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

M. ROSENBERG, R. NESBITT, R.W. REDDING and B.L. PEASNALL

Abstract: Recent work at Hallan Çemi and other round house horizon sites in eastern Anatolia indicates that the Taurus-Zagros flanks were a second autochthonous center of neolithization in southwestern Asia. Fully settled complex hunter-gatherer societies are in existence in this area by the late Younger Dryas. These settled village societies were based on adaptations that did not involve cereal exploitation, presumably because cereals were absent in this area during the late Younger Dryas. Instead, these adaptations revolved around the exploitation of nuts and pulses, plus the hunting of sheep, and deer supplemented by early experiments with animal husbandry involving pigs. They are thus distinct from those that served as the foundation for the earliest sedentary societies in the Levant. Most current attempts to explain the beginnings of settled village life in southwestern Asia are based solely on Levantine data, which until recently were virtually all that were available. The Anatolian data do not confirm the Levantine pattern and thus raise serious questions about the general validity of these models.

Résumé: Les travaux récents conduits à Hallan Çemi et sur d'autres sites qui se placent au Anadolie orientale au 7^{ème} millénaire à des maisons circulaires indiquent que les flancs du Taurus-Zagros furent un deuxième centre autochtone de néolithisation en Asie du sud-ouest. Des sociétés non à but sédentaires de chasseurs-cueilleurs étaient présentes dans cette région au Dryas récent. Ces groupes vivants en village avaient une subsistance qui ne reposait pas sur l'exploitation des céréales absentes dans cette région au Dryas récent, mais ils s'adaptèrent à l'exploitation de noix et de légumineuses à laquelle s'ajoutaient la chasse d'ovicapridés et de cerfs, ainsi que les premiers essais d'élevage y compris celui de cochons. Ainsi, ces sociétés se distinguaient de celles qui constituaient les premières sociétés sédentaires au Levant. Jusqu'à présent, les tentatives d'explication du début de la vie villageoise reposaient uniquement sur des données provenant du Levant, toutes éphémères. Les données en provenance d'Anatolie ne se conformant pas à celles du Levant et soulèvent ainsi des questions sérieuses sur la validité de la généralisation de ces modèles.

Key-words: Turkey, Hallan Çemi, Zagros-Taurus, neolithization, animal husbandry.
Mots clés: Turquie, Hallan Çemi, Zagros-Taurus, néolithisation, élevage.

INTRODUCTION

Over the past half century, a variety of factors have combined to make the Neolithic and PPNA – the two successive cultures of the round house horizon in the Levant – much better known than their contemporary counterparts along the flanks of the

Taurus-Zagros arc. Until recently, the data from Zawi Chemi¹ and sketchy data from M'lefaat and Karim Shahr² were virtually all that were available for the Taurus-Zagros, for these

1. SULEYRI R.L., 1981
2. BRADSDON and HOWL, 1960; BRADSDON et al., 1983

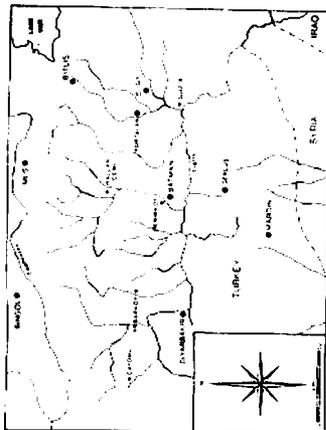


Fig. 1. Map of eastern Anatolia showing sites mentioned in the text.

periods. This paucity of data had tended to foster the view that the Levant was the primary center of early Neolithic development in southwestern Asia³, with the Taurus-Zagros zone largely the recipient of these developments.

Recent work in northern Iraq at Qermez Dere⁴, Nemrik⁵ and M'lefaat⁶ began the process of changing this misperception. The still more recent work in eastern Turkey, particularly at Hallan Çemi and in the round-house levels at Çayönü⁷, have substantially clarified the pattern emerging for the round-house horizon in the Taurus-Zagros highlands. These data collectively indicate that the Taurus-Zagros area was a second, largely autochthonous center of early "neolithization" in southwestern Asia. Moreover, the Hallan Çemi data verify the existence of a type of early Post-Pleistocene adaptation that has been suggested to have existed in parts of southwestern Asia⁸, but which had hitherto been undocumented. This adaptation involved early pig husbandry, but did not involve wild cereal exploitation until after the end of the Younger Dryas. Its existence raises questions about widely-held assumptions concerning both the forces promoting sedentism in southwestern Asia at the end of the Pleistocene and the origins of animal husbandry.

3. See, e.g., Moore, 1982; Bocawade and Bocawade, 1986; U. J. Childe, 1959; Bate, Yusef and Maden, 1995.
4. Watkins and Braid, 1987; Watkins, Braid and Britts, 1991; Watkins, 1990; Watkins, Britts et al., 1991.
5. Kizildagci, 1989, 1990, 1992.
6. Kizildagci, Kizildagci and Szyrak, 1991.
7. Ozdoğan, n.d.
8. Van Zing, 1988; Rosenberg, 1990.

HALLAN ÇEMI AND ITS SETTING

Hallan Çemi⁹ is situated at an elevation of 640 meters in the southern facing foothills of the Sason Dağları, a chain of the eastern Taurus (fig. 1). It is located ca. 40 km north of the city of Batman, on the west bank of the Sason Çayı (a tributary of the Batman River and Tigris respectively), which cuts through these foothills to form a small valley. Extensive oak forests currently cover both the higher elevations of the foothills surrounding the site and the unfarmed portions of the lower elevations in this foothill zone (fig. 2). Remnants of riverine forest also occur along the Sason Çayı.

To the north of the site, the snow-capped peaks of the Sason Dağları rise to well above the tree line. To the south, the foothills terminate in an expanse of rolling terrain that continues for ca. 40 km to the Tigris. This relatively flat terrain is cut by the wide floodplain of the Batman River¹⁰ and is currently devoid of forests. To the west of the Batman drainage, other small tributaries of the Tigris regularly cut through terrain that also conforms to this basic pattern. From west to east, these include the Bağazay (along which Çayönü is situated), the Amburgeç and several others. To the east of the Batman drainage, the terrain south of the foothills becomes progressively more hilly and is somewhat more forested than in the Batman area. It is also cut by fewer, but larger, tributaries (e.g., the Garzan Çayı and the Bahian Çayı). South from the Tigris, the terrain rises again until the Tur Abhan massif drops down to the high plains of northern Mesopotamia. Several small tributaries flow north from this area to the Tigris. Oak forests again recur in this area. Annual precipitation in this entire region is currently sufficient to support dry cereal farming.

Based on a preliminary analysis of 125 wood charcoal fragments¹¹ (derived from 3 of the 10 samples, *Fraxinus*, *Quercus*, *Prunus*, *Pistacia*, and *Salix* or *Populus* are present in the site deposits, *Buxthorn* (cf. *Fraxinoides alba*) may also be present. The *Salix/Populus* charcoal suggests the proximity of riverine forests to the site during the period of its occupation; the other species are consistent with a mixed oak forest essentially

9. Funding and other support for the Hallan Çemi excavation was provided by the National Geographic Society, the National Science Foundation, Mohd Exploration-Mekranistan Inc., the University of Delaware, the Research Foundation of the University of Delaware, the University of Pennsylvania, the American Research Institute in Turkey, and the University of Michigan.
10. Ozdogan et al., 1991 for a more detailed description of this area's geomorphology.
11. We are indebted to Roseana Kable for providing these data.



Fig. 2. Oak forest in vicinity of Hallan Çemi.

similar to that which presently covers the vicinity of the site. Ash (*Fraxinus*) is by far the most common species present in the samples analyzed to date, though ash is only a small component of present day *Q. brantii* forests in eastern Turkey. This raises the possibility that the ash may be derived from riverine, not mixed oak forests.

Thus, despite the late Younger Dryas date, forests were still present in the vicinity of the site, as is also implied in the faunal data (see below). Assuming these ancient charcoal fragments are a representative sample, the site appears to have been set on the edge of riverine woodland, with surrounding hillsides covered by deciduous mixed oak forest (similar to the current "natural" vegetation in the vicinity of the site). These oak forests would presumably have disappeared in the higher elevations of the Sason Dağları to the north as they do now and may, as they also do now, have given way to more open terrain down river, in the direction of the Tigris.

STRATIGRAPHY AND ARCHITECTURE

Hallan Çemi is a small mound, only ca. two-thirds hectare in size¹². A deep sounding in the highest part of the mound indicates that there are 2.3 meters of preserved deposits in that area, all of it yielding acramic assemblages that can best be categorized as terminal Epipaleolithic. A series of radiocarbon dates indicate that this acramic occupation dates to the last few hundred years of the 11th millennium BP (uncalibrated)¹³, the last part of the Younger Dryas. This is broadly

12. Sparse deposits apparently devoid of archaeological remains and the failure, during some part of the late ceramic Neolithic, to cover the entire southern flank of the mound to a depth of almost two meters. This late occupation first discovered during the 1993 season, remains for the present both undated and poorly understood. The acramic deposits do not seem to extend south under the remains of this late occupation, meaning that the acramic period site is something less than 5 hectares in area.
13. Rosenburg, 1994.

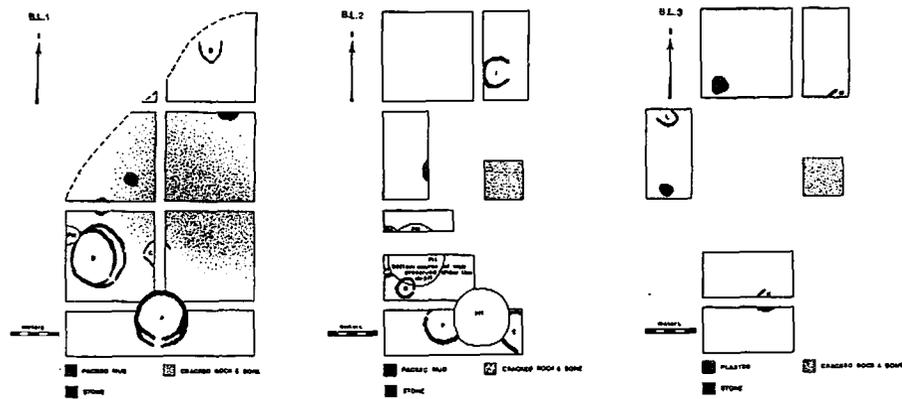


Fig. 3: Sketch plans of the three uppermost building levels at Hallan Çemi.

contemporary with the end of the Natufian and beginning of the PPNA in the Levant.

A total of 750 sq. meters was excavated on the top of the mound to expose the aceramic occupation. The deep sounding aside, the rest of the main excavation reached depths of up to ca. 2.5 meters, exposing what appear to be three aceramic building levels (fig. 3)¹⁴.

The community layout in all three of these levels consists of circular structures arranged around an open central area ca. 15 meters in diameter. The deposits of this central area are characterized by extremely dense concentrations of both small stones and animal bone. The stones are typically fire cracked pebbles and the animal bone is often found in the form of still-articulated portions of carcasses. Also found in this area was a row of three sheep crania that had clearly been purposefully arranged in this fashion. The deep sounding suggests that this central area was devoid of architecture over the full life of the site.

Scattered among the recognizable (*i.e.*, stone) structures ringing the open central area are a number of low circular platforms. These platforms were made of stone (in at least one case covered with a layer of mud plaster), packed mud¹⁵, or a plaster-like

14. The existence of a fourth is indicated but was never fully excavated and lower ones presumably also exist.

15. There is no evidence of mud bricks.

material. They average ca. two meters in diameter and 10 to 40 cm in preserved height and do not appear to have been constructed for the purpose of covering anything. For the moment, the most plausible explanation for these features is that they were the foundations for storage silos, as storage pits appear to be absent in all the levels.

The recognizable (*i.e.*, stone) structures vary in terms of construction methods by building level and also in terms of size in the uppermost two building levels. At least in the very uppermost building level (1), this size differential likely reflects functional differences.

The uppermost building level has thus far yielded the remains of four structures: two large round semi-subterranean structures and two smaller C-shaped surface structures. The two semi-subterranean structures (fig. 3: A and B) are particularly noteworthy. They are five to six meters in diameter and built of flat, edge-dressed soft sandstone slabs. The layout of both these structures is circular, with a doubled wall in the area of the entrance extending out like a set of pincers to create a vestibule of sorts. In both structures, a semi-circular stone bench or platform was set along one wall. Small circular plaster hearths occur on the floors. The floors of both structures were surfaced in a yellow sand and plaster mixture ca. 1 cm thick and several resurfacings were evident in each. Burials do not occur within these structures (nor have they yet been encountered anywhere within the site). In the more southerly of these

large structures (fig. 3: A), an aurochs skull was found that once hung opposite the entrance on or near the north wall of the structure¹⁶.

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 Beidha¹⁷. 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 distinct to have been symbolized. Public buildings are known to exist at later sites in eastern Anatolia such as Çayönü¹⁸ and Nevalı Çori¹⁹. They are also known to exist at sites, such as Ain Mallaha²⁰, that are similar in age to Hallan Çemi, but located in other parts of southwestern Asia. The point is that the apparent existence of public structures at Hallan Çemi 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 worth briefly reviewing 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 conditions. 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 bas-relief) decorations in a variety of geometric and naturalistic motifs²¹. 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 Çayönü²². Certain decorative elements also have broad parallels in the Natufian of the Levant²³, but the significance of this is debatable.

Other ground stone artifacts noteworthy for their suggestion of connection to later 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.

Typological 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 Çemi) are called sculpted stone pestles and what are called stone sculptures at the slightly later site of Nemrik 9²⁴. In contrast to the more common and coarsely made pestle types, these fancy pestles are typically made of the same raw material and to the same basic scale 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 not immediately recognizable²⁵. 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 Çayönü²⁶, 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 scale, suggesting that they were used together. Coupled with the fact that they

16. ROSENBERG, 1994a.

17. BYRD, 1994.

18. ÖZDOĞAN and ÖZDOĞAN, 1989; SCHIRMER, 1990.

19. HALPITMANN, 1993.

20. PERROT, 1966.

21. ROSENBERG and DAVIS, 1992.

22. ÖZDOĞAN and ÖZDOĞAN, 1993: 92.

23. HENRY, 1989: 203; EDWARDS, 1991: 132; NOY, 1991: 563.

24. KOZŁOWSKI, 1989: 29; KEMPISTY and KOZŁOWSKI, 1990: figs. 64-68.

25. ROSENBERG and DAVIS, 1992; ROSENBERG, 1994a.

26. DAVIS, 1982: Pl. 3.III: 6; ÖZDOĞAN, n.d.

both were vehicles for symbolization, this implies use in formalized contexts such as perhaps feasting. In that vein, the above-noted presence of extremely high concentrations of animal bone, including still-articulated portions of animal carcasses, the "display" arrangement of three sheep crania, and fire-cracked stone in the central activity area is worth emphasizing. This is because they have been considered indicative of feasting by others²⁷.

The stone bowls and sculpted pestles aside, two other elements of the ground stone assemblage are particularly noteworthy. One is a type of small notched ground stone baton; the other is a set of pierced ground stone types.

The notched stone batons are known from several fragmentary and one possibly intact example²⁸. This type is generally made of a relatively soft, micaceous grey metamorphic rock (perhaps a schist). Though the full form is problematic, all the pieces generally exhibit certain features. These are: a lenticular cross section with a maximum width of no more than 1.5 cm and maximum height of ca. 3 cm; a length of at least 15 cm, tapering down to either a convex or dimpled tip; and, a variably spaced series of sharp notches cut into one or both edges, usually quite neat. These notches range from one to eight in number on the examples at hand.

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

Pierced ground stones in round or oval form are commonly found at early Neolithic sites in eastern Turkey²⁹. As with the pestles, the pierced stones in the Hallan Çemi assemblage come 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 shaped³⁰. Such a shaft seems well suited to hafting. Some are also decorated with incised designs.

Their function remains problematic. However, the work and select raw materials that went into their manufacture argue against their being mere weights, as the coarser examples of

27. HAYNES, 1993: 296.

28. ROSENBERG, 1994a: 139.

29. e.g., SCHWIDR, 1988: fig. 17; DAVIS, 1982: fig. 3.13.

30. e.g., SCHWIDR, 1988: fig. 17: 1-2.

Neolithic pierced stones are often speculated to have been. Also, examples of this type bear a striking resemblance to what are usually called mace heads in later periods and the use of similar objects as mace heads has been documented ethnographically³¹. Coupled with the evidence of depression fractures in at least four of the Zawi Chemi burials³², they suggest violent competition, and hence the existence of at least some population pressure throughout the 11th Millennium BP.

Both flint and obsidian were used by Hallan Çemi'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 Çemi chipped stoneware offers little evidence of any connection to later industries. Bilaterally retouched "Çayönü blades" and Levantine PPNB type foliate and tanged points, both commonly found at later sites in eastern Anatolia³³, are completely absent. Likewise absent are Levantine PPNB type side notched (i.e., Khiam) points, of the kind found in the region at the slightly later round house sites of Nemrik 9³⁴ and Qermez Dere³⁵. There may, however, be a typological connection between the rare angular foliate pieces from Hallan Çemi³⁶ and Nemrik points. The former differ from the latter primarily in having been shaped by abrupt as opposed to flint retouch; but, that may be because they are simply early examples of the type.

The strongest typological links in the Hallan Çemi chipped stone assemblage are to the lithic assemblages from Zawi Chemi and other late Zarzian sites. Both convex pieces and scalene triangles (here called backed blades) occur in both the Shanidar Cave B³⁷ and the Zawi Chemi Shanidar assemblages³⁸, though at the latter site in an inverse ratio to their relative frequencies in the Hallan Çemi assemblage. Scalene triangles are also the major geometric component of the late Zarzian assemblage from Zarzi³⁹, and are at least present in other Zarzian assemblages⁴⁰.

As telling as the Zarzian artifact types present at Hallan Çemi, are the other early types that are apparently absent. Characteristically Natufian-type backed and truncated blades

31. BLACKWOOD, 1950.

32. AGRESTINI, 1993: 242.

33. e.g., RENFREW, 1982.

34. KOZŁOWSKI and SZYMICKA, 1989: 1940.

35. WATKINS, BAIRD and BIRTS, 1989.

36. ROSENBERG, 1994a.

37. SOLECKI R.S., 1955.

38. SOLECKI R.S., 1981: fig. 10: b-c.

39. GABRIEL, 1930: fig. 9: 10-14.

40. SMITH, 1966: fig. 15.

are completely absent, as are all other distinctly Natufian types. Microburins are extremely rare.

The chipped stone connection to the Zarzian is reinforced by a type within the worked bone assemblage. These artifacts are flat to slightly curved bone objects, sometimes decorated, that come in both rectangular, oval, and undulating form. They are characteristically drilled two or more times through their centers, such that they resemble large elongated bone buttons⁴¹. Examples of such artifacts also occur at Zawi Chemi, where they were called "flat, pointed tools" in the case of the oval form and "double-holed winged objects" in the case of the undulating form⁴².

LONG DISTANCE TRADE

There is evidence for trade in at least three commodities between Hallan Çemi's inhabitants and peoples to the north and west. The obsidian at Hallan Çemi was obtained from both the Lake Van and Bingöl areas⁴³. Both 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 Çayönü.

Sea shells of Mediterranean gastropods (*Massaria gibbosa*, *Conus mediterraneus*, and *Strombus* sp.)⁴⁴, though not common, also occur at the site, along with those of locally available fresh-water gastropods (*Theodoxus jordani*) and bivalves (*Unio tigrinus*), as well as land snails. Several of the Mediterranean gastropod shells were apparently collected with their backs already abraded (creating a natural hole); others were pierced. Presumably they were all strung as beads. The fresh water gastropod and several of the fresh-water bivalve shells were also pierced, presumably for the same purpose.

It is noteworthy that despite the points of similarity (e.g., the sculpted pestles) between Hallan Çemi and Nemrik 9, there is little evidence for long distance trade in that direction (the east). Obsidian is, in fact, conspicuously rare in the chipped stone assemblages from round house sites in the Mosul re-

41. ROSENBERG and DAVIS, 1992: fig. 10: 7-11.

42. SOLECKI, 1981: pl. 10: k-l, q.

43. We are indebted to Dr. James Blackman (Smithsonian) for providing these data.

44. We are grateful to Daniela E. Bar-Yosef (Peabody Museum, Harvard University) for providing this information.

gion⁴⁵. 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 Çemi chipped stone assemblage.

As noted earlier, two otherwise rare obsidian cores were found in one of the level I public structures, along with evidence of obsidian working. There is also the general association of copper ore finds with both the level I public structures. This suggests that the suprahousehold groups 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 Çemi was occupied year round. What makes this particularly noteworthy is that: 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 raises questions about the hypothesized causal role of specialized gathering (in general) and cereal grass exploitation⁴⁶ (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 Çemi deposits. Collection was by means of flotation using a modified "Straf"-type flotation machine⁴⁷ 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 1991 and 1992 seasons (Table 1). Analysis of the sample balance is ongoing.

All the seeds found at Hallan Çemi can be most plausibly interpreted as food remains⁴⁸. In any case, relatively few seeds of wild grasses were found, mostly in fragmentary condition. None have yet been identified as belonging to the cereal grasses. In contrast, pulses are common. Most are fragmentary and cannot be identified beyond *Vicia/Lathyrus*. However, identifiable examples of both lentils (*Lens* sp.) and bitter vetch (*Vicia ervilia*) were noted. Nuts are also common (fig. 4).

45. KOZŁOWSKI and SZYMICKA, 1989: 1990; WATKINS, BAIRD and BIRTS, 1989.

46. e.g., HENNESSY, 1989; MCCORMICK and HOLE, 1991.

47. WILLIAMS, 1973.

48. Cf. HALLAN, COLLEDFE and HARRIS, 1989: 259-260.

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

CONTEXT DETAILS	FRUIT AND NUTS				PULSES			GRASSES		OTHER WILD PLANTS				UNIDENTIFIED			
	LITRES	FLOTTS	LITRE	LITRE	Fluoroc	Prunus	Other	Medium	Small	Lentils	Grasses	Azore	Bolboschoenus scaberrimus		Gundelia tournefortii	Polygonum	Seeds
CONTEXT	FLGATED	LITRE	Fluoroc	Prunus	Other	Medium	Small	Lentils	Grasses	Azore	Bolboschoenus scaberrimus	Gundelia tournefortii	Polygonum	Seeds	Other material		
SG-22-844	300	0.04															
SG-22-845	200	0.17															
SG-26-830	100	0.18															
SG-26-839	100	0.06															
SG-27-846	140	0.02															
SG-36-834	200	0.01															
SG-36-834B	190	0.09															
SG-36-835	200	0.05															
SG-36-839	160	0.20															
SG-36-841	180	0.17															
SG-36-841B	150	0.07															
6F-07-747	51	0.31															
6F-14-741	40	0.002															
6F-17-733	100	0.06															
6H-07-966	85	0.10															
6H-07-979	40	0.13															
6H-08-976	110	0.05															
6H-09-982	90	0.01															
6HEXT-1-911	210	0.02															

Notes:
Number of items
- 1-10; ++ 11-50; +++ 51.

These include almond (*Amygdalus* sp.), pistachio (*Pistacia* sp.) and another thin-walled nut that remains to be identified⁴⁹. Also common are seeds of sea club-rush (*Bolboschoenus maritimus*), a species of *Polygonum*, and *Gundelia tournefortii*.

The *Gundelia tournefortii* (fig. 5) is particularly interesting as it has rarely appeared in site deposits. It is a perennial tumbleweed belonging to the daisy family (Compositae) and typically native to steppe habitats. The fruit consists of a woody and fibrous capitulum enclosing a single achene (weight ca. 0.03 gm). The achene, as its waxy appearance suggests, is rich in fatty oils⁵⁰ and is described by Zohary⁵¹ as "edible and tasty." *Gundelia* consumption is documented ethnographically in northern Iraq⁵².

Animal bone is both 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 (1 mm wet screened) heavy fraction from flotation were also collected. Evidence of carnivore gnawing is rare; and, in general, the faunal assemblage does not appear to have been heavily biased by non-human activities.

49. It is perhaps noteworthy that during the 1993 and 1994 seasons deposits in the vicinity of various smaller structures yielded almond in particular abundance.

50. ERCIYES, KARASMANOGLU and CIVELEKOGLU, 1989.

51. ZOHARY, 1982.

52. GUEST, 1933.



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 steppe-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 ca. 42% of all mammalian bone between them. Sheep outnumber goats at 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 deer remains decreases over time.

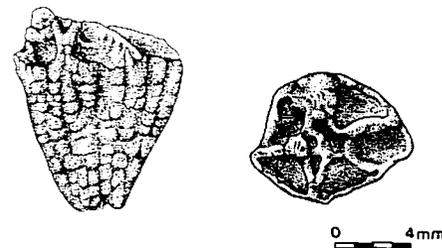


Fig. 5: Capitulum of *Gundelia tournefortii*.

while the frequency of pig remains increases. Other mammalian species represented in the faunal assemblage are canids (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%, fallow deer (*Dama dama*) and stone marten (*Martes fionda*). Wild cat (*Felis caus*), 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 at the site in the form of the above-mentioned aurochs skull.

Non-mammalian species include two types of fish (catfish and a species of cyprinid), lizards, turtles of the genus *Mauremys*, 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 lizard⁵³. In addition, the shells of fresh water clams (*Unio tigrinus*) 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. Approximately 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 population⁵⁴. 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 biased slightly toward females⁵⁵. This extreme bias

53. These frequencies do not include any of the wet screened samples (collected using a smaller mesh). Fish and lizard bones are thus under-represented.

54. HESSE, 1982.

55. GRIST, 1971.

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 ovicaprids 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 molars⁵⁶. The majority are within the range of overlap between domestic and wild pigs; three are sufficient large as to have come from animals that must have been wild; and, five⁵⁷ 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 Hallan Çemi.

First, the survivorship curve for pigs is in 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 Hallan 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 site 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 Çayönü⁵⁸ and pigs are particularly common (relative to sheep and goats) in the lower levels of that site⁵⁹. Moreover, the most recent pig data⁶⁰ from that site are also consistent with a mixed pig-rearing/pig-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 pigs is not surprising when one considers certain facts : 1) the fecundity and growth rate

56. The upper third molars range in size from 35.5 to 39.4 mm (N = 7, mean = 36.9); the upper second molars range in size from 19.6 to 26.3 mm (N = 10, mean = 23.3); the lower third molars range in size from 38.4 to 41.9 mm (N = 3); and, the lower second molars range in size from 22.0 to 24.0 mm (N = 3).

57. Two are lower third molars of 38.4 and 40.0 mm length and three are upper second molars of 19.6, 21.1 and 21.8 mm length.

58. LAWRENCE, 1980, 1982; HONGO and MEADOW, n.d.

59. LAWRENCE, 1982; HONGO and MEADOW, n.d.

60. HONGO and MEADOW, 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 tame readily and will imprint on humans; and, 4) juvenile or neonate pigs are relatively easy to obtain⁶¹.

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 domesticate (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 Hallan Çemi and Çayönü) and/or in contexts where, for whatever reason, cereals were not a component of the human subsistence economy (as was apparently the case at Hallan Çemi), pigs would seem superior to sheep and goats. The shift to ovicaprid 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 Hallan Çemi was occupied year-round. The plant remains, variously available from late spring (pulses) through the summer (e.g., *Gundelia*) and early autumn (nuts), indicate occupation of the site during at least those seasons. 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 months⁶².

The most direct evidence, however, is the growth bands on the clam shells⁶³ 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 bands⁶⁴. 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 phase⁶⁵. Thus, clams were clearly gathered over the course of the entire year at Hallan Çemi.

RESOURCE EXPLOITATION PATTERNS AND CATCHMENT AREA

Sedentary hunting-gathering requires a logistical (i.e., radiating), as opposed to residential (i.e., circulating) resource procurement strategy, with the concomitant risk of local resource depletion due to prolonged residence in the same place⁶⁶. It is, therefore, noteworthy that in the case of the Hallan Çemi animal remains, there is evidence that a remarkably high proportion of the meat consumed at that site was not procured locally.

Dividing sheep and deer limb segments into 'meat bearing' (i.e., scapula, humerus, radius, ulna, innominate, femur, patella, tibia, and fibula) and "non-meat bearing" (metapodials, podials, and phalanges) elements, the expected percentages⁶⁷ if entire 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 Hallan Çemi. At Hallan Çemi, the actual percentages of meat bearing bones in the faunal assemblage are 55% (45% non-meat bearing) for sheep-goats and 50% (50% non-meat bearing) for deer. For both sheep-goats and deer, this is significantly higher than the expected frequency⁶⁸. In contrast, for pigs the percentage is only 43% from meat-bearing bones, against an expected percentage of 30%. 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.

65. The estimate of where the «end» of the current year's rapid growth band would have been is based on the size of the previous year's rapid growth band.

66. e.g., LIEBERMANN, 1993: 610 ff.

67. The model used to calculate these percentages allows for the differential breakage patterns inherent in these various type bones.

68. Deer metapodials (non-meat bearing bones) were the preferred bones for the manufacture of bone awls and appear to have been preferentially brought back to the site. Thus, the frequency of non-meat bearing deer bones at Hallan Çemi is likely higher than it would otherwise have been.

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 Hallan Çemi may very well have served such insurance purposes.

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 basins⁷⁰. Hallan Çemi 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 *Gundelia* 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 – Hallan Çemi and Demirköy⁷¹. Demirköy is situated on the west bank of the Batman River, directly across from the city of Batman and ca. 30 km down river from Hallan Çemi. Survey collections made in 1989 and 1993 and soundings at this site conducted in 1997 yielded a lithic assemblage containing both scalene triangles and projectile points, the latter including examples of nemrik type points. Obsidian constituted only ca. 8% of the chipped stone, significantly less than it did at Hallan Çemi.

The lower frequency of obsidian and scalenes in the Demirköy assemblage and the presence in that assemblage of Nemrik points indicate that the main occupation at Demirköy postdates the one at Hallan Çemi. Thus, Demirköy 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 Hallan Çemi. In any case, it is not a second community sharing the Batman drainage with the one at Hallan Çemi.

69. REDDING, 1988.

70. e.g., JOCHIM, 1976.

71. ALGAZE et al., 1991: 181-182 and fig. 3 (where it is called Demirköy Höyük). A third stratified site, related to the PPNB scatter at Nevala Denik (see ROSENBERG and TOGUL, 1991), is suspected to exist; but, its existence remains to be confirmed by a walking survey along the south bank of the Ramdenka Çayı. Any such site bears on what follows only to the extent that it extends the sequence of community relocations.

The Younger Dryas, spanning the 11th Millennium BP. (uncalibrated), is a relatively short period marked by a relatively sudden return to glacial conditions. At Zawi Chemi in northern Iraq, which dates to the early part of the Younger Dryas (and is situated at a somewhat lower elevation – 425 meters – than Hallan Çemi), cereals were exploited. At Hallan Çemi, which dates to the late Younger Dryas, they were not. However, the presence of a sickle haft⁷² at Demirköy⁷³ raises the possibility of a return to or the beginning of cereal exploitation in the Batman drainage during the late round house period, following the end of the Younger Dryas.

The general paucity of wild grasses and absence of cereals at Hallan Çemi is surprising, in view of their generally significant presence at both earlier and later round house horizon sites along the Taurus-Zagros flanks, not to mention the Levant. Given the presence of other grasses in the botanical assemblage from Hallan Çemi, it is difficult to attribute the absence of cereals at that site to purposeful neglect. That, combined with the late Younger Dryas date for Hallan Çemi, suggests that they were simply not present to be exploited in the immediate environment of Hallan Çemi at the time that site was occupied.

Forests, however, apparently remained present within the Batman drainage throughout the Younger Dryas. While cervid remains decrease over time at Hallan Çemi, they are common in all levels. Since deer (and pigs) are primarily forest creatures, this implies that forests were present in the vicinity of Hallan Çemi during the full course of its occupation, a conclusion supported by the wood charcoals.

A thorough discussion of the larger issue of why animals – in this case pigs – were first domesticated is beyond the immediate scope of this article. However, two points are nevertheless worth noting. The first is that most of the relatively small pig teeth come from the uppermost building level and that pig remains generally increase over time, implying that both pig exploitation and pig husbandry became progressively more important over time. The second is that, while ovicaprid remains stay relatively constant over time, cervid remains (as noted above) decrease over time in association with the increasing pig remains. The point is that this pattern is consistent with the above-mentioned proposal that animal husbandry first develops as a mechanism for managing resource risk, in this case the growing risk produced by the gradually declining availability of wild forest-derived animal species (i.e., deer and pig) as the Younger Dryas progressed.

72. ALGAZE et al., 1991: fig. 3: 6 and fig. 4.

73. *Ibid.*: fig. 4.

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 ecotone as to facilitate the vertical exploitation of all the resources zones within the Batman 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 latter 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 site⁷⁴. So does the absence of any identifiable early round house sites in the Ergani area⁷⁵ – any such sites would, according to this model, be located further up the Boğazçay (or Tigris) in or at least nearer to the forest zone.

Such a model of changing adaptations raises two questions. The first is: why are 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?

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 emphasized that the evidence thus far indicates only that cereals were unavailable for exploitation in the vicinity of the site. It remains quite possible that they were available for exploitation at lower elevations further down river (e.g., the area where Demirköy would later be situated⁷⁶) 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 cereal exploitation during the late round house 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 Bohtan drainage (Guzir Höyük)⁷⁷, that of the Ambarçay (Ambarçay Höyük)⁷⁸, and in the Gercüş vicinity (Hirbet Selim)⁷⁹ along a small tributary that flows north out of the Tur Abdin. Another early aceramic site (S63/26)⁸⁰ also exists along the Bitlis Çayı (a tributary of the Bohtan), 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.

77. ALGAZE *et al.*, 1991.

78. This site was discovered by the Diyarbakır Museum staff in 1995. It was visited by two of the authors (Rosenberg and Peasnall) in 1995 and again in 1996. Collections were made on both visits.

79. ÖZDOĞAN and ÖZDOĞAN, 1993: 91.

80. BENEDICT, 1980: 167. The assessment of S63/26's date is based on an inspection of the survey assemblage from this site by two of the authors (Rosenberg and Peasnall) at Istanbul University during the summer of 1997. The assemblage includes a polished pestle fragment of the type typical at round house horizon sites such as Hallan Çemi, Demirköy and Nemrik. It includes no scapulae, such as occur at early round house period sites in the region and it also includes no lithic types (e.g., retouched rods, Byblos points) characteristic of post-round house horizon periods. The implication is thus that it probably dates to the late round house period. We are indebted to Mehmet Özdoğan and Aslı Özdoğan for their assistance in making this inspection possible.

Various lines of typological evidence indicate that round house sites from this region can be ascribed to a single cultural unit that had its primary roots in the Zarzian. This evidence includes the triangles and "bone buttons" from Hallan Çemi and their link to Zawi Chemi and the Zarzian. It also includes the sculpted pestles and possible Nemrik points from Hallan Çemi, as well as the Nemrik points from Demirköy⁸¹ and basal Çayönü⁸², and the tie they indicate to the round house sites in the Mosul area.

Their common cultural origin notwithstanding, the presence of PPNA (Kham) type side notched points in both the Nemrik⁸³ and Qermez Dere⁸⁴ assemblages implies some contact between the central Tigris sites and the Levant⁸⁵ by the late round house period. The absence of any such points at Guzir, Demirköy, Ambarçay and basal Çayönü suggests that any such contact did not penetrate into the upper Tigris region. The absence of much obsidian at the Mosul area sites may also be related to this apparent breakdown of communication between the upper and middle Tigris sites during the late round house period⁸⁶.

The earliest clear evidence for Levantine influence along the upper Tigris is found at Çayönü, but only in the levels that postdate the round house horizon. There, it takes the form of PPNB type tanged (Byblos) points and bidirectional blade cores that can be subsumed under the naviform type⁸⁷. There is a general similarity between the lithic assemblages from the post round house levels at Çayönü and those from contemporary sites along the Euphrates⁸⁸. That, coupled with the obvious Levantine influence visible at these Euphrates sites⁸⁹ and the lack of Levantine influence further south along the Tigris, suggests that the direction of influence at this time is up along the Euphrates and not the Tigris. What prompted this geographic shift in Levantine interactions from the middle Tigris in the PPNA period to the upper Euphrates and the

adjacent portions of the upper Tigris drainages during the PPNB is an intriguing question, if for no other reason than it undoubtedly relates to the development of the PPNB "interaction sphere"⁹⁰. However, the nature of this regional "interaction sphere" and the dynamics underlying its development (and later collapse) are subjects sufficiently complex as to be best addressed separately at some future date.

HALLAN ÇEMI AND THE BEGINNINGS OF SETTLED VILLAGE LIFE

Lastly, the data from Hallan Çemi raise questions concerning the central role often accorded to wild cereal exploitation in the development of settled village societies in southwestern Asia at the end of the Pleistocene. It has been suggested that cereals, simply because of their density, "induced" sedentism (with all its processual ramifications)⁹¹. Yet, Hallan Çemi's inhabitants were clearly sedentary without benefit of wild cereal exploitation.

Although sedentism and the intensive exploitation of wild cereals have often been assumed to be linked, only two Epipaleolithic sites actually show archaeological evidence for heavy dependence on wild cereals. These are Ohalo II, situated by the massive emmer stands of Lake Galilee (where wild cereals form 27% of the seed assemblage)⁹², and Mureybit in North Syria (where wild cereals form 40% of the seed assemblage)⁹³. At other sites, such as Abu Hureyra, Wadi Hammeh, Qermez Dere, and M'lefaat, wild grasses form only part of a very diverse range of collected plant foods⁹⁴.

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 subsistence 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 "pull" 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.

90. BAR-YOSEF, 1991; BAR-YOSEF and MEADOW, 1995.

91. e.g., HENRY, 1989: 27.

92. KISLEV, NADEL and CARMI, 1992.

93. VAN ZEIST and BAKKER-HEERES, 1984.

94. e.g., HILLMAN, COLLEDGE and HARRIS, 1989; NESBITT, 1995.

74. VAN ZEIST and DE ROLLER, 1991/1992.

75. CANEVA, 1992.

76. Elevation 560 meters.

The point is that 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 other than just the availability of a particular resource. As argued elsewhere⁹⁵, population pressure/resource stress is that driving force and the ownership and territoriality it precipitates are the intermediate steps in the process. The fact that the earliest sedentary sites in eastern Anatolia date 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 associated with the advance of the Younger Dryas.

As has become expected of sedentary groups⁹⁶, the inhabitants of Hallan Çemi displayed a degree of cultural complexity beyond that typical of mobile hunter-gatherers. The elaborately decorated stone bowls and fancy pestles can be construed to have been used for the formalized/ritualized preparation or consumption of food or beverages – in other words, feasting. The notched stone batons, on the other hand, appear to represent formal tallies. Social complexity is also implicit in the presence of public structures at that site.

Culturally, the evidence strongly suggests that Hallan Çemi is derived from the Zarzian. The evidence also suggests that Hallan Çemi was part of an early Neolithic tradition that evolved along the Taurus-Zagros arc from at least as far east as the Diyarbakır region of eastern Turkey to as far west as the Mosul region of Iraq. This tradition appears to have evolved independently of the contemporary Levantine cultures, at least until the end of the early round house period, which also corresponds to the end of the Younger Dryas.

The evidence for trade in exotic commodities at Hallan Çemi seems consistent with such a conclusion, indicating connections largely along the Tigris, though some connections to the Mediterranean (and the Natufian?) are evident. All this, not to mention the snake and bull iconographic elements, implies that the 10th millennium B.P. cultural efflorescent in eastern Anatolia (typified by sites such as Çayönü and Nevalı Çori) has its basic roots in the Taurus-Zagros round house horizon, the obvious Levantine PPNB influences notwithstanding.

Lastly, the data from Hallan Çemi and other round house period sites in eastern Anatolia raise serious questions concerning the central role often accorded cereal exploitation in current models seeking to explain increased sedentism in southwestern Asia at the end of the Pleistocene. In eastern Anatolia, significant cereal exploitation does not seem to commence until after the end of the Younger Dryas, perhaps due to the unavailability of cereals for exploitation in that region prior to that time. Yet, sedentary societies developed 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 southwestern Asia.

Michael ROSENBERG
University of Delaware
Parallel Program
333 Shipley St.
Wilmington
DOVER DE 19801
USA

R. Mark NESBITT
University College
London

Richard REDDING
Museum of Anthropology
Ann Arbor
M148109
USA

Brian L. PEASNALL
University of Pennsylvania
33rd and Spruce Streets
Philadelphia
19104 Pennsylvania

BIBLIOGRAPHY

- AGELARAKIS A.
1993 The Shanidar Cave Proto-Neolithic Human Population: Aspects of Demography and Paleopathology. *Human Evolution* 8: 235-253.
- ALGAZE G., BREUNINGER R., LIGHTFOOT C. and ROSENBERG M.
1991 The Tigris-Euphrates Archaeological Reconnaissance Project: A Preliminary Report of the 1989-1990 Seasons. *Anatolica* 17: 175-240.
- BAR-YOSEF O.
1991 Stone Tools and Social Context in Levantine Prehistory. In: CLARK G.A. (ed.), *Perspectives on the Past: Theoretical Biases on Mediterranean Hunter-Gatherer Research*: 371-395. Philadelphia: University of Pennsylvania Press.
- BAR-YOSEF O. and MEADOW R.H.
1995 The Origins of Agriculture in the Near East. In: PRICE T.D. and GEBAUER A.B. (eds), *Last Hunters-First Farmers*: 39-94. Santa Fe: School of American Research Press.
- BENDER B.
1978 Gatherer-Hunter to Farmer: A Social Perspective. *World Archaeology* 10: 204-237.
- BENEDICT P.
1980 Survey Work in Southeastern Anatolia. In: ÇAMBEL H. and BRAIDWOOD R.J. (eds), *Prehistoric Research in Southeastern Anatolia I*: 151-191. Istanbul: Istanbul University, Faculty of Letters Press.
- BLACKWOOD B.
1950 The Technology of a Modern Stone Age People in New Guinea. *Pitt Rivers Museum Occasional Papers on Technology* 3. Oxford: Oxford University Press.
- BRAIDWOOD L.S. and BRAIDWOOD R.J.
1986 Prelude to the Appearance of Village-Farming Communities in Southwestern Asia. In: VORYS CANNY J.V., PORADA E. et al. (eds), *Ancient Anatolia: Aspects of Change and Cultural Development*: 3-11. Madison: University of Wisconsin Press.
- BRAIDWOOD L.S., BRAIDWOOD R.J., HOWE B., REED C.A. and WATSON P.J.
1983 Prehistoric Archaeology Along the Zagros Flanks. *Oriental Institute Publications* 105. Chicago: University of Chicago Press.
- BRAIDWOOD R.J. and HOWE B.
1960 Prehistoric Investigations in Iraqi Kurdistan. *Studies in Ancient Oriental Civilization* 31. Chicago: University of Chicago Press.
- BYRD B.F.
1994 Public and Private, Domestic and Corporate: The Emergence of the Southwest Asian Village. *American Antiquity* 59: 639-666.
- CANEVA I.
1992 Early Villages in Southeastern Turkey: New Research in the Çayönü Area. *Studi Micenei ed Egeo-Anatolici* 30: 121-142.
- CANEVA I., CONTI A.M., LEMORINI C. and ZAMPETTI D.
1994 The Lithic Production at Çayönü: A Preliminary Overview of the Aceramic Sequence. In: GEBEL H.G. and KOZŁOWSKI S.K. (eds), *Neolithic Chipped Stone Industries of the Fertile Crescent: Proceedings of the First Workshop on PPN Chipped Stone Industries*, Berlin 1993. *SENEPSE* 1: 253-266. Berlin: Freie Universität.
- CAUVIN J.
1989 La Néolithisation au Levant et sa Première Diffusion. In: AURENCHIE O. and CAUVIN J. (eds), *Neolithization*. *BAR Int. Ser.* 516: 3-36. Oxford.
- CAUVIN M.-C.
1988 L'industrie lithique en Turquie Orientale au VII^e Millénaire. *Anatolica* 15: 25-35.
- CLARK G.R.
1979 Seasonal Growth Variations in the Shells of Recent and Prehistoric Specimens of *Merceenaria* from St. Catherine's Island, Georgia. *Anthropological Papers of the American Museum of Natural History* 56: 161-179.
- COHEN M.N.
1985 Prehistoric Hunter-Gatherers: The Meaning of Social Complexity. In: PRICE T.D. and BROWN J.A. (eds), *Prehistoric Hunter-Gatherers: The Emergence of Cultural Complexity*: 99-122. New York: Academic Press.
- DAVIS M.K.
1982 The Çayönü Ground Stone. In: BRAIDWOOD L.S. and BRAIDWOOD R.J. (eds), *Prehistoric Village Archaeology in South-Eastern Turkey*. *BAR Int. Ser.* 139: 73-174. Oxford.
- EDWARDS P.C.
1991 Wadi Hamme 27: An Early Natufian Site at Pella, Jordan. In: BAR-YOSEF O. and VALLA F.R. (eds), *The Natufian Culture in the Levant*. *International Monographs in Prehistory, Archaeological Series* 1: 123-148. Ann Arbor.
- ERCIYES A.T., KARAOŞMANOĞLU F. and CİVELEKOĞLU H.
1989 Fruit Oils of Four Species of Turkish Origin.
- GARROD D.A.E.
1930 The Paleolithic of Southern Kurdistan: Excavation in the Caves of Zarzi and Hazar Merd. *Bulletin of the American School of Prehistoric Research* 6: 8-43.
- GEIST V.
1971 *Mountain Sheep: A Study in Behavior and Evolution*. Chicago: University of Chicago Press.
- GUEST E.
1933 Plants and Plant Products of Iraq. *Department of Agriculture of Iraq, Bulletin* 27. Baghdad.
- HARRINGTON F.A. Jr.
1977 *A Guide to the Mammals of Iran*. Tehran: Department of the Environment.
- HAUPTMANN H.
1993 Ein Kultgebäude in Nevalı Çori. In: FRANGIPANE M. et al. (eds), *Between the Rivers and Over the Mountains: Archaeologica Anatolica et Mesopotamica Alba Palmieri Dedicata*: 37-69. Rome: University of Rome.
- HAYDEN B.
1995 A New Overview of Domestication. In: PRICE T.D. and GEBAUER A.B. (eds), *Last Hunters-First Farmers*: 273-299. Santa Fe: School of American Research Press.
- HENRY D.O.
1989 *From Foraging to Agriculture: The Levant at the End of the Ice Age*. Philadelphia: University of Pennsylvania Press.
- HESSE B.
1982 Slaughter Patterns and Domestication: The Beginnings of Pastoralism in Western Iran. *Man* 17: 403-417.
- HILLMAN G.C., COLLEDGE S.M. and HARRIS D.R.
1989 Plant-food Economy During the Epipaleolithic Period at Tell Abu Hureyra, Syria: Dietary Diversity, Seasonality, and Modes of Exploitation. In: HARRIS D.R. and HILLMAN G.C. (eds), *Foraging and Farming: The Evolution of Plant Exploitation*: 240-268. London: Unwin Hyman.

95. ROSENBERG, 1990.

96. e.g., BENDER, 1978; COHEN, 1985; PRICE and BROWN, 1985.

- HOLE F.
1984 A Reassessment of the Neolithic Revolution. *Paléorient* 10,2 : 49-60.
- 1989 A Two-Part, Two-Stage Model of Domestication. In: CLUTTON-BROCK J. (ed.), *The Walking Larder: Patterns of Domestication, Pastoralism, and Predation* : 97-104. London : Unwin Hyman.
- HONGO H. and MEADOW R.H.
n.d. *Patterns of Pig Exploitation at Neolithic Çayönü Tepesi in Southeastern Anatolia*. Paper presented at the annual meeting of the American Anthropological Association, November 20-24, 1996.
- JOCHIM M.A.
1976 *Hunter-Gatherer Subsistence and Settlement: A Predictive Model*. New York : Academic Press.
- KEMPISTY A. and KOZŁOWSKI S.K.
1990 Objects of Art. In: KOZŁOWSKI S.K. (ed.), *Nemrik 9: Pre-Pottery Neolithic Site in Iraq (General Report - Seasons 1985-1986)* : 155-162. Warsaw : Warsaw University Press.
- KISLEV M.E., NADEL D. and CARMİ I.
1992 Epipalaeolithic (19,000 BP) Cereal and Fruit Diet at Ohalo II, Sea of Galilee, Israel. *Review of Palaeobotany and Palynology* 73:161-166.
- KOZŁOWSKI S.K.
1989 Nemrik 9. A PPN Neolithic Site in Northern Iraq. *Paléorient* 15,1 : 25-31.
- 1990 *Nemrik 9: A Pre-Pottery Neolithic Site in Iraq (General Report - Seasons 1985-1986)*. Warsaw : Warsaw University Press.
- 1992 *Nemrik 9: A Pre-Pottery Neolithic Site in Iraq, 2: House No. 1/1A/1B*. Warsaw : Warsaw University Press.
- KOZŁOWSKI S.K., KUZMA K. and SZYM CZAK K.
1991 La reprise des fouilles à M'lefaat (Saison 1989/1990). In: *Polish Archaeology in the Mediterranean, II*. Warsaw : Polish Center of Mediterranean Archaeology, University of Warsaw.
- KOZŁOWSKI S.K. and SZYM CZAK K.
1989 Flint Industry from House 1/1A/1B at the PPN Site in Nemrik 9, Northern Iraq. *Paléorient* 15,1 : 32-42.
- 1990 Flint Industry. In: KOZŁOWSKI S.K. (ed.), *Nemrik 9: A Pre-Pottery Neolithic Site in Iraq (General Report - Seasons 1985-1986)* : 59-103. Warsaw : Warsaw University Press.
- LAWRENCE B.
1980 Evidences of Animal Domestication at Çayönü. In: GAMBEL H. and BRAIDWOOD R.J. (eds), *Prehistoric Research in Southeastern Anatolia* : 285-308. Istanbul : Istanbul University Faculty of Letters Press.
- 1982 Principal Food Animals at Çayönü. In: BRAIDWOOD L.S. and R.J. (eds), *Prehistoric Village Archaeology in South-Eastern Turkey*. *BAR Int. Ser.* 138 : 175-199. Oxford.
- LIEBERMANN D.E.
1993 The Rise and Fall of Seasonal Mobility among Hunter-Gatherers. *Current Anthropology* 34 : 599-631.
- MCCORRISTON J. and HOLE F.
1991 The Ecology of Seasonal Stress and the Origins of Agriculture in the Near East. *American Anthropologist* 93 : 46-69.
- MOORE A.M.T.
1982 Agricultural Origins in the Near East - a Model for the 1980s. *World Archaeology* 14 : 224-236.
- NESBITT R.M.
1995 Clues to Agricultural Origins in the Northern Fertile Crescent. *Diversity* 11 : 142-143.
- NOY T.
1991 Art and Decoration of the Natufian at Nahal Oren. In: BAR-YOSEF O. and VALLA F.R. (eds), *The Natufian Culture in the Levant. International Monographs in Prehistory, Archaeological Series 1* : 557-588. Ann Arbor.
- ÖZDOĞAN M.
n.d. *The Formation of Neolithic Cultures in Eastern Anatolia: An Area Marginal or Nuclear in the Development of Village-Farming Communities*. Paper presented at the annual meeting of the Society for American Archaeology, April 20-24, 1994.
- ÖZDOĞAN M. and BALKAN-ATLI N.
1994 South-East Anatolian Chipped Stone Sequence (Approach for a Synthesis). In: GEBEL and KOZŁOWSKI S.K. (eds), *Neolithic Chipped Stone Industries of the Fertile Crescent: Proceedings of the First Workshop on PPN Chipped Stone Industries*, Berlin 1993. *SENEPSE* 1 : 205-206. Berlin : Freie Universität.
- ÖZDOĞAN M. and ÖZDOĞAN A.
1989 Çayönü : A Conspectus of Recent Work. *Paléorient* 15,1 : 65-74.
- 1993 Pre-Halafian Pottery of Southeastern Anatolia : With Special Reference to the Çayönü Sequence. In: FRANGIPANE M. et al. (eds), *Between the Rivers and Over the Mountains: Archaeologia Anatolica et Mesopotamica Alba Palmieri Dedicata* : 87-103. Rome : University of Rome.
- PERROT J.
1966 Le gisement natoufien de Mallaha (Eynan), Israël. *L'Anthropologie* 70 : 437-484.
- PRICE T.D. and BROWN J.A.
1985 Aspects of Hunter-Gatherer Complexity. In: PRICE T.D. and BROWN J.A. (eds), *Prehistoric Hunter-Gatherers: The Emergence of Cultural Complexity* : 3-20. New York : Academic Press.
- QUITMEYER J.R., HALE and JONES
1985 Paleoseasonality Determination Based on Incremental Shell Growth in the Hard Clam, *Mercenaria mercenaria*, and its Implications for the Analysis of Three Southeast Georgia Shell Middens. *Southeastern Archaeology* 4,1 : 27-40.
- REDDING R.W.
1988 A General Explanation of Subsistence Change : From Hunting and Gathering to Food Production. *Journal of Anthropological Archaeology* 7 : 59-97.
- REDMAN C.L.
1982 The Çayönü Chipped Stone Industry. In: BRAIDWOOD L.S. and BRAIDWOOD R.J. (eds), *Prehistoric Village Archaeology in South-Eastern Turkey*. *BAR Int. Ser.* 139 : 17-71. Oxford.
- REED C.A.
1960 A Review of the Archaeological Evidence on Animal Domestication in the Prehistoric Near East. In: BRAIDWOOD R.J. and HOWE B. (eds), *Prehistoric Investigations in Iraqi Kurdistan. Studies in Ancient Oriental Civilization* 31 : 119-145. Chicago : University of Chicago Press.
- ROSENBERG M.
1990 The Mother of Invention : Evolutionary Theory, Territoriality, and the Origins of Agriculture. *American Anthropologist* 92 : 399-415.
- 1994a Hallan Çemi Tepesi : Some Further Observations Concerning Stratigraphy and Material Culture. *Anatolica* 20 : 121-140.
- 1994b A Preliminary Description of the Lithic Industry from Hallan Çemi. In: GEBEL H.G. and KOZŁOWSKI S.K. (eds), *Neolithic Chipped Stone Industries of the Fertile Crescent: Proceedings of the First Workshop on PPN Chipped Stone Industries*, Berlin 1993. *SENEPSE* 1 : 223-238. Berlin : Freie Universität.

- ROSENBERG M. and DAVIS M.
1992 Hallan Çemi Tepesi, an Early Aceramic Neolithic Site in Eastern Anatolia : Some Preliminary Observations Concerning Material Culture. *Anatolica* 18 : 1-18.
- ROSENBERG M., NESBITT R.M., REDDING R.W. and STRASSER T.F.
1995 Hallan Çemi Tepesi : Some Preliminary Observations Concerning Early Neolithic Subsistence Behaviors in Eastern Anatolia. *Anatolica* 21 : 1-12.
- ROSENBERG M. and TOGUL H.
1991 The Batman River Archaeological Site Survey, 1990. *Anatolica* 17 : 241-254.
- SCHIRMER W.
1990 Some Aspects of Building at the "Aceramic-Neolithic" Settlement of Çayönü Tepesi. *World Archaeology* 21 : 363-383.
- SCHMIDT K.
1988 Nevalı Çori : Zum Typenspektrum der Silexindustrie und der Übrigen Kleinfunde. *Anatolica* 15 : 161-201.
- SMITH P.E.L.
1986 Paleolithic Archaeology in Iran. *American Institute of Iranian Studies Monograph* 1. Philadelphia : The University Museum.
- SOLECKI R.L.
1981 An Early Village Site at Zawi Chemi Shanidar. *Bibliotheca Mesopotamica* 13. Malibu : Undena Publications.
- SOLECKI R.S.
1955 Shanidar Cave, a Paleolithic Site in Northern Iraq. *Annual Report of the Smithsonian Institution* 1954 : 389-425.
- STEWART J.H.
1938 Basin Plateau Aboriginal Sociopolitical Groups. *Bureau of American Ethnology Bulletin* 120.
- VAN ZEIST W.
1988 Some Aspects of Early Neolithic Plant Husbandry in the Near East. *Anatolica* 15 : 49-67.
- VAN ZEIST W. and BAKKER-HEERES J.A.H.
1984 Archaeobotanical Studies in the Levant. 3. Late-Palaeolithic Mureybit. *Palaeohistoria* 26 : 171-199.
- VAN ZEIST W. and DE ROLLER G.J.
1991/1992 The Plant Husbandry of Aceramic Çayönü SE Turkey. *Palaeohistoria* 33/34 : 65-96.
- WATKINS T.
1990 The Origins of House and Home? *World Archaeology* 21 : 336-347.
- WATKINS T. and BAIRD D.
1987 Qermez Dere 1987. *University of Edinburgh, Department of Archaeology Project Paper* 6. Edinburgh : University of Edinburgh, Department of Archaeology.
- WATKINS T., BAIRD D. and BETTS A.
1989 Qermez Dere and the Early Aceramic Neolithic of N. Iraq. *Paléorient* 15,1 : 19-24.
- WATKINS T., BETTS A., DOBNEY K. and NESBITT R.M.A., GALE R. and MOLLESON T.
1991 Qermez Dere, Tell Afar : Interim Report No 2, 1989. *University of Edinburgh, Department of Archaeology Project Paper* 13. Edinburgh : University of Edinburgh, Department of Archaeology.
- WILLIAMS D.
1973 Flotation at Siraf. *Antiquity* 43 : 288-292.
- ZOHARY M.
1982 *Plants of the Bible*. Cambridge : Cambridge University Press.