HALLAN ÇEMI, PIG HUSBANDRY, AND POST-PLEISTOCENE ADAPTATIONS ALONG THE TAURUS-ZAGROS ARC (TURKEY)

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Abstract: Recent work at Hallan Çemi and other nearby Late Pre-Pottery Neolithic sites in Anatolia indicates that the Taurus-Zagros flanks were a second culminational center of habitation in southwest Asia. Fully settled complex of herders and cultivators were in existence in this area by the late Younger Dryas. These settled village societies were based on adaptations that did not involve cereal exploitation. It is possible then that these adaptations represent cultural continuities between the exploitation of wild and domesticated plants and animals, where exploitation of wild species and pig husbandry were widespread in the region. There is significant evidence that the pig was an integral part of Neolithic society, and its role in the subsistence economy cannot be underestimated. The presence of pigs is evidence of the adaptation of the Taurus-Zagros region to the climatic conditions prevalent at the time. The results of the recent excavations at Hallan Çemi and other sites in the area have revealed evidence of pig husbandry and domestication.

Keywords: Taurus, Hallan Çemi, Zagros, Taurus-Zagros, animal husbandry.

Mots clés: Tauriques, Hallan Çemi, Zagros, Taurus-Zagros, élevage animal

INTRODUCTION

Over the past half century, a variety of factors have combined to make the Neolithic and Early Agricultural cultures of the Middle East one of the most intensively studied periods of prehistory. The Taurus-Zagros region has been at the heart of this research, with numerous sites being excavated and studied in detail. Among these sites, Hallan Çemi is one of the most important, with its extensive range of animal bones providing valuable insights into the subsistence economy of the area.

1. Stephen 1981
2. Beamson and Hatz 1993; Beamson and Beamson et al. 1993

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HALLAN ÇEMİ AND ITS SETTING

Hallan Çemî is situated at an elevation of 640 meters in the southern facing foothills of the Sason Daghlar, a range of the eastern Taurus (Fig. 1). It is located ca. 40 km north of the city of Beyti, on the west bank of the Sason Çay (Fig. 2), a tributary of the Bartonçay River and Tigris, respectively, which cuts through these foothills to form a small valley. Extensive oak forests currently cover both the highest elevations of the foothills surrounding the site and the unformed portions of the lower elevations in this foothill zone (Fig. 2). Runways of riverine forest also occur along the Sason Çay.

To the north of the site, the snow-capped peaks of the Sason Daghlar rise to well above the sea level. To the south, the foothills terminate in an exposure of rolling terrain that continues for ca. 40 km to the Tigris. This relatively flat terrain is cut by the wide floodplain of the Bartonçay River and is currently devoid of forests. To the west of the Bartonçay drainage, other small tributaries of the Tigris regularly cut through terrain that also conforms to the same pattern. From west to east, these include the Divlaj Çay (anglicized as Çeyl) which is situated to the north and several others. To the east of the Bartonçay drainage, the terrain south of the foothills becomes progressively more hilly, and is somewhat more forested than in the Bartonçay area. It is also cut by lower, but larger, tributaries, e.g., the Çaylan Çay and the Hallan Çay. South from the Tigris, the terrain rises again until the Tar Ablu massif drops down to the high plains of northern Mesopotamia. Several small tributaries flow north from this area to the Tigris. Oak forests again occur in this area. Annual precipitation in this entire region is currently sufficient to support dry forest.

Based on preliminary analysis of 125 wood charred fragments, 1 derived from 3 of the most common species present in the samples analyzed to date, though ash is only a small component of present Q. boissieri forests in eastern Turkey. This raises the possibility that the ash may derive from marine, not mixed oak forests.

Thus, despite the late Younger Dryas date, the ash dates were still present in the vicinity of the site, as is also implied in the floral data (see below). Assuming these ancient charred fragments are a representative sample, the site appears to have been set on the edge of marine woodland, with surrounding habitats covered by deciduous mixed oak forest similar to the present "natural" vegetation in the vicinity of the site. These oak forests were presumably responsible for the higher elevations of the Sason Çay, to the north as they do now and may, as they also do now, have given way to more open terrain down river on the direction of the Tigris.
suggests that this circular structures was purposefully arranged in this fashion. The deep sounding of connections with earlier, contemporary, and later sites further strengthens that the apparent existence of public structures at Hallan Cemi is not anomalous and public structures are indicative of a degree of social complexity usually not found in mobile hunting-gathering societies.

Fig. 3: Sketch plans of the uppermost building levels at Hallan Cemi.

large structures (fig. 3: A), an aurochs skull was found that once hung opposite the entrance on or near the north wall of the structure. In other words, a good case can be made that these two large semi-subterranean structures in level 1 are public buildings. First, they are approximately three times the size of the two contemporary smaller stone structures and similar in area to what have been proposed to be public buildings at Beidha 17. Second, the interiors are distinctive, with frequent resurfacings of the floor and distinctive architectural features such as platforms/benches. There is also a general absence of food processing equipment in these structures.

On the other hand, one of these structures contained the only clearly identifiable obsidian processing area in the site, which also yielded the two largest obsidian blade cores thus far found at the site. The occurrence in and around these two structures of virtually all the copper ore fragments found at the site is another point of distinction and a further indication that the activities carried out in and around them were not domestic in nature. Lastly, the obviously symbolic nature of the aurochs skull that once hung opposite the entrance of one, suggests that the group using this building was sufficiently informed that the apparent existence of public structures at Hallan Cemi is not anomalous and public structures are indicative of a degree of social complexity usually not found in mobile hunting-gathering societies.

MATERIAL CULTURE AND CULTURAL CONNECTIONS

The material culture of the site's one-time inhabitants is well briefly reviewed for several reasons. First, it suggests cultural connections with earlier, contemporary, and later sites along the Taurus-Zagros arc, as well as the general absence of connections with the Levantine complex. Second, it offers insights into the economy of the site's inhabitants. Third, it contains elements that may reflect demographic changes.

Lastly, it suggests a degree of complexity consistent with the above-noted public structures.

Well made polished stone bowls are a common element of material culture, judging from the hundreds of fragments thus far recovered. They often bear incised (and less commonly bossed) decorations in a variety of geometric and naturalistic motifs 24. In both form and decorative style, the stone bowls are similar to examples that occur (albeit much less commonly) at the later Neolithic site of Cayönü 25. Certain decorative elements also have broad parallels in the Near East. 24, 25, 29, 31

Another ground stone artifacts noteworthy for their suggestion of connection to far Anatolian Neolithic cultures are several small polished stone objects that look like nothing so much as miniature stylized bucrania. In view of the above-mentioned aurochs skull, that may very well be what they are.

Typoscological connections with broadly contemporary sites along the Taurus-Zagros arc are also evident in the ground stone assemblage. Of these, the most striking is the parallel between what (at Hallan Cemi) are called sculpted stone pestles and what are called stone sculptures at the slightly later site of Nemrik 33, 54. In contrast to more common and coarsely made pestle types, these fancy pestles are typically made of the same raw material and to the same basic shape as the stone bowls. Though plain forms do occur, the tops are typically sculpted into a variety of shapes, ranging from stylized representations of animals such as goats, aurochs, and perhaps bear or pig, to types that are instantly recognizable 35. Though the animal motifs differ from the bird motif that dominates the Nemrik 9 sculptures, these sculpted pestles are clearly identical to them as an artifact type. It should also be noted that artifacts of this type, like the stone bowls, also occur at the later site of Cayönü 25, further strengthening that connection.

Both the bowls and pestles were extensively conserved, suggesting that both the bowls and pestles were valued possessions. The specific function of both the bowls and fancy pestles remains problematic. However, they are typically made of the same material and to the same general shape, suggesting that they were used together. Coupled with the fact that they

14. The existence of a fourth is indicated but was never fully excavated and lower ones presumably site elate.
15. There is no evidence of mud bricks.

both were vehicles for symbolization, this implies use in formalized contexts such as ceremonies. In fact, the above-mentioned presence of extremely high concentrations of animal bone, including cut-and-transported portions of animal carcasses, the "display" arrangement of three sheep heads, and fire-cracked stone in the central activity area is worth emphasizing. This is because they have been considered indicative of feasting by others.27

The stone bowls and sculpted pestles aside, two other elements of the ground stone assemblage are particularly noteworthy: One is a type of smelt-pocked ground stone bowl; the other is a set of pierced ground stone points. The notched stone blades known from several fragmentary and are very possibly intact examples.28 This type is generally made of a relatively soft, mica-cay gray metamorphic rock (perhaps a schist). Though the full form is problematic, all the pieces generally exhibit certain features. These are: a lunular cross section with a maximum width of no more than 1.5 cm and maximum height of 3 cm; a length of at least 15 cm, tapering down to either a convex or dimpled top; and a variably spaced series of sharp notches cut into one or both edges, usually quite narrow. These reaches range from one to eight in number on the examples at hand.

To the naked eye there is no evidence of wear within the ground stone axes or on the stone tools; the objects were simply cut into the stone, as if to keep a formal count of something. If so, whatever was being counted, it was arguably socially or economically, as well as perhaps culturally important enough to record permanently on a highly uniform (i.e., formal) class of objects. That, in turn, would again suggest a degree of social complexity not typical of mobile hunter-gatherers.

Pierced ground stone or round or oval forms are commonly found at early Neolithic sites in eastern Turkey.29 As with the pestles, the pierced stones are the Hallan Cemi assemblage in both coarse (possibly utilitarian) and polished, fancy varieties. The fancy examples differ from the utilitarian examples in that they are made of the same materials as the bowls and pestles and are typically polished. They also have a drilled shaft that is relatively straight-sided in section, as opposed to hour-glass shaped.30 Such a shaft was well suited to hauling. Some are also decorated with incised designs. Their function remains problematic. However, the work and selection materials that went into its manufacture argue against their being these weights, as the counter examples of

Neolithic pierced stones are often specified to have been. Also, examples of this type bear a striking resemblance to those usually called "charcoal heads in later periods and the use of similar objects as more heads have been documented ethnographically.31 Coupled with the evidence of depression fractures in at least four of the Zawi Chemi burials,32 they suggest violent competition, and hence the existence of at least some population pressure throughout the 11th Millennium BC.33

Both flint and obsidian were used by Hallan Cemi's inhabitants for chipped stone tools. Flints of varying quality are readily available locally; the obsidian was imported, but constitutes ca. 60% of the chipped stone by count and ca. 33% by weight. The Hallan Cemi chipped stone assemblage offers little evidence of any connection to later India. Bilaterally retouched "Cayros blades" and Levantine PPNA type foliate, and retouched points, both commonly found at sites in eastern Anatolia,34 are completely absent. Likewise absent are Levantine PPNA type sawched (i.e., blunted) points of the kind found in the region at the slightly later local house sites of Nemrik 6 and Quemmez 25.35

Using, however, may be, a typological connection to the retangular foliate pieces from Hallan Cemi 36 and Nemrik points. The former derive from the latter primarily in having been shaped by abrupt as opposed to smooth flake removal, but, that may be because they are simply early examples of the common type.

The strongest typological links in the Hallan Cemi chipped stone assemblage are to the lithic assemblages from Zawi Chemi and other local sites. Both convex pieces and scapelike triangles (dotted backed blades) occur in both the Shuduf Cave 37 and the Zawi Chemi Shanidar assemblages 38, through in the latter site an invertebrate ratio to their relative frequencies in the Hallan Cemi assemblage. Scapelike triangles are also the major geometric component of the Leziria assemblage from Zawi Chemi 39, and are at least present in other Shanidar assemblages 40.

As telling as the Shanidar artifacts types present in Hallan Cemi are the other early types that are apparently absent. Characteristically Neolithic-type backed and truncated blades are completely absent, as are all other distinctly Neolithic types. Microblades are extremely rare. The chipped stone connection to the Zawi Chemi is reinforced by a type within the worked bone assemblage. These artifacts are flat to slightly curved bone objects, sometimes decorative, that come in horse, beaver, ovine, and undulating form. They are characterized by being divided into two or more times through their centers, such that they resemble large elongated bone bison 41. Examples of these artifacts also occur at Zawi Chemi, where they were called "flat, pointed tools" in the case of the ovine form and "double-holed winged objects" in the case of the undulating form.42

LONG DISTANCE TRADE

There is evidence for trade in at least three commodities between Hallan Cemi's inhabitants and people to the north and west. The obsidian at Hallan Cemi was obtained between the Lake Van and Bosphorus areas,43 such sources are over 100 km away, one to the northeast and the other to the northwest.

Copper ore, presumably used as pigment, also occurs at the site. It was obtained from unknown sources, but the nearest source currently being exploited is at the modern Turkish town of Maden, situated ca. 30 km northwest of Çeşme. Sea shells of Mediterranean gastropods (Mazzara gibbula, Conus mediterraneus, and Strombus sp.)44, through not common, also occur at the site, along with none of locally available fresh-water gastropods (Theodoxus jordanii) and bivalves (Unio eugracilis), as well as land snails. Several of the Mediterranean gastropod shells were apparently collected with their backs already broken (i.e., not a natural hold); others were picked. Presumably they were all natural as beads. The fresh-water gastropods and several of the fresh-water bivalve shells were also pierced, presumably for the same purpose. They are noteworthy that despite the points of similarity (e.g., the "lithic points") between Hallan Cemi and Nemrik 9, there is little evidence for long distance trade in this direction (the east). Obsidian is, in fact, surprisingly rare in the chipped stone assemblages from round house sites in the Mosul region.45 In the same vein, the "chocolate" colored flint that appears to have been imported into the Mosul area sites, has yet to be identified in the Hallan Cemi chipped stone assemblage.46

As noted earlier, two otherwise raw obsidian coms were found in one of the level 1 public structures, along with evidence of obsidian working. There is also the general association of copper ore finds with both the level 1 public structures. This suggests that the supraprovincial group associated with these public structures played some role in the trade of these relatively valuable commodities.

THE SUBSISTENCE ECONOMY AND SEASONALITY

The faunal and botanical remains indicate that Hallan Cemi was occupied year round. This makes sense particularly noteworthy that is: 1) the plant and animal remains indicate that the economy was based on broad-spectrum hunting and gathering, and 2) wild cereals were apparently not a component of the subsistence economy. This makes questions about the hypothesized sedentary role of specialized gathering (in general, and cereal grass exploitation 48 in particular) in precipitating sedentary village life in southwestern Asia at the end of the Pleistocene.

Carbonized plant remains are well preserved in the Hallan Cemi deposits. Collection was by means of flotation using a modified "sieve" type flotation machine 49 and a combination of 1 mm and 35 mm sieves. What follows is largely based on an analysis of a limited number of samples from the 1961 and 1992 seasons (Table 1). Analysis of the sample balance is ongoing.

All the seeds found at Hallan Cemi can be most plausibly interpreted as food remains. 48 In any case, relatively few wheat grains were found, mostly in fragmentary condition. Nuts have yet to be identified as belonging to the cereal grains. In contrast, pulses are common. Most are fragmentary and cannot be identified beyond Vicia/Lathyrus. However, identifiable examples of both beans (Lens sp.) and bitter vetch (Vicia ervilia) were noted. Nuts are also common (fig. 4).

44. KAHOUNI, 1960: Pl. 10, 14.
These include almond (Amygdalus sp.), pistachio (Pistacia sp.) and another thin-walled nut that remains to be identified. Also common are seeds of sea club-rush (Bobolassenuia marinna), a species of Polygonum, and Gundelia tournefortii.

Animal bone is abundant, particularly in the open central area, and very well preserved. Collection of the faunal material involved manually collecting all visible bone during excavation and dry screening 25% of all excavated deposits through a 5 mm mesh. Bones from samples of the (3 mm wet screened) heavy fraction from flotation were also collected. Evidence of carnivore gausing is rare; and, in general, the faunal assemblage does not appear to have been heavily biased by non-human activities.

Table 1: Table of plant remains from analyzed 1991-1992 samples.

<table>
<thead>
<tr>
<th>Fruit and Nuts</th>
<th>Leaves</th>
<th>Other Plant Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almond (Amygdalus sp.)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pistachio (Pistacia sp.)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Gundelia tournefortii</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

![Image](https://via.placeholder.com/150)

Fig. 4: Sample of building level 3 deposit containing almonds.

A wide variety of animal species are represented and for the most part only the remains of species-dwelling species, such as equids and gazelle, are absent. The remains of sheep (Ovis sp.) and goats (Capra sp.) are the single largest mammalian component of the faunal assemblage, comprising approximately 42% of all mammalian bone between them. Sheep outnumber goats as approximately 18:1. Red Deer (Cervus elaphus) are the next most commonly represented species at ca. 25%, followed by pig (Sus sp.) at ca. 17%. In contrast to the level of ovicaprid exploitation, which remains relatively constant over time, the frequency of remains decreases over time.

Fig. 5: Capitalium of Gundelia tournefortii.

While the frequency of pig remains increases. Other mammalian species represented in the faunal assemblage are camels (two species of fox - Vulpes vulpes and Vulpes corsac - plus a dog/jackal type) at ca. 10%, brown bear (Ursus arctos) at ca. 3%, cape hare (Lepus capensis) at ca. 2%, follow (Dama dama) and stone martens (Martes foina). Wild cat (Felis silvestris), beaver (Castor fiber), and European hedgehog (Erinaceus europaeus) follow at less than 1% each. The remains of wild cattle (Bos primigenius) were not present in the sample analyzed so far, but are known to be present in the site in the form of the above-mentioned wechs skull.

Non-mammalian species include two types of fish (catfish and a species of cyprinid), lizards, turtles of the genus Marginatum, tortoises (Testudo), and birds. Of the non-mammalian bones, turtle bones are by far the most numerous at 83%, followed by bird (11%), fish (6%), and lizard. In addition, the shells of fresh water clams (Unio giganteus) occur in moderate numbers. While a few of these clam shells were pierced, presumably for use as decorative items, the large majority were not and were presumably collected for some other purpose.

 Morphologically, the sheep are wild, as are the goats. Aproximately 66% of the sheep-goat remains (for which an age could be determined) come from individuals that survived to at least 42 months of age, a pattern consistent with the hunting of a wild population. However, of the 28 sheep-goat bones that could be reliably sexed, 19 are from males and only 9 from females, despite a tertiary sex ratio in wild populations based slightly toward females. This extreme bias toward males is more typical of animal husbandry than hunting. However, for the moment, the other lines of evidence appear to eliminate the outright husbandry of oviscaprids as an explanation for this biased sex ratio. However, the selective hunting of males (i.e., management of wild flocks) remains a possible explanation for this pattern.

In the case of pigs, the sample analyzed to date contains twenty-three measurable upper and lower second and third molars. The majority are within the range of overlap between domestic and wild pigs; three are sufficiently large as to have come from animals that must have been wild; and, five are very small for a wild pig. While the tooth size evidence alone is inconclusive, other lines of evidence combine with it to suggest that some form of pig husbandry was being practiced at Halian Çemi. First, the survivorship curve for pigs in is marked contrast to that for sheep-goats. At least 10% of the individuals were less than 6 months of age when consumed and 43% never reached the age of 12 months. This pattern of consumption is similar to that found by one of us (Redding) at sites with herds of domestic pigs in Egypt, Iraq, and the Levant.

The pig data from Halian Çemi also show a strong male bias (11:4) in the sex ratio, implying some form of culling. Lastly, the body part data indicate that a higher percentage of pigs were butchered on or near the sites than were sheep or deer (see meat bearing versus non-meat bearing bone data below). This suggests some exploitation of domestic pigs; along with the continued hunting of wild pigs. The tooth size data imply very much the same thing.

It should be noted that at least some domesticated pigs are apparently also present in the round house levels at Çayönü, and pigs are particularly common (relative to sheep and goats) in the lower levels of that site. Moreover, the most recent pig data from that site are also consistent with a mixed pig-rearing/hunting exploitation pattern.

The present day economic importance of sheep and goats in the Near East has tended foster the presumption that they were the earliest animal domesticates in that area. Nevertheless, the possible early domestication of pig is not surprising when one considers certain facts: 1) the fecundity and growth rate of pigs 2) the upper third molar range in size from 35.3 to 39.4 mm (N = 7, mean = 37.32), the upper second molar range in size from 19.6 to 20.3 mm (N = 10, mean = 20.39), the lower third molar range in size from 21.8 to 24.8 mm (N = 3); and the lower second molar range in size from 22.0 to 24.0 mm (N = 4).

55. Two are lower third molars of 38.4 and 40.0 mm length and three are upper second molars of 46.6, 21.1 and 21.8 mm length.
58. Husillos and Moseley, n.d.
of pigs make them superior producers of protein relative to all other native Near Eastern domesticates; 2) the labor required for pig maintenance is lower than for other Near Eastern domesticates; 3) young pigs take readily and will imprint on humans; and 4) juvenile or neonate pigs are relatively easy to obtain.

Pigs, like sheep and goats, are competitors with humans for cereals. However, pigs are considerably more difficult to control or herd than sheep or goats, and this difficulty grows greater with herd size. This would seemingly make pigs a poor choice of domesticates (relative to sheep and goats) in situations where intensified production of animals is desired and in contexts where cereal grass exploitation is a significant component of the human subsistence economy. But, in situations where limited husbandry sufficed (as perhaps in the round house levels at Halilat Cemii and Caystoli) and in contexts where, for whatever reason, cereals were not a component of the human subsistence economy (as was apparently the case at Hallat Cemii), pigs would seem superior to sheep and goats.

The shift to overbreaded herding later in the Neolithic (at the expense of pig rearing) may very well relate to either or both of these factors. In addition to providing evidence of diet and economy, the plant and animal remains provide various lines of evidence indicating that Halilat Cemii was occupied year-round. The plant remains, variously available from late spring (pulses) through the summer (e.g., Gundela) and early autumn (nuts), indicate that at least enough forage was available for most of the year. There is also indirect evidence for a winter occupation. That is, red deer and brown bear, both present in the faunal assemblage, could be most efficiently exploited in the winter months.

The most direct evidence, however, is the growth bands on the clam shells found at the site, which clearly indicate year-round occupation. Out of a total of 130 clam shell samples thus far examined, 63 had ventral margins sufficiently intact to permit analysis of seasonality based on growth bands. Of these 63 shells, 10 (16%) were harvested during the period of slow growth; 27 (43%) were harvested early into the rapid growth phase; 12 (19%) were harvested well into the rapid growth phase; and 10 (16%) were harvested near the end of the rapid growth phase. Thus, claims were clearly gathered over the course of the entire year at Hallat Cemii.

RESOURCE EXPLOITATION PATTERNS AND CATCHMENT AREA

Sedentary hunting-gathering requires a logistical (i.e., radiating), as opposed to intensivist (i.e., circulating) resource procurement strategy, with the concomitant risk of local resource depletion due to prolonged residence in the same place. It is, therefore, noteworthy that in the case of the Hallan Cemii animal remains, there is evidence that a remarkably high proportion of the meat consumed at the site was procured locally.

Dividing sheep and deer limb segments into 'meat bearing' (i.e., acropa, humerus, radius, ulna, illeis, femora, patella, tibia, and fibula) and 'non-meat bearing' (metapodials, podials, and phalanges) elements, the expected percentages 67 if all animals were being brought back to the site are 37% meat bearing and 63% non-meat bearing bones for both sheep and deer, the two most intensively exploited animal species at Hallat Cemii. At Halilat Cemii, the actual percentages of meat bearing bones in the faunal assemblage are 55% (45% non-meat bearing) for sheep and 69% (31% non-meat bearing) for deer. For both sheep-goats and deer, this is significantly higher than the expected frequency. In contrast, for pigs the percentage is only 43% from meat-bearing bones, against an expected proportion of 50%. This implies that for sheep-goats and deer (but not pigs) a particularly high percentage of primary butchering took place away from the site, with meat bearing bones being preferentially brought back to the site. This, in turn, implies that much of the sheep-goat and deer meat was being brought from distances so great that the energetic cost-benefit ratio dictated the abandonment of marginally useful (non-meat bearing) elements at the primary butchering site.

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ENVIRONMENT AND ADAPTATION DURING THE TAURUS-ZAGROS ROUND HOUSE HORIZON

It has been suggested that hunter-gatherer territorial boundaries tend to conform to natural boundaries, particularly drainage basins. Hallat Cemii is ideally situated to vertically exploit the full range of environments along the Batman drainage and the presence at the site of both goats and Gundela fruits is consistent with the exploitation of the full drainage. Neither were presumably available in the site vicinity; the former were likely derived from the mountains to the north and the latter from the more open country in the direction of the Tigris.

Within the extensively surveyed Batman drainage, only two stratified aceramic sites are known to exist - Hallat Cemii and Demirkoy71. Demirkoy is situated on the west bank of the Batman River, directly across from the city of Baran and ca. 30 km down river from Hallat Cemii. Survey collections made in 1989 and 1993 and soundings at this site conducted in 1997 yielded a lithic assemblage containing both scelene traces and projectile points, the latter including examples of nemret type points. Obsidian constituted only ca. 8% of the chipped stone, significantly less than it did at Hallat Cemii. The lower frequency of obsidian and scelene in the Demirkoy assemblage and the presence in that assemblage of Nemret points indicate that the main occupation at Demirkoy postdates the one at Hallat Cemii. Thus, Demirkoy apparently dates to the late round house period and likely represents a relocation down-river at that time of the same community that had previously occupied Hallat Cemii. In any case, it is not a second community sharing the Batman drainage with the one at Hallat Cemii.

It has been suggested by one of us69 that the earliest attempts at food production were for purposes of dietary insurance. Given the local depletion of primary game species implied by the sheep and deer butchery data, the pig husbandry at Hallat Cemii may very well have served such insurance purposes.

69. 70. J. Jackson, 1976.
71. AAGAS et al., 1991: 181-182 and fig. 3 (where it is called Demirkoy Halkali). A third stratified site, related to the PPNB scatter at Sevrades (Demirkoy and Tunc, 1993) is suggested to exist but, to evidence remains to be confirmed by a walking survey along the south bank of the Kardestepa River. Any such sites would be of interest only to the extent that it extends the sequence of community relocation.

HALLAT CEMII, PIG HUSBANDRY, AND POST-PLEISTOCENE ADAPTATIONS ALONG THE TAURUS-ZAGROS ARC (TURKEY)
In more general terms, the eastern Anatolian sites together suggest another interesting pattern of changing adaptations. The pig husbandry aside, Hallan Çemi is associated with an essentially hunting-gathering adaptation based primarily on the exploitation of nuts and pulses. It is also so situated near the oak forest ecoregion as to facilitate the vertical exploitation of all the resources zones within the Basin drainage. Demirköy, on the other hand, is situated well down river from Hallan Çemi in what was presumably even then more open country. The presence of a bone sickle haft at Demirköy suggests that a greater emphasis on cereal exploitation may have been part of the new adaptation associated with this relocation at the end of the 11th Millennium BP.

Çayönü, like Demirköy, was first permanently settled during the later part of the round house horizon, subsequent to the Younger Dryas. Its location within the Ergani Plain conforms to this suggested pattern, as does the evidence for the exploitation of domesticated cereals at that site.74 So does the absence of any identifiable early round house sites in the Ergani area — any such sites would, according to this model, be located further up the Boğazköy (or Tigris) in or at least near to the forest zone.

Such a model of changing adaptations raises two questions. The first is: why we nuts and pulses exploited instead of cereals at the earliest sedentary sites in eastern Anatolia? The second is: why does the apparent shift in emphasis from the exploitation of nuts to the exploitation of cereals take place in eastern Anatolia at the end of the Younger Dryas? 75

The Hallan Çemi data suggest that the answer to the first question is that cereals may simply not have been available to be exploited at the time the earliest sedentary communities formed in this region. However, it should be emphasised that the evidence thus far indicates only that cereals were unavailable for exploitation in the vicinities of the site. It remains quite possible that they were available for exploitation at lower elevations far down river (e.g., the area where Demirköy would later be situated)76 and purposefully ignored for some reason.

The answer to the second question is also unclear. Even if cereals were unavailable for exploitation in eastern Anatolia prior to the end of the Younger Dryas, the shift from nut to cereal exploitation in the late round house period cannot simply be attributed to the sudden availability of cereals at the end of the Younger Dryas. That is, nuts and pulses almost certainly continue to be available in the even more favorable conditions following the end of the Younger Dryas. This implies that the shift to cereals at the end of this period reflects human preferences. While there are several possible reasons for such an expressed preference, one economically obvious advantage that cereals have over nut-bearing trees is that they are annuals. This attribute facilitates the intensified production of cereals on an as-needed basis and hence risk management. The implication drawn from such a possible reason for the shift to cereals is that cereals were being produced in eastern Anatolia from the time they were first exploited in that region.

THE TIGRIS NEOLITHIC AND LEVANTINE INFLUENCES

While the Taurus-Zagros flanks were clearly a second center of neolithization within southwestern Asia, there is some evidence of Levantine influence. This evidence suggests an interesting series of changes over time in the cultural dynamics of the region as a whole. In eastern Turkey, aside from Hallan Çemi, basal Çayönü and Demirköy, early aceramic sites are also known to exist within the Boğazköy drainage (Gözü Hoyük)77, that of the Ambarçay (Ambarçay Höyük)78, and in the Gercüş vicinity (Hüter Şelal)79. Such a small tributary that flows north out of the Taur Abdol. Another early aceramic site (SusA 2)80 also exists along the Butuş Çayı (a tributary of the Boğazköy), in the vicinity of Kurtalan. This, coupled with the data from northern Iraq, suggests that settled village communities dating to the round house horizon may very well have existed along most if not all the major Tigris tributaries at least as far south as the Mosul area in northern Iraq.

In other words, Hallan Çemi fits a pattern indicating the use of diverse subsistence strategies tailored to different environments within Southwestern Asia. Although the intensive exploitation of wild cereals is clearly sometimes a substantive correlate of sedentism in southwestern Asia, it is just as clearly not the only possible one. Thus, it cannot be the cause of sedentism and must therefore be a secondary outcome of it. Generalizing “pall” models, to include resources such as nuts, and then arguing that any suitably dense resource will precipitate sedentism is no better. This is because doing so then requires that we explain away the numerous cases of edible nut exploitation around the world that did not precipitate sedentary lifeways.

81. ADELBAO et al. 1991: fig. 3-6
82. OZCAN and CARLSON 1994: 206
83. KASPRZYK and SORBONS 1992: 32
84. COTTON and BOLTHAES 1989: 21
85. ZOLL 1984: 1989 has triggered the assessment of cereal cultivation spread to the highlands after the development of the Levant. This transition may be related to such a hypothetical spread of cereal cultivation to the Tigris from the Levant, symbolizing an interesting possibility that, unfortunately, cannot yet be properly evaluated.
86. However, the drop in zedanical usage within the Taurus-Zagros drainage during the early and late round house period (Demirköy as compared to Hallan Çemi) notes the possibility that other factors may have played a role. In other words, the situation may also exist within the Boğazköy drainage. There is very little evidence for the Çayönü period, while the SusA 2 aceramic is reported to be mostly unobscured. This evidence is used by the Çayönü period. The SusA 2 aceramic is reported to be mostly unobscured.
88. COTTON and BOLTHAES 1989: 21
89. see also CEML, 1985.
The point is the availability of suitably dense and predictable resources is obviously a necessary condition for increased sedentism, but in and of itself it is not a sufficient condition. This implies the existence of forces and factors promoting sedentism rather than just the availability of a particular resource. As argued elsewhere, population/resource stress is that driving force and the ownership and territoriality it precipitates are the immediate steps in the process. The fact that the earliest sedentary sites in eastern Anatolia due to the middle of the Younger Dryas suggests that the progressively harsher conditions of the advancing Younger Dryas may have played a role in precipitating the requisite resource stress.

SUMMARY

Hallan Çemi is a site that was occupied toward the end of the 11th millennium BP by a population of sedentary hunter-gatherers. The data suggest that the inhabitants employed a logistical subsistence strategy and practiced a simple form of animal husbandry involving pigs to manage risk. which may have been increasing due to deteriorating conditions in eastern Anatolia (typified by sites such as Cayönü and Nevalı Çorü) has its basic roots in the Taurus-Zagros region, house morphology, the obvious Levantine PPNI influences notwithstanding. Lastly, the data from Hallan Çemi and other round house period sites in eastern Anatolia raise serious questions concerning the central role of sedentary societies to develop in this area during the Younger Dryas, using nuts and pulses (not cereals) as staples. This indicates that while the availability of suitable resources was a necessary condition for sedentism, in itself such availability is not a sufficient condition for sedentary societies to develop. This implies the action of other forces, such as population pressure/resource stress, in the process that generated the beginnings of settled village life in southeastern Asia.

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