strata of the same community, on the other hand, used the dwelling itself for storage, thus keeping their assets less exposed.<sup>15</sup> Hendon interprets this as a desire in the lower strata of society to exhibit resources. However, in the case of the more homogenous communities, the exposed household storage could simply mean that the individual possession of more or less surplus was not an issue to be concerned with. (In the end, one would probably not let a member of a small community starve to death because of their inability to amass harvests on par with other members of the group—people do get old, not

<sup>5</sup> Halstead 1989.

<sup>6</sup> As demonstrated by Forbes (1989, 91–93), this is also true of modern subsistence farmers in Greece.

<sup>7</sup> E.g. Renfrew 1972, 287–289; Halstead (1992) regarding specialization on a few agricultural products under direct palatial control and taxation of more diversified products for palatial storage; Strasser (1997) on protopalatial *kouloures*; Christakis (2011) provides an account of the archaeological evidence for storage from Neolithic to Neopalatial Crete.

<sup>8</sup> Smyth 1989, 90.

<sup>9</sup> Smyth 1989, 91–93.

<sup>10</sup> See e.g. Psaraki *et al.* 2013, 89–90 and Christakis 2008, 10.

<sup>11</sup> Halstead 1989, 78; 1995, 16–19. On the redistributive/regulative character of the Cretan Bronze Age palaces, see Renfrew 1972, 480–482; Branigan 1987. Halstead (1992, fig. 1) illustrates a model of palatial economy with agricultural labour, non-staples (taxes) and staple grains as the obligations of the non-palatial sector to the palatial, and possible craft goods and subsistence relief could then be offered in return.

<sup>12</sup> Christakis (2011, 202–203) argues that the storage capacity of the palaces covered the needs of only a select few and that the general community did not benefit from the palatial storage.

<sup>13</sup> Forbes (1989, 96, citing Wolf 1966, 17): “The peasant retains – in his control of land and his capacity to raise crops on it – both his autonomy and his capacity to survive when others, more delicately dependent on the larger society, find such survival difficult.” The quotation is appropriate for the modern farmers studied by Forbes at Methana, who had no desire to be incorporated in any larger economic systems and who fared comparatively well through WW II and other crises.

<sup>14</sup> Halstead & O’Shea 1982; Halstead 1989, 79.

<sup>15</sup> Hendon 2000, 45.

to mention sick and incapacitated in other ways.) Items other than staple food could perhaps signal social diversity more effectively, and in discussing “storage”, Hendon actually presents examples which are not directly connected to basic needs.<sup>16</sup>

A communal form of storage, which is open to the members of the community and not under the control of an authority, is not included in Smyth’s three models. If my interpretation of the round buildings and large pits is correct, i.e. that they served as village granaries with communal access, the organization of such is neither on a domestic nor a centralized level. There are examples linked to land use, like grazing in modern pastoral Greece and the Swedish “right of public access”,<sup>17</sup> where the individual is trusted to behave according to social codes when making use of resources on common lands. Such systems have been upheld for centuries by the simple force of a combination of common sense, mutual respect and social control.

## The storage of grain in practice

As pointed out by Tomkins, for households to function, there has to be some type of storage facilities in the household for the daily preparation of meals,<sup>18</sup> but the issue here is the relationship between household and long-term bulk storage of grain.

In his study of the Protopalatial *kouloures* in Crete, Strasser turns to Roman authors for advice on underground and above-ground granaries.<sup>19</sup> Subterranean grain storage is generally understood to be best for long-term storage, and above-ground grain storage is best for the short-term. These practices have been tested and supported by experimental archaeology. In experiments aimed at recreating the conditions of possible underground grain storage in Iron Age Britain, results were positive.<sup>20</sup> The original pits were mainly cylinder- or beehive-shaped,<sup>21</sup> and all were of very similar size with a capacity of 1,200 litres. In the experiments, it was clear that the size of the pit was not of consequence to its utility, and smaller pits were constructed in order to economize. They were cut through subsoil and limestone bedrock, lined with clay, capped with clay and rubble, and then left without protective superstruc-

ture. Notably, some pits were also left unlined. After a period of six months, from October to April, the grain was taken out, and it was found to be still in good condition. However, opening the sealing to take out part of the contents and then resealing the pit caused the upper layer of grain to degrade. If all the grain was not taken out and consumed, there would be great losses, and it was therefore suggested that pits were more suitable for storing the seed grain for the sowing season than for storing grain for consumption. Instead, jars of unfired, still-moist clay proved to be the perfect vessels for storing and drawing grain, whether they were sealed or not, but such containers would rarely show up in the archaeological record.

In modern underground silos, the highest permissible moisture content is 13%, but in prehistoric Britain the moisture content would probably be 16%.<sup>22</sup> Since Britain has a much more humid climate than southern Greece, the storage conditions in Greece are more favourable in that respect. Firing the pit before use could also be a means of making the storage area dryer, and it would also have killed off unwanted microflora. Nevertheless, a flooded *bothros* does not perforce mean that the grain is lost, at least not as foodstuff.<sup>23</sup> In short, the experiments showed that with very simple means grain can be stored underground (even in a temperate climate), outdoors, and for many months.<sup>24</sup>

There are numerous threats to long-term food storage, and containers would therefore have to be resistant not only to humidity but also vermin. However, certain crop-processing practices may both protect and prolong the life-span of stored food. Glume wheats, like emmer and einkorn, are enclosed in spikelets that, after threshing, have to be additionally pounded in order to fall off. The indoor storage of wheat still in its spikelets is a practice which has been attested at prehistoric sites in Greece.<sup>25</sup> The advantage is that the wheat is then not as vulnerable to decay as other cereals, but the disadvantage is that additional storage space is required.

For the Cretans of the Late Bronze Age, Christakis estimates that nearly half of an adult’s nutritional intake derived from cereals, corresponding to 300–400 litres annually.<sup>26</sup> It would thus seem safe to calculate the capacity of the preserved

<sup>16</sup> Hendon 2000, 45–47.

<sup>17</sup> “Allemansrätt”, literally “every man’s right”, gives the public the right to use the countryside, including private lands, under certain rather self-evident rules (<http://www.swedishepa.se/Enjoying-nature/The-Right-of-Public-Access/This-is-allowed/>).

<sup>18</sup> Tomkins 2004, 42.

<sup>19</sup> Strasser 1997, 79–81.

<sup>20</sup> Reynolds 1974.

<sup>21</sup> Reynolds notes in his experiments that cylindrical pits have a tendency to become beehive-shaped after repeated use and cleanings (1974, 129).

<sup>22</sup> Reynolds 1974, 119, 121.

<sup>23</sup> Reynolds 1974, 128.

<sup>24</sup> Strasser (1997) and Halstead (1997) used the same source of information, i.e. Reynolds 1974; yet, with contrary results. Whereas Strasser concludes that the subterranean *kouloures* of Phaistos and Knossos could not have functioned as silos, Halstead leans towards the interpretation that they were indeed granaries.

<sup>25</sup> Halstead 1989, 71; Jones 1987, 115–116.

<sup>26</sup> Christakis 2008, 29–30; 2011, 202. Christakis proposes that individuals in preindustrial Mediterranean societies would have required 166 kg of grain per annum. In production, this quantity equals 4 *stremmata* of arable land (1 *stremma* = 1000 m<sup>2</sup>), including two in fallow (Christakis 2008, 34). Barley was the grain of choice for the calculations.

containers and *bothroi* in order to estimate the number of individuals the stock could have served. In most archaeological contexts, however, there are too many uncertainties involved: How many containers/*bothroi* were in use simultaneously? How many containers of perishable materials were used? How many of the containers were used for other storage than crops? What type of crop was stored?<sup>27</sup> How pure was the crop?<sup>28</sup> If it was wheat, was it stored with or without spikelets? These unknown factors all make the results of the calculations unreliable.

## Domestic grain storage

There are no indications of Early Helladic centralized grain storage in the manner of the Middle–Late Minoan and Mycenaean power structures, where some storage facilities are clearly incorporated into a superstructure which only few could access.<sup>29</sup> Instead, there appear to be only the (suggested) communal granaries and the household receptacles (two main options, pithoi or *bothroi*), but it is also probable that there were containers made of perishable materials, although traces of such remains are yet to be attested.

### PITHOI

The most frequent of storage containers is the ceramic pithos, which comes in a variety of shapes and sizes. Common uses were probably for water, grain, legumes, olive oil or wine, but basically anything could have been stored in pithoi. Pithos fragments are found in most archaeological settlement contexts, and this attests to their use as storage vessels in both humble and less humble dwellings, but their numbers possibly increase with the size of the building.<sup>30</sup> However, the larger size of the building and the larger storage facilities may suggest nothing more than a larger household. It should be noted that the so-called “corridor houses”, of which the House of the Tiles at Lerna is the best preserved, have not yielded any storage areas with pithoi *in situ*, although the buildings are often

presumed to be redistributive centres.<sup>31</sup> One problem with mapping out the pithoi of households is that only a minority of Early Helladic dwellings have pithoi *in situ*; this phenomenon could partly be explained by how the houses were abandoned, e.g. if the furnishings were removed, or whether later building phases have intruded on the remains.

In an analysis of the storage capacity of an EH II house at Thebes, nine pithoi and fragments of 60 amphorae and 40 jars were accounted for.<sup>32</sup> The EH II pithoi ranged in content capacity from 143 to 178 litres, and therefore—if using Christakis’ estimates—two pithoi would approximately cover the needs of one individual’s annual intake of grain. The excavated houses of EH II Thebes have, as yet, not yielded evidence of an individual concentration of economy and power, but the evidence rather points to self-sufficient units within the settlement. In this case, Psaraki *et al.* suggest a multi-centric economy in which the individual household constitutes the basis.<sup>33</sup>

### BOTHROI

Cylinder-shaped pits have been dug into the soil, or cut into bedrock, for many reasons and in many different cultures.<sup>34</sup> In domestic contexts dated to the Early Helladic III period, there is an abundance of such pits. When excavated, these pits may contain—as in the case of Berbati—non-stratified earth mixed with contemporaneous pottery fragments, animal bones, ashes and organic matter. Säflund therefore concluded that the intramural EH II–III *bothroi* of Berbati were not used for storage but were intended for waste disposal.<sup>35</sup> One

<sup>27</sup> See e.g. in Psaraki *et al.* 2013, table 1 for how the same volumes of wheat and barley have very different weights and different nutritional values.

<sup>28</sup> Although it has been shown that, from the Neolithic onwards, the stored grain is generally of very high purity in that it contains no or very little weed or other contamination (Dennell 1974, 132–135).

<sup>29</sup> Whether or not the storage is for the benefit of all or the elite only (cf. Halstead 1992; Christakis 2011).

<sup>30</sup> E.g. the House of the Pithoi and House L at Zygouries, with four and six pithoi respectively, are not the smallest of the excavated houses of the settlement (Blegen 1928, 9–12, 21–22).

<sup>31</sup> It is principally the large buildings excavated at Lerna, Kolonna, Thebes and Akovitika that are referred to as corridor houses. The excavators of Kolonna and Akovitika are convinced of the buildings’ hierarchical significance. Felten (1986, 23) is willing to call them palaces and Themelis (2011) argues that they are centres of administrative and economic control, possibly religious too, over satellite settlements of the region. Also, general literature on the Aegean Bronze Age often states that the corridor houses are in all likelihood chieftains’ seats (e.g. Pullen 2008, 30–36; Renfrew 1972, 390). Although few want to use the word “palace”, they either imply or specifically state that the buildings constitute evidence for a palatial economy with central storage and redistribution. Large-scale, intramural storage capacity has been questioned, however (e.g. Pullen 2011a, 187), as has the use of the corridor houses as centres of governance (e.g. Nilsson 2004, 136–145).

<sup>32</sup> Psaraki *et al.* 2013, 91–94. Although the amphorae and jars were used for storage, they probably most often contained produce other than cereals; the pithoi, on the other hand, could also have contained e.g. water, wine and oil.

<sup>33</sup> Psaraki *et al.* 2013, 99.

<sup>34</sup> Aegean 20th-century examples of domestic uses include a drainage sump (Hutchinson 1935, 6–8), a container for rising and flavouring bread dough (Blegen *et al.* 1950, 84 n. 1), and an oven (Mylonas 1928 (pr. 1975), 162).

<sup>35</sup> Säflund 1965, 121. Bulle, on the subject of the numerous intramural *bothroi* of EH III Orchomenos, suggests that they were used for the deposition of sacrificial ashes (Bulle 1907, 29–34).

could argue, however, that any hollowed underground space, like wells and cisterns, usually ends up as a waste disposal unit when it no longer serves its original purpose. As Caskey put it, “Some [*bothroi*], lined with clay, must have served first as cool places for storage; almost all, lined or unlined, were used ultimately for the disposal of rubbish.”<sup>36</sup> Also, most *bothroi* that can be put in relation to architecture are intramural, which would suggest that they were put to other practical uses than simply for garbage disposal.

The *bothroi* used for grain storage, as defined by Strasser, are underground rock-cut or clay-lined pits, not simple dirt pits which, he states, would not have kept the grain safe from damp.<sup>37</sup> However, Reynolds showed that unlined pits served well for grain storage.<sup>38</sup> Perhaps clay-lining is still a better alternative since many unlined pits were actually dug into a layer of clay, as in the case for the Orchomenos *bothroi*, which Hutchinson was the first to suggest had been used for grain storage.<sup>39</sup> At Orchomenos, the first pits were constructed in the collapsed mudbrick walls of the previous settlement phase, the *Rundbautenschicht*, while the slightly later ones are thickly lined with clay. Thus, the effect on the preservation of the contents of both types of pits, lined and unlined, must have been more or less identical. At Lerna, the majority of the c. 280 excavated EH III *bothroi* are unlined.<sup>40</sup> They are, however, cut into the mudbrick layer of the EH II settlement phase and, in some instances, can still be discerned as cylinder-shaped shafts in the standing mudbrick walls of the House of the Tiles.<sup>41</sup> Although not Helladic, but still in an Early Bronze Age (EBA) Aegean context, are the many *bothroi* of Troy Phase IId, the “Pit Period”, and other EBA phases, that are unlined.<sup>42</sup> Troy is an urban site of the tell type and therefore has large volumes of collapsed or levelled mudbrick under the buildings of each phase. Thus, the *bothroi* could have been for domestic grain deposits at Orchomenos, Lerna and Troy even though they were not lined with clay. In addition, the problem, if any, of humidity control in unlined pits can be solved with other measures, like the application of ashes and sand.<sup>43</sup> It is noteworthy that the Neolithic–EH I pits of Eutresis, with diameters ranging between 1 and 2 metres, are suggested by the

excavators to be clay quarries.<sup>44</sup> However, in accordance with the previously mentioned examples, if these pits were dug into a natural clay layer, they could just as well have functioned as storage space. To simply extract clay, one would not necessarily dig circular shafts of rather limited diameter.

Hutchinson, Marinatos, Mylonas and Strasser have all suggested that a majority of the Early Helladic *bothroi* were originally used for grain storage.<sup>45</sup> Strasser is of the opinion that “*bothroi* may be a form of storage intermediate between domestic and state controlled facilities”, but he points out that within the frame of the “social storage” hypothesis<sup>46</sup> they appear to be non-applicable for the development of Aegean palatial economies: none precede the Cretan palaces, and there is the hiatus between EH “granaries” (meaning the *bothroi*) and the storage facilities of the mainland palaces.<sup>47</sup> However, the *bothroi* found in domestic contexts do not constitute large-scale storage spaces.<sup>48</sup> On the contrary, both in terms of size and location, with access generally through a dwelling, they instead provide evidence for household storage facilities.

## Suggested communal granaries

The absence of large storage containers in Early to Middle Neolithic households in Greece led Tomkins to suggest that staple food was stored communally.<sup>49</sup> There must have been small or large granaries in every agricultural community, and yet few are attested in archaeological contexts. Solid evidence is scarce for granaries in settlements related to the EH in terms of both geography and time.<sup>50</sup> It is therefore somewhat ironic that an 11,000-year-old settlement yields granaries so well preserved that detailed reconstructions of structural phases can be suggested.<sup>51</sup> The finds are from the Pre-Pottery Neolithic A (PPNA) phase at Dhra in Jordan and are evidence for the practice of large-scale storage even before the advent of (attested)

<sup>36</sup> Caskey 1960, 294.

<sup>37</sup> Strasser 1999, 813, 815.

<sup>38</sup> Reynolds 1974.

<sup>39</sup> Hutchinson 1935, 2–3.

<sup>40</sup> Caskey 1960, 294.

<sup>41</sup> The *bothroi* that cut into the walls are now filled in with the tiles of the building’s roof structure.

<sup>42</sup> Blegen *et al.* 1950, 277–300. For the expression “Pit Period”, see *ibid.* 206.

<sup>43</sup> Marinatos mentions ash being used for food preservation and argues that this would also explain why some EH *bothroi* contained pure ash, i.e., the ashes were collected and stored for future use (1968, 83–84).

<sup>44</sup> Caskey & Caskey 1960, 161.

<sup>45</sup> Hutchinson 1935, 18–19; Marinatos 1946, 337–351; Mylonas 1959, 20; Strasser 1999, 815.

<sup>46</sup> See Halstead & O’Shea (1982) on the application of surplus storage with a bad year redistributive function as a means of establishing social power.

<sup>47</sup> Strasser 1999, 816.

<sup>48</sup> The size range of most *bothroi* is 0.60–1.00 m in diameter and 0.40–0.90 m in depth, meaning that the smallest contained 110 litres and the largest 700 litres.

<sup>49</sup> Tomkins 2004, 42–43. He stresses that concrete evidence is in short supply and that non-ceramic containers were indisputably in use within the home; but only by using the pithos—which is a later introduction—would a household be able to store enough to secure staple food for a whole year.

<sup>50</sup> E.g. Dova 1997, 290–291; Pantelidou Gofa 1991, 176–178; Evans & Renfrew 1968, 17–18.

<sup>51</sup> Kuijt & Finlayson 2009, figs. 4–5.

plant domestication.<sup>52</sup> The circular structures, which are 3 m in exterior diameter, are placed in between other buildings of the site; they have small doors reminiscent of windows and suspended floors to protect against moisture and rodents.<sup>53</sup>

In general, attested and suggested granaries are circular structures, the reason being that the lateral pressure of grain stored as a loose mass is much higher than the vertical pressure (two-thirds of the weight compared to one-third).<sup>54</sup> Common architectural solutions to the problem of high pressure on a wall are to add buttresses or make the wall curved/arched.

Aegean Neolithic–EBA round structures are, with some exceptions, regarded by Yiannouli as dwellings. They can then be seen as part of an architectural tradition which developed from pits/*bothroi*, via pit-houses made of perishable materials, to non-submerged round houses.<sup>55</sup> She notes that both Neolithic and EBA round structures are usually part of settlements where the other buildings have a different layout, which is mostly rectilinear.<sup>56</sup> If regarded as dwellings, however, one has to wonder why they are so distinctly different from other buildings and why their size is generally so much smaller than “normal” houses. It thus seems natural to assume that they had a function separate from other buildings. Also, if there is indeed an architectural sequence from *bothros* to building, a common function should be the reason for their construction and since a small *bothros* could not have served as a home, neither could its architectural successor.

Although they are not yet fully understood, we know for certain that the organizational and economic systems applied during the Minoan and Mycenaean eras are not comparable to those of the Early Helladic. The latter are of more modest dimensions in every way, and yet there are traces of complexity and organization in many details of the archaeological record which should not be ignored. Vermeule tentatively suggested that a corridor house could have functioned as a village granary which was equally accessible to all villagers. Interestingly, she adds that the “concept of a community farm with a large centrally defended building harmonizes with other facets of Early Helladic civilization.”<sup>57</sup> Corridor houses were in all probability not used this way; nevertheless, the idea is appealing since there are other structures in EH settlements, also with distinctly different architectural forms, which are more likely to be granaries. Marinatos was the first to interpret the *Rundbau* at Tiryns and the *Rundbauten* at Orchomenos as granaries; Kilian, as one of the excavators of the *Rundbau*,

agreed, and as such they were seen as evidence of a political system inspired by the hierarchical Near Eastern states.<sup>58</sup> Though I agree as to their function, there is, in my opinion, another more likely interpretation concerning their management, namely communal management, which is, as Vermeule noted, in better agreement with the overall impression of the archaeological material of the EH period.

Neolithic–EBA round architectural structures and large pits are known from numerous contexts in the Aegean, and some of them will not be dealt with here. First of all, this study is limited to Early Helladic sites, i.e. settlements of mainland southern Greece—or sites like that of Kastraki on Kythera, which share the same material culture—within the timespan of the EBA.<sup>59</sup> Therefore, Neolithic settlements like those on the small island of Saliagos<sup>60</sup> and at Nea Makri, Attica,<sup>61</sup> as well as those of the EBA Myrina and Poliochni Black phases on Lemnos,<sup>62</sup> are not included. The EH round structure of the Pelopion in Olympia is excluded because of its unique location in a later cultic focal point and because of an insufficient contemporaneous context.<sup>63</sup> Other EH sites of interest are either short on information or short on preserved remains. At Asine, in the Argolid, both the Lower Town and the Acropolis had substantial EH layers. *Bothroi* and part of a round building were reported, but due to several inconsistencies in the report and the difficulty of situating the finds in relation to each other, Asine is also excluded.<sup>64</sup> On the western side of the Argolid plain, a large circular building of EH date has been reported.<sup>65</sup> The find-spot, at Makrovouni, has not been systematically excavated, but it is believed to have been a densely settled site. As for Perachora in Corinthia, Fossey found the remains of one circular wall of the earliest EH I phase (named X) in a trial trench, but no other architecture.<sup>66</sup>

The suggested communal grain storage facilities are of two types: large rock-cut pits and built structures. As for the rock-cut pits, their size and location within the settlements differentiate them from household *bothroi*. In some cases they have been interpreted as cisterns, but could these pits actually

<sup>52</sup> Evidently, wild barley and wild oat were collected en masse at this time (Kuijt & Finlayson 2009, 10969).

<sup>53</sup> Kuijt & Finlayson 2009, 10967.

<sup>54</sup> Reynolds 1974, 125.

<sup>55</sup> Yiannouli 2009, 90.

<sup>56</sup> Yiannouli 2009, 92–93.

<sup>57</sup> Vermeule 1964, 36.

<sup>58</sup> Marinatos 1946, 337–351; Kilian 1986, 69–70.

<sup>59</sup> This definition is in itself problematic since the Attic coastal sites share Cycladic traits.

<sup>60</sup> Evans & Renfrew 1968, 17–18, fig. 7, pl. VII.

<sup>61</sup> Pantelidou Gofa (1991, 176–178). The site has numerous settlement phases, some of which also have *bothroi* and large pits (178–180); these have been interpreted by the excavator as storage space.

<sup>62</sup> Dova 1997, 289–291, figs. 2a–c, 3.

<sup>63</sup> Kyrieleis 1990, 186.

<sup>64</sup> Frödin & Persson 1938. See e.g. pp. 42, 59, 91–92, 200, 202.

<sup>65</sup> Arvanitopoulos 1916, 76 (then identified as a Neolithic settlement); Renard 1995, 65–66.

<sup>66</sup> Fossey 1969, 53, fig. 1.

have been waterproof?<sup>67</sup> They would have had to be lined with hydraulic plaster in order to hold water for any considerable length of time, and as yet there are no indications of such a lining in any EBA context in Greece. Regarding the built structures, the confirmed living quarters of the EH period are always rectangular or, occasionally, apsidal. The suggested communal granaries, on the other hand, all have a common denominator: each structure is circular, or of another uncommon shape.<sup>68</sup> Also, none of them have a preserved door opening; thus the hypothesis that they were indeed used as containers is strengthened. Building J at Aghios Kosmas, as the only non-circular structure, has disproportionately thick walls which were perhaps a primitive solution to withstand the interior pressure of grain.

As for calculations on the maximum storage capacity of each structure, none of the buildings is preserved to its full height, and therefore one can only speculate as to how much they contained. Also, there are several ways to use a building for storage: the space could be completely filled with produce, there could be partitions, or the building could house containers of produce. At each suggested site, it is still evident that the presumed volumes of one specific crop are beyond the annual needs of a family household.

## BUILT STRUCTURES

### Orchomenos, Boeotia

The material evidence of the EH II settlement at Orchomenos is very fragmentary, but the natural resources of the region provide the foundations for an economy based on agriculture in general and cereals in particular.

The seven so-called “*Rundbauten*” from Orchomenos have an inner diameter of 6 metres and a wall thickness of *c.* 1 metre (Fig. 1).<sup>69</sup> Bulle interpreted them as dwellings and discusses circular buildings of various times and cultures, whereas

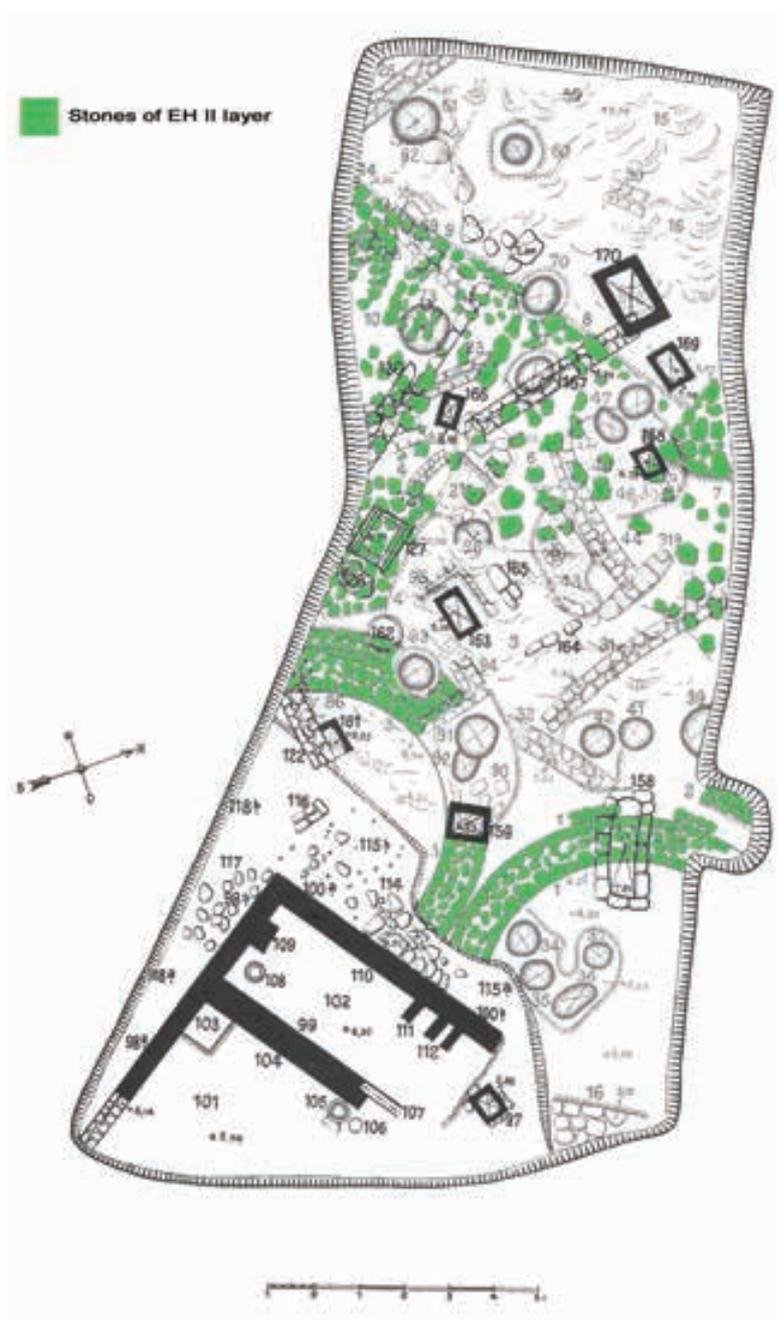


Fig. 1. The Rundbauten of Area K in Orchomenos. After Bulle 1907, pl. 5.

<sup>67</sup> Prehistoric materials for safely holding drinking water are not the same as materials for safely holding grain.

<sup>68</sup> Round buildings and underground chambers used as granaries in other cultures have already been noted by e.g. Marinatos (1946) and Evans (1921, 106–107).

<sup>69</sup> Bulle 1907, 19–25, pls. 4–5. An eighth structure, *Rundbau D*<sup>1</sup>, had an inner diameter of only 2 metres and was placed 70 m north of the big cluster. No finds could date it, but a specific sand layer, which was also found in other parts of the excavation, indicated a much later date.

Marinatos argued that the round structures functioned as silos.<sup>70</sup> Their spatial relation to the settlement, however, has not been established, since later constructions destroyed the EH II remains, but it is known that rectangular structures had

<sup>70</sup> Bulle 1907, 36–52; Marinatos 1946.

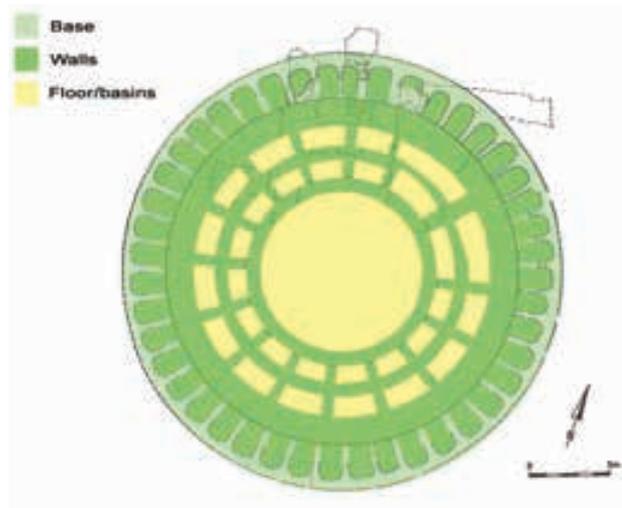
been erected nearby.<sup>71</sup> The simultaneous presence of rectangular and round buildings would indicate that they had separate functions, and, as suggested by Marinatos, it is very likely that the round buildings were designated for grain storage.

The *Rundbauten* were located in two groups. The larger of the two groups contained five of the buildings, but two of them had, in fact, been abandoned in an earlier phase. Consequently, the proposed granaries were divided into one cluster with three buildings and one with two buildings. Such clusters of granaries could have several explanations: one is that different groups within the community had their own storage space, while another explanation is that as agriculture intensified and harvests increased through time, storage space also had to expand. The *Rundbautenschicht* is then superseded by the *Bothrosschicht* when storage becomes private.

Fragmented stone-paved areas are situated directly to the west of *Rundbauten* K1 and K2.<sup>72</sup> It would appear from the plan that at least three of the stone pavings were confined to a round shape of approximately up to 3 metres in diameter, like smaller versions of the threshing floors known from historic times.<sup>73</sup> *Rundbauten* K1 and K3 have “reinforcement work” along part of their western side, facing the stone pavings.<sup>74</sup> The reinforcement work that Bulle refers to are the lines of stones that follow the outline of the buildings at foundation level, which are preserved to a height of two courses. One could perhaps consider the possibility that these are the foundations of exterior steps which reached the top of the buildings.

### Tiryns, the Argolid

The EH II *Rundbau* of Tiryns is a very large, circular building with a diameter of 28 m, and its identification as a granary is therefore somewhat controversial (*Fig. 2*).<sup>75</sup> It has been established that it was a building with an upper floor, but there is nothing to support that it was tower-like in structure, a conclusion that many have drawn due to the expanse of its foundation. Based on the archaeological evidence, Kilian reconstructed its height to approximately 6 metres, of which perhaps half was utilized for the upper floor. The *Rundbau* is divided into many rooms or shafts, as Kilian calls them, which



*Fig. 2. The Rundbau of Tiryns, reconstructed. After Kilian 1986, fig. 59.*

would have been ideal storage spaces from which to draw grain and, perhaps, other agricultural produce kept in separate shafts from the floor above. The storage capacity of the *Rundbau* is impressive, but not unthinkable. Tiryns lies at the eastern edge of one of the most agriculturally fertile plains of southern Greece, an area that certainly possesses the conditions for agricultural surplus harvests.

The Mycenaean palace was built on and around the site of the *Rundbau*, and so a reconstruction of its immediate surroundings is not possible, though it is clear that the *Rundbau* did not stand in isolation. Several rectangular buildings were built in its proximity, and the settlement also extended all around, under the Late Bronze Age remains.<sup>76</sup> It was one of the most densely populated settlements of the EH II period and would therefore have required a granary of exceptional size.

### Voïdhokoilia, Messenia

The small EH II–III settlement of Voïdhokoilia Bay is situated on a promontory on the coastline with easy access to arable land and fresh water. The 15 or so structures that comprised the settlement were small and densely conglomerated, with small alleyways in between. At Voïdhokoilia, the evidence for an EH II granary is quite solid. With a single exception, all the buildings of the settlement are rectangular in plan, and the sole round building, which has an inner diameter of 3.80 m and is located in the centre of the settlement, therefore seems to have had a special purpose (*Fig. 3*). The overwhelming argument for its use as a granary is the fact that some 20

<sup>71</sup> Bulle 1907, 24–25, pls. 4–5.

<sup>72</sup> Bulle 1907, 24, pl. 5.

<sup>73</sup> At the settlement of Lithares, also in Boeotia, a semicircle of a stone-paved area is preserved in Area 50 in what appears to be an open area just to the north of the houses and the Sanctuary of the Bulls (Tzavella-Evjen 1984, 68). Its diameter is 2.75m.

<sup>74</sup> Bulle 1907, 22, pls. 5, 9:2.

<sup>75</sup> Many suggestions have been put forward as to its function—a palace being one of them—but, as stated earlier, both Marinatos and Kilian were convinced that it was indeed a granary (Marinatos 1946; Kilian 1986).

<sup>76</sup> Kilian 1986, 69.

millstones were recovered from within and to the immediate south of the building.<sup>77</sup> A Mesoamerican parallel shows that grinding could have taken place even within the storage space.<sup>78</sup> In addition, a curvilinear wall follows the western exterior of the building for *c.* 2 metres, as was the case at two of the *Rundbauten* at Orchomenos. The short curvilinear wall could have constituted the foundation of exterior steps for access to the building from above. The surrounding houses display no inequality in terms of architecture or finds, and physical access to the round building is not restricted.

#### Aghios Kosmas, Attica

At the coastal settlement of Aghios Kosmas, there appear to be designated areas of specific communal use during its last EH II phase (Fig. 4).<sup>79</sup> Whereas Houses E, F and H clearly functioned as combined workshops and living quarters, House L has the appearance of a specialized food preparation area, and House I could perhaps have been used for assemblies, ceremonies and meals. Structure J is, however, the architecturally most conspicuous building of them all. It is rectangular on the outside and triangular on the inside, with walls up to 2.35 m thick and, in contrast to the other buildings, it is clearly without entrance on ground-level. From the “base” of the triangle to the tip, the room measures 7.50 m, and the “base” is 2.35 m long. The architecture in itself, with oversized walls, suggests that if not for defence, its purpose was to withstand high pressure from within, as a form of silo. In addition to the uniqueness of the architecture itself, five andesite querns were found *in situ* on the floor of Structure J, placed so that five people could work the last of the stored grain together in a semicircle. Accordingly, there can be little doubt as to how this building was used. This must have been the granary of the settlement and, to all appearances, there were no restrictions to

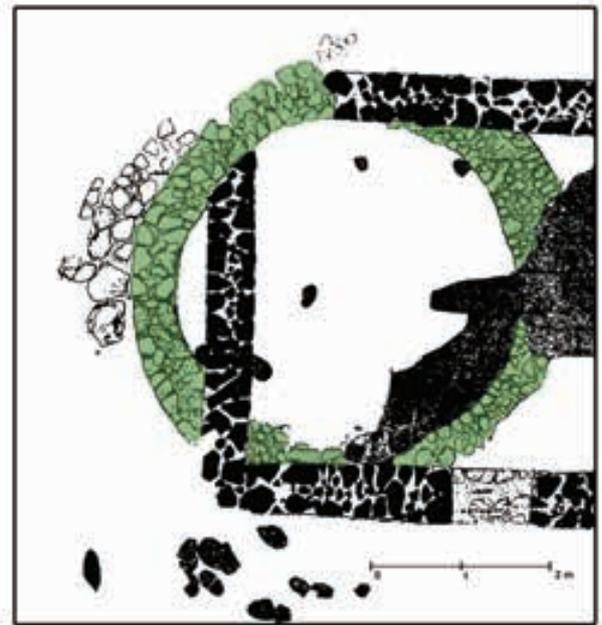


Fig. 3. The round building of Voidbokoilia (the square structure is from a later phase). After Korres 1981 (pr. 1983), pl. IB.



Fig. 4. The excavated settlement of Aghios Kosmas. After Hägg & Konsola 1986, fig. 18, and Mylonas 1959, drawing 12.

<sup>77</sup> Korres 1981 (pr. 1983), 220–223, pl. IB.

<sup>78</sup> Hendon 2000, 50.

<sup>79</sup> Nilsson 2004, 150–155, based on the information provided by Mylonas 1959, 26–45.

its disposal. Mylonas reported that Structure J was called “the house of the *mylonas*”, as in “the house of the miller”, by the excavation workmen, but he did not himself want to state more than “perhaps it served as a workshop”.<sup>80</sup>

The fact that a large part of the settlement was preserved, excavated and reported in detail provides exceptional opportunities for spatial analyses, which in turn point to segregated areas of function, i.e. in Houses I and L, and Structure J. The Aghios Kosmas community appears to have been a well-organized, non-hierarchical society where storage space was open to all inhabitants and chores linked to subsistence were carried out jointly. Halstead, from the perspective of Early–Middle Neolithic settlement contexts, notes that although households were architecturally isolated from each other, open-space cooking evidently took place, which suggests that meals were still shared communally in the village.<sup>81</sup> The sharing of cooked food is more or less universally the social glue, both at an intra- and inter-community level. There are several practical aspects to preparing and sharing joint meals—besides the enjoyment factor—since it imposes a temporal rhythm for labour and repose on the whole community, and less labour is required on the part of each individual. However, if the food was regarded as private property, such customs could not be upheld.

It is also noteworthy that no *bothroi* were constructed during the habitation phase of Structure J. The five rock-cut *bothroi* found at Aghios Kosmas are all associated with the domestic architecture of the earlier EH phase. The architectural remains of that phase are, however, so few that the spatial relationship cannot be determined.<sup>82</sup>

## UNDERGROUND CHAMBERS OR LARGE PITS

### Koropi, Attica

Parts of an EH II settlement, situated under the houses of modern Koropi in the fertile region of the Mesogaia, have been investigated. In close vicinity to the excavated dwellings, the archaeologists located five subterranean chambers cut out in the bedrock, although two of them had collapsed before they were even put to use. One of the collapsed chambers and one of those in use had been cut out separately from the others, which were found in a close cluster. Their dimensions are large, up to 10 metres in length and with a depth of more than 2.50 m. They were entered through a vertical shaft that ended on a landing, whereas the rest of the floor was hollowed out.<sup>83</sup> At the time of the excavations, Kakavoyanni suggested several

functions but has since settled on an interpretation of the subterranean chambers as communal storage facilities.<sup>84</sup> I would like to take this a step further and specify that those storage facilities were communal granaries.

### Zagani, Attica

The EH I–II site of Zagani was also situated in the Mesogaia, on a small hill which was erased for safety reasons during the construction of Athens International Airport Eleftherios Venizelos at Spata.<sup>85</sup> The settlement was fortified and contained numerous small houses and a large circular pit in an open area at its centre. The diameter was not reported, but its depth was 1.50 m and the excavator proposed that it was a cistern.<sup>86</sup> Against the background of kindred examples, another plausible interpretation would be that it functioned as a communal granary in the midst of the settlement.

### Raphina, Attica

The coastal site of Raphina features the eroded remains of an EH II settlement, with a fortification wall and a metal workshop nearby. The complete settlement cannot be reconstructed, but there is evidence for living quarters and paved streets (*Fig. 5*). At the intersection of two streets are the remains of what could have constituted the communal granary: an enigmatic construction consisting of two parts labelled H and Z. The excavator tentatively put forward the interpretation that it functioned as a very small sheepfold.<sup>87</sup> However, another suggestion easily presents itself. The architectural Structure H was severely damaged, but it clearly had an opening towards the street. Within is the curved line of flagstones that slopes towards Structure Z, which constitutes a pit that is 0.65 m deep, 3 m long and 2.50 m wide. In my opinion, rather than indicating a sheepfold, the size and depth of the pit implies that it functioned as a communal grain storage facility with a protective superstructure, i.e. Structure H. If so, it is a granary that would have been easily accessible from the street for all the inhabitants of the settlement.

### Eutresis, Boeotia

An enigmatic find at Eutresis, named the Chasm, was in use from the EH I period and was filled in with garbage in an early EH II phase (*Fig. 6*). It is a funnel-shaped pit, 1.50 m in shaft diameter, and it was excavated to a depth of 4 metres without arriving at its bottom.<sup>88</sup> It is unfortunate that the information

<sup>80</sup> Mylonas 1959, 41–42.

<sup>81</sup> Halstead 1995, 16–19; Tomkins 2004, 43–45.

<sup>82</sup> Mylonas 1959, 16–18.

<sup>83</sup> Kakavoyanni 1986.

<sup>84</sup> Apostolopoulou-Kakavoyanni 2001, 41.

<sup>85</sup> The archaeological museum housed on the premises of the airport displays a model of the settlement.

<sup>86</sup> Steinhauer 2001, 31–33.

<sup>87</sup> Theocharis 1953, 110–111.

<sup>88</sup> Caskey & Caskey 1960, 138–139.

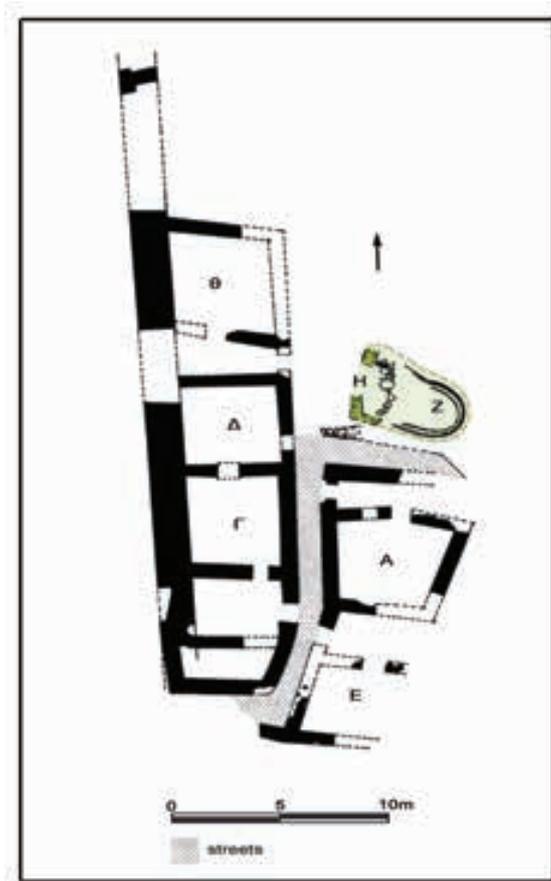


Fig. 5. The settlement of Raphina with Structures H and Z. After Hägg & Konsola 1986, fig. 50.

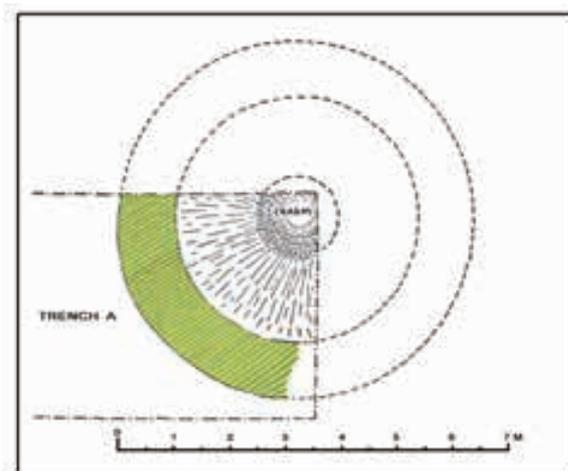


Fig. 6. The Chasm at Eutresis enclosed by a circular building. After Caskey & Caskey 1960, fig. 6.

on the EH II settlement is incomplete due to the intrusions of later habitation; however, partly preserved houses were excavated at several locations on the hill, and all buildings in the settlement are rectangular in plan. The Chasm, on the other hand, was surrounded by the sturdy wall, more than 1 m wide, of a circular building with an exterior diameter of 6.40 m. Since there is not enough space within for other installations, the purpose of the building was exclusively to cover the large pit and provide access to it.

Caskey and Caskey dismiss the idea that it functioned as storage space since “it is much too big”, nor do they believe that it served as a well, since it is located at a high point on the hill and with a natural spring available nearby, further down the hill.<sup>89</sup> Instead, the authors associate the Chasm with a religious purpose, probably a chthonian cult. However, bearing in mind that this is the same area that was suggested to have been used as a clay quarry in earlier phases,<sup>90</sup> I believe that the deep pit could actually have been used for grain storage.<sup>91</sup> Furthermore, it is worthy of note that by the time the Chasm went out of use, houses were constructed with *bothroi* inside.<sup>92</sup>

#### Kastraki, Kythera

The site of Kastraki on Kythera is situated on a flat, low hill by the coast. The finds dated to the EH I and EH II periods are concentrated to the contents of a circular pit.<sup>93</sup> The large pit at Kastraki is the only evidence of an EH I–II presence at the site, but later habitation has presumably destroyed the early building remains. The pit, which was cut out of the bedrock, has a diameter of 5.40 m, and its bottom is 3.60 m below the present ground surface.<sup>94</sup> No artefacts could establish a cultic function of the pit, so it seems a pointless endeavour if it did not have a practical application. Again, since the pit did not hold water, a plausible practical application would be as a granary.

#### Zygouries, Corinthia

The mound of Zygouries, Corinthia, is located in a valley suitable for agriculture and lies at the crossroads of passageways which were presumably important since prehistory onwards.<sup>95</sup> Zygouries was settled for centuries during the EH II period, but only small sections of the area have been excavated. In the course of trial trenches being dug along the western edge of the mound, seven man-made cavities in the bedrock, distrib-

<sup>89</sup> Caskey & Caskey 1960, 162–163.

<sup>90</sup> Caskey & Caskey 1960, 161.

<sup>91</sup> See discussion above on *bothroi* cut into clay layers.

<sup>92</sup> Goldman 1931, 16, 19, 25–26; Caskey & Caskey 1960, 133, 152.

<sup>93</sup> Coldstream & Huxley 1972, 273.

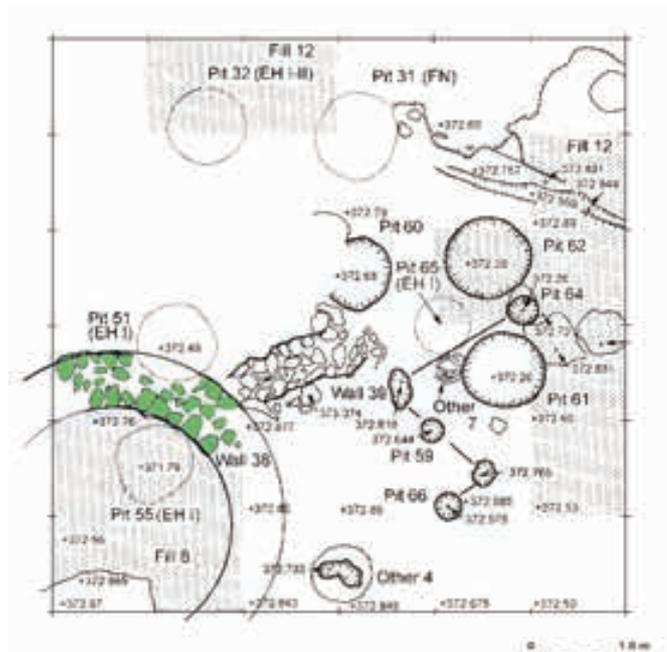
<sup>94</sup> Coldstream & Huxley 1972, 68.

<sup>95</sup> Blegen 1928, 1–3.

uted over three separate groups, were encountered.<sup>96</sup> They are described as pithos-shaped pits which are smaller in diameter at the top than in the middle and are interconnected through an opening midway up. The maximum diameter of two of the pits was 1.45 m and 1.85 m respectively. Blegen concluded that they had been cut during the EH II period and were later rediscovered by the Byzantine settlers who reused them as cisterns. Although they are different in terms of execution, in comparison to the previous examples, I propose that their original purpose may have been as communal subterranean granaries. Ten houses were excavated in Zygouries, none of which had a single *bothros*, and only two houses had any significant storage facilities, namely, the House of the Pithoi with four pithoi and House L where six pithoi were found.<sup>97</sup> The pits, however, were in use in an earlier phase than that of the last excavated EH settlement;<sup>98</sup> accordingly, either the main storage areas of the last EH II settlement at Zygouries are still to be identified or domestic pithoi had replaced them.

### Tsougiza, Corinthia

The small hill of Tsougiza is situated in the fertile Nemea Valley in Corinthia. The Early Helladic material was retrieved mainly from the highest point of the site, where people of numerous settlement phases were active and, over time, dismantled earlier architectural obstacles. Therefore, the EH I period is only represented by a number of *bothroi* and the so-called “Cistern 2”, which had been cut into the bedrock. The chronological sequence of the *bothroi* and their relation to domestic architecture, if any, are indistinct.<sup>99</sup> The original use of the more than 5-metre-deep Cistern 2 is also unclear, but geologists have concluded that it was definitely not a well.<sup>100</sup> In the next phase, the Early Helladic II Initial period of Tsougiza, further *bothroi* were still cut in the same area and some scanty remains of architecture of the same period were identified both on the hill and on the south-eastern slope.<sup>101</sup> Part of a single circular wall, Wall 38, was preserved on the hill, whereas other walls were linear (*Fig. 7*).<sup>102</sup> The estimated inner diameter was 2.50 m, which would render it rather inconvenient for a dwelling, and no finds could otherwise specify its use. The excavated architecture of the Early Helladic II Developed period, although very fragmentary, constitutes several distinct phases with, for example, the substantial House A which is generally held as a precursor to the corridor houses, the small



*Fig. 7. The curved Wall 38 of the EH II Initial period at Tsougiza. After Pullen 2011, fig. 4.5.*

curvilinear stumps of Walls 1 and 42, and the later context of the so-called “Burnt Room”, which suggests gatherings and specialized communal use.<sup>103</sup> The EH III remains on the hill-top include the feature named Cistern 1, which was excavated to a depth of 12.25 m and has a maximum diameter of 2.05 m. This could not have functioned as a well (*Fig. 8*).<sup>104</sup> At the same ground level, placed just to the north of it, is House E, or the House of the Querns, which constituted a single room containing eight pithoi, nine querns and a number of small tools.<sup>105</sup> It has the appearance of a workshop with the specific purpose of processing grain and, at that, a workshop without living space. It is consequently of particular importance for the interpretation of the “cistern” that the non-residential House of the Querns was next to it and that the two structures were probably related. If the workshop was more or less exclusively used for the processing of grain, whether by designated millers or—perhaps rather—by any villagers, the quantities far exceeded the needs of any singular household, and the source of the grain could have been the “cistern” with its large storage capacity. The pithoi were perchance a newer installation, or maybe they functioned as storage space for grain or flour in transit.

<sup>96</sup> Blegen 1928, 28. An eighth was indicated in the scarp of the unexcavated area.

<sup>97</sup> Blegen 1928, 9–15, 21–24, 215.

<sup>98</sup> Blegen 1928, 215.

<sup>99</sup> Pullen 2011b, 41–51.

<sup>100</sup> Pullen 2011b, 46, fig. 3.6.

<sup>101</sup> Pullen 2011b, 141–160.

<sup>102</sup> Pullen 2011b, 144–146, figs. 4.5–4.6.

<sup>103</sup> Pullen 2011b, 241–336. Wall 1 appears apsidal, whereas Wall 42 could be either apsidal or round. Cf. *ibid.*, fig. 5.2.

<sup>104</sup> Again, the conclusion of the geological investigation (Pullen 2011b, 460–463, fig. 6.15).

<sup>105</sup> Pullen 2011b, 452–460, figs. 6.10–6.14.

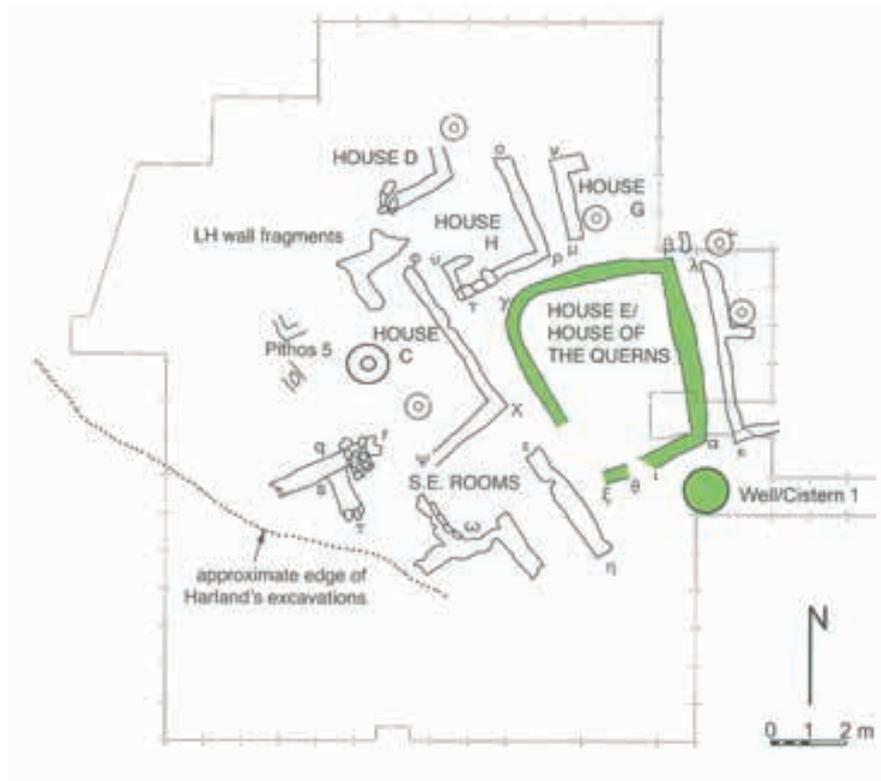


Fig. 8. EH III Tsoungiza with House of the Querns and "Cistern 1". After Pullen 2011, fig. 6.2.

The extreme depth of the "cisterns" seems rather impractical, but the combination of a relatively small opening and bedrock as "lining" may have served as perfect protection for the grain. The input of work required to cut them out of the bedrock suggests that whatever use they were put to, it was of great importance to the settlement.

The excavated EH layers have been published in detail, and yet the condition of the remains is such that a reconstruction of the site is not feasible. Nevertheless, some general patterns can be discerned. Although Tsoungiza has yielded only fragments of each settlement phase, it would seem that the top of the hill was mainly reserved for settlement features other than ordinary dwellings. Under the site of the EH III House of the Querns with its associated "cistern", there is a layer of EH I *bothroi* which are also roughly contemporaneous with a "cistern".<sup>106</sup> In the phases in between, the adjacent area was used for at least one round building, a corridor house precu-

ror, and one building for gatherings, although not simultaneously. The emphasis appears to be on features of collective importance for the inhabitants, and as for the "cisterns", the round building or buildings, and possibly even the numerous clustered *bothroi* with no apparent domestic connection, I again suggest that they were communal granaries. Thus, there would be a designated central storage area in both EH I, II and III contexts at Tsoungiza, although not necessarily continuously.

## Discussion

The *bothroi* for storage are common in the EH III period and can, at some settlements, be counted in tens or even hundreds, probably reflecting the distribution of inhabitants.<sup>107</sup> If so, the implication is that the members of each household guarded its own supply of staple food. In addition, they probably pro-

<sup>106</sup> For a section drawing, see Pullen 2011b, fig. 6.12.

<sup>107</sup> Lerna (Caskey 1960, 294–295) and Orchomenos (Bulle 1907, 25–36).

duced it themselves, and they possibly traded it for the benefit of the family unit.<sup>108</sup> In the preceding period, however, there are comparatively few finds that can be interpreted as household storage facilities. Instead, there are settlements where it seems that storage was concentrated in an area of communal use, and no architecture or division of space indicates that these areas were restricted or required administrative measures.<sup>109</sup>

The geographical distribution of the suggested communal granaries stretches across central Greece, the Peloponnese and, southwards to the island of Kythera. It is therefore a settlement feature that, in all likelihood, would have been present at numerous other sites within these geographical borders and, perhaps, beyond. Dwellings at these sites, where they could be identified, were all rectangular in shape. The round buildings and the single triangular one are thus set-off architecturally, and are likely to have differed in function from the rectangular living quarters. It is worth underlining that in two cases, at Aghios Kosmas and Voidhokoilia, excavations yielded a number of millstones which were directly associated with such specific buildings. As for the large pits and subterranean chambers, I maintain that they were most likely communal granaries. Not even the deep pits of Eutresis and Tsoungiza reached the water-table, and none of the pits and chambers had been lined or made waterproof; thus, they were not useful as wells or cisterns. If they had a principally ceremonial purpose, there is nothing whatsoever to prove it since no artefacts of display or religious connotations can be linked to any of them. For all that, one problem remains regarding the granary interpretation: an outdoor hole in the ground, as at Koropi, Zagani, Kastraki and Zygouries, is perhaps not the ideal way to preserve grain.<sup>110</sup> It is evident, however, that at both Raphina and Eutresis a building with stone foundations had been raised with the sole purpose of sheltering the large pit. In the muddled multiple *bothroi* contexts of Eutresis and Tsoungiza, there are also signs of possible postholes, which could signify the practice of erecting wooden structures to protect the storage from exposure. It stands to reason that the large pits and underground chambers were in some way protected by a superstructure, if only by a simple lid or sealing.

Spatial relations between the buildings are known only in a minority of the cases since few sites have been extensively excavated down into Early Helladic layers. There is a tendency, though, for the proposed communal granaries to be located

at a central, slightly elevated part of the settlement. What is of particular significance regarding their location is the apparent accessibility. In the case of Raphina, the building that shelters the large pit has an opening towards the street. As for the round and triangular structures, they were not entered from ground level, but must have been equipped with exterior stairs or ladders, i.e. they were accessible from open, shared settlement space. None of them are incorporated into a larger building complex or enclosed by exterior walls, and no adjacent architecture makes apparent claim to the granaries.

Communal storage space seems to have been an EH I, if not earlier, invention, at least at Zagani, Eutresis and Tsoungiza. Zagani was abandoned before the end of the EH II period; at Eutresis, the practice went out of use at some point during the EH II period; and only at Tsoungiza could it have been a recurring feature through the EH I–III ages. The other suggested granaries, of Orchomenos, Tiryns, Voidhokoilia, Aghios Kosmas, Koropi, Raphina, Kastraki and Zygouries are, based on what is known today, characteristics of the EH II phases only. The abandonment of many settlements at the end of EH II is a sign in itself that social, political and economic structures changed abruptly. Moreover, in the communities that survived the EH II–III break, storage space generally moved into the house, which would indicate a change in the socio-economic structures, causing new forms of management to emerge within these communities. Yet, for a substantial part of the EH I–II periods, it would seem that society was generally based on equality, and that each community cared equally for the well-being of its inhabitants. The inhabitants of some settlements shared communal space for specific purposes, they carried out work with a shared goal in mind, and they kept the vitally important crops in a communal storage space.

Concerning the background, communal storage could have been an “inherited” or “leftover” practice from the Early–Middle Neolithic. For the Late Neolithic households, an increase in the number of *bothroi* and the introduction of pithoi suited for agricultural storage are indications of a new sense of ownership, where the individual household is in control of its produce.<sup>111</sup> In addition, open village space is transformed into courtyard groups, thus restricting the cooking facilities to the group.<sup>112</sup> The people of Late Neolithic villages thus have less intra-communal affairs than their ancestors, and the concept of hoarding has been irrevocably introduced, meaning that they were on the path to the socially stratified society. (At Dhra’ in Jordan, mentioned earlier, the extramural, communal granaries were replaced by intramural storage as early as

<sup>108</sup> The produce could, however, have been distributed between the households in a joint harvesting process.

<sup>109</sup> Stamped clay sealings in EH contexts are not conclusive evidence of administration (Nilsson 2004, 201–207).

<sup>110</sup> Yet, Reynolds (1974) showed that by simply closing the opening with clay and rubble the grain would be safe for many months of storage.

<sup>111</sup> Tomkins 2004, 50.

<sup>112</sup> Halstead 1995, 17–18, pl. Ib.

10,500 cal B.P.<sup>113</sup>) In some cases, this argument may be questioned. Several of the EH settlements had Neolithic roots, so either they had lost the notion of hoarding or they had never been introduced to it. One should perhaps be careful not to assume that all innovations were introduced and adopted by all communities. The many groups that made up the Aegean population had various backgrounds, ethnicities, experiences, and alliances, and types of subsistence, environmental conditions, and geographic accessibility all differed. At that rather experimental stage in Greek prehistory, there would not have been a “one size fits all” management, but rather locally adapted solutions would have been in place.

As regards the management of cultivation, the storage facilities in all probability reflect the production form—household storage mirrors the land and work capacity of the individuals, and guarded palace/central storage mirrors the collective efforts of the specialized farming community. This storage model, with communal granaries, strongly implies communal management. If the economic resources were managed and consumed jointly by the inhabitants of certain Early Helladic communities, this would demonstrate that a society can be concurrently well-organized and non-hierarchical. A community commitment, not authority control, may have been the preferred method of management.

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<sup>113</sup> Kuijt & Finlayson 2009, 10966: “This transition from extramural to intramural storage system may reflect evolving systems of ownership and property, with PPNA granaries being used and owned communally and with later food storage systems becoming part of household or individual based systems.”

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