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Farming, Herding, and the Transformation of Human Landscapes in Southwestern Asia

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This paper explores the changes in settlement patterns caused by the Neolithic Revolution, as well as the perception of landscape of various communities as much as it is expressed in the archaeological records. For this purpose, we need to examine differences between cultural markers of terminal Pleistocene foragers and those that stem from the evolution of agropastoral societies. The case examined here concerns a particular region within southwestern Asia known as the Levant. It is dealt with in its widest geographic definition that includes portions of northern Mesopotamia.

The geographic variability of this region should be taken into consideration, but not in today’s image. Although past topographic features were essentially the same as today, the distribution of vegetational belts was different during the Upper Pleistocene and early Holocene. What we see today are the results of long-term impacts on the landscape of some ten millennia of agricultural and pastoral activities. We also know that the Holocene climate was not as stable as was once believed (Mayewski et al. 2004). Somewhat lower level of temperatures when compared to today’s characterized the terminal Pleistocene, and in particular the Younger Dryas. Both temperatures and precipitation started to increase during the early Holocene. The climatic evidence has been gathered from east Mediterranean deep sea cores, marine and terrestrial pollen cores, the study of cave speleothems, geomorphological observations, fluctuations of lake levels, and, to a lesser degree, the fluctuating distributions of prehistoric hunter-gatherer sites who moved into and out the arid areas. In addition, correlations of the regional palaeoclimatic sequence with ice core records from the northern hemisphere provide a more global yardstick that facilitates tentative comparisons with socioeconomic processes in neighboring regions. However, as a cautionary note I should stress that chronological correlations between palaeoclimatic fluctuations and cultural changes are rather approximate and cannot be considered as simple cause and effect interactions. Direct climatic evidence from archaeological sequences is urgently needed in order to justify hypotheses based on environmental changes as triggers for new cultural adaptations. Yet the lack of this kind of evidence does not necessarily mean that intrinsic social changes were the sole cause for socioeconomic changes.

**Timing the Neolithic Revolution**

The emergence of cultivation of plants and the ensuing tending of animals with the eventual domestication of both took place as a process within changing environmental conditions since at least 11,700–11,500 cal B.P. until about 8,200 cal B.P.
This time span is also known as the Pre-Pottery Neolithic A and B periods (PPNA, PPNB), names coined by Kenyon (1957) when she excavated at Jericho, and both were later adopted by most archaeologists across the Levant. This generalized chronological subdivision is now under revision owing to the fast increasing number of radiocarbon dates. The dates from the northern Levant, Anatolia, and Greece are obtainable through the web page of CANeW (www.CANeW.org); we are still missing a similar web page for most of the Levant. Dating layers of Neolithic sites and particular assemblages, especially when based on short-lived samples (seeds and bones), are crucial for chronological correlations.

Testing competing hypotheses as regards plant domestication—that is, one Levantine “core area” versus “multiple centers” in the region—depends on accurate radiocarbon dates with small standard deviations. Unfortunately, published overviews do not discriminate between dates of short-lived samples such as seeds and those obtained from wood charcoal. The potential difference in age between charcoal from local oak trees, available everywhere in this region, and seeds can easily amount to several hundred years. Indeed, with currently available dates we may still fall into the pitfall of what I have called elsewhere the McDonald’s chrono-model (Bar-Yosef 2004). The model states that radiocarbon dates for the earliest and the latest known as McDonald’s restaurants from Ohio (1948) to China (2000), respectively, would obtain a date of 1975 ± 35 for both of them. This apparent age could be easily interpreted as indicating the contemporaneous emergence of McDonald’s restaurants across the globe. However, within a small region such as the Levant, contemporary dates of layers in Neolithic mounds or single layer sites serve us in recognizing a larger population that survived, exploited plant resources, and was in contact within a particular landscape. Good examples for this situation are sites in the middle Euphrates River valley, along the Jordan River valley or across the landmass of the trans-Jordanian plateau and the Syro-Arabian desert. The material culture from sites located in such smaller areas reflects the degrees of socioeconomic interaction and, by reference, the landscape perception shared by the inhabitants of the different hamlets and villages.

**The Interaction Sphere**

An additional issue that needs to be taken into account is the evidence for long-range connections among Near Eastern human communities and their technologies or improve long-held local subsistence technologies, and try to domesticate regional species of plants and animals. This kind of evidence, when collected and compared within a large region as the Levant, is often referred to as “the interaction sphere.” Among the best documented routes of exchange were those that facilitated the dispersal of obsidian products brought from Anatolia into the Levant, the exchange of chlorite bowls connecting the Zagros foothills with the northern Levant, and the Red Sea shells that reached far away Neolithic groups (e.g., Aurenche and Kozlowski 1999). Examples for transport of obsidian artifacts, Red Sea shells, and chlorite bowls between far-apart Neolithic sites were recorded by archaeologists (e.g., Cauvin 2002, and see below). The best-known case of repeated movements of entire groups is the process of colonization of Cyprus (e.g., Vigne and Cucchi 2005). Farmers, employing an unknown type of sea craft, brought across the sea the animals that were later considered as clearly among the domesticated species together with the fallow deer and the cat. This was not the first time that the island was visited by humans, as there is evidence of part-time inhabitants or short-term visitors during the Epi-Palaeolithic who came from the coast of Anatolia (Simmons 1999). Hence, we should consider coastal navigation around the Mediterranean Sea as another efficient means of communication and transportation (see also Crouch, this volume). Additional evidence for maritime routes comes from the late PPNB colonization of Thessaly (e.g., Perlès 2001, 2005) and Crete (Efstratiou 2005), whereas terrestrial movements took place from western Anatolia into the Balkans (Figure 32.1).

Thus, the practical knowledge of the region, whether shared among all humans or controlled by certain groups or by individuals, led to the expansion of the Interaction Sphere, as evidenced in rare imported or exchanged items. It may also indicate that the perception of landscape had a double meaning, including both “homeland” and “regional” landscapes.

**Early Cultivation**

As stated earlier, a major issue of the Neolithic Revolution is the understanding of the process of domestication of both plants and animals (Zeder 2006). There is no doubt today that this was an ongoing process and that different human communities played different roles in the formation of the “agricultural package” that was then transported from the Levant to Europe and other parts of Western Asia at a variable pace (e.g., Bellwood 2005; Cavalli-Sforza 2002; Pinhasi, Colledge, and Conolly 2004). The perception shared by the inhabitants of the different regions of the Levant to Europe and other parts of Western Asia at a variable pace (e.g., Bellwood 2005; Cavalli-Sforza 2002; Pinhasi, Colledge, and Conolly 2004).
A major contribution to this discussion is the latest studies indicating that the cultivation of certain crops was tried several times and failed (such as rye; see Weiss, Kislev, and Hartman 2006). Other scholars point to the domestication of different species in different localities across the region (Willcox 2005). However, whereas barley was cultivated in most known Levantine sites (Willcox 2005; Table 32.1), Emmer wheat that appears in the southern Levant (from Damascus to the Dead Sea area) is genetically considered to originate in the foothills of the Taurus region (Ozkan et al. 2002). The discrepancy between the archaeobotanical evidence and the genetic observation requires further research. Einkorn wheat is known from Neolithic sites in the northern Levant and with geographically corresponding genetic evidence of the wild varieties (Heun et al. 1997). Thus, there is generally a correlation between what could have been the natural distribution of the cereals and their domestication.

**The Climatic Impact**

In sum, it seems that the current debates concerning the first steps of plant domestication are far from reaching an accepted consensus. This adds to the disagreements about the climatic impacts of the Younger Dryas. Global changes in CO₂ indicate that there was a decrease in temperatures and precipitation during the Younger Dryas. Such a reduction often plays a role in the success of C₃ plants that flourish owing to large amounts of precipitation (while C₄ plants characterize desert environments), an issue yet not dealt with by the archaeobotanists working in the Near East. The absence of barley, one of the most resistant cereal species from Hallan Çemi, a village site of foragers that was occupied during the Younger Dryas (Savard, Nesbitt, and Jones 2006), supports the notion that the cold and dry period had an impact on the distribution of the cereals.

Palaeoclimatic records indicate a rise in the...
(Mayewski et al. 2004). The trend for improved environmental conditions is expressed by the genetic study of the Einkorn in southeast Turkey (Heun et al. 1997) that demonstrated the eastward spread of the younger subspecies.

Last but not least is the issue of the changing social context within which the shifts in resource exploitation techniques, accompanied by technological innovations, and realignments of cosmological configurations, took place. The most basic aspect is the nature of human occupation and the social organization of groups ranging from mobile to fully sedentary communities (e.g., Bar-Yosef 2001; Bellwood 2005; Richerson and Boyd 2001). As stressed many times before, perhaps for no avail, the evidence for the length of annual stay in one location by a given group should be based on biological markers such as the presence of commensals (for example, mice and sparrows) and not on the basis of archaeological remains such as building activities. Proposed interpretations are sometimes not necessarily based on principles derived from ethnographic examples but are simply stated as such. For example, clustered compounds such as in Bouqras, Basta, Ba‘aja (Gebel, Hermansen, and Jensen 2002) could be interpreted as resulting from social pressures for living close in order to remove anxiety. Do these well-attached buildings reflect the fear of attack? The evidence for physical conflict is still missing but a proliferation in the production of arrowheads during the PPNB may indicate preparations and/or participation in limited warfare or raiding campaigns and not necessarily intensified hunting.

**Early Neolithic Villages**

**The First Steps: Pre-Pottery Neolithic A**

The archaeological sequence of the Neolithic Revolution begins with the cultivation of a selection of "founder crops" (e.g., Bar-Yosef 1998; Harris 1998; Hillman 1996; Weiss, Kislev, and Hartman 2006; Willcox 2005; Zohary and Hopf 2002). The most prominent and successful in cultivation/domestication were Einkorn and Emmer wheat, barley, and legumes. The process of domestication—namely, when entire fields comprised already the mutation varieties of nonshattering rachis, and seeds that germinated annually—took some 800–1,000 years to complete (Kislev 1997; Tanno and Willcox 2006). Fields were probably located around the villages, and the villages themselves were of different sizes. Villages of 1.5 to 2.5 hectares in size could have accommodated a fully viable biological social determine the size of their controlled territory, separated from other villages' territories.

Villages were spaced in the Jordan Valley some 15 to 25 km apart. Within each territory that was smaller than the average Natufian one, the perception of landscape began to change. Although we have no idea whether or not the village stood at the center of a land-owning group's territory, the village location was probably on a low hill, in close proximity to a water source. PPNA domestic buildings were rounded or oval with stone foundations; walls were built of unbaked, plano-convex bricks, with flat roofs; households comprised courtyards with grinding equipment; and above-ground rounded silos were constructed with mud bricks or clay mixed with marls—these were among the physical elements in the common look of these villages (e.g., Bar-Yosef and Gopher 1997; Kuijt 2000 and papers therein; Stordeur and Abbé 2002). The first communities of cultivators continued to hunt, trap, fish, and gather a large array of wild plant and fruit species. They also tended fruit trees such as figs, as suggested recently (Kislev et al. 2006). Maintaining and propagating wild fruit trees is a known technique among recent foragers in both Africa and South America (Laden 1992).

It is important to stress that PPNA farmers continued to operate also as hunters, probably organized by members of the same kin system. Farmers being also hunters are known historically and ethnographically (Kent 1989). It is a strategy embedded in the lifeways of semi- and fully sedentary cultivators and even pastoralists. PPNA hunters used bows and arrows and hunted the same species as their Late Natufian predecessors (e.g., Helmer 1992; Tchernov 1994). In addition to mammals such as gazelles, onagers, aurochs, wild goat and sheep, wild boar, and foxes, they collected reptiles, waterfowl, and some fish. An increase in catching waterfowl, as demonstrated by Tchernov (1994), could be explained, in part, as an increase in demand for meat and especially for feathers. Trapping birds was facilitated as fresh water bodies existed in closed basins in the Levant (e.g., in the Jordan Valley, and locations across its eastern margins). These were formed during the rapid climatic improvement immediately following the termination of the Younger Dryas. In addition, it should be noted that the Jordan Valley and the Levantine coastal plain are among the main routes of migratory birds between Europe and Africa. Thus, for example, the inhabitants of Netiv Hagdud, Gilgal, Hatoula, and probably other sites were able to exploit these seasonal resources (e.g., Pichon 1991).

Given the size of the newly formed communities,
is no equivocal evidence for continued residential mobility as suggested for the Natufi an population. These new villages were ten times larger than the Natufi an base camps. The increase in the number of people was the unconscious result of becoming cultivators/farmers with permanent supplies of staple food. Cereals were undoubtedly among the most suitable weaning foods, thus increasing the chances of survival of newborns by making porridge from crushed cereals. The process caused settlements to become villages with 300–400 people living contemporaneously in the same location. One could imagine the amount and tempo of garbage accumulation. In the known Neolithic mounds, reworked ashes, fire-cracked rocks, and discarded mud bricks would have been responsible for the nature of the rapid accumulation. However, villages survived for no more than 200–400 years at most (based on the calibrated radiocarbon dates for various sites) and then were abandoned. Discussion of the reasons for abandonment is beyond the scope of this paper, but soil erosion owing to felling trees and clearing new fields for planting; salinization; environmental deterioration such as that caused by successive droughts owing to climatic fluctuations; and group conflict come in mind as more common causes than were the potentials for local epidemics.

The social organization of the PPNA groups is not well known. However, even if it was somewhat loose with shifting responsibilities among a suite of local temporary chiefs or a few “Big Man”-type personalities (variously defined decision makers), public operations such as the building of the tower and wall in Jericho testify to a certain degree of centralized social organization and cooperation, as well as the need to guard the identity of the social unit, whether for practical (for example, defense; food production) or symbolic purposes (Bar-Yosef 1986; Naveh 2003; Ronen and Adler 2001). Other architectural evidence indicates that communal needs were expressed in buildings of the “kiva-type” semisubterranean structures. Several clear examples of this type of building were exposed in PPNA and early PPNB Mureybet III and Jerf el-Ahmar (Cauvin 2000; Gebel, Hermansen, and Jensen 2002; Kuijt 2000 and papers therein; Verhoeven 2002). Not least of these changes was the shifting of male and female roles within the farming communities. Presumably women as gatherers knew well the plants, and we may therefore assume that they were probably the initiators of plant cultivation.

On a domestic level they were the food processors and users of grinding tools. Males were probably responsible for felling trees, building (while females could have been the makers of the bricks), tilling small plots with hand picks, and building fences, all the while continuing to hunt. Women and children gathered small game, such as tortoises and lizards, and trapped birds. The contention that females had increasing work loads, including grinding and pounding that require continuous energy expenditure, is based on ethnographic examples, but with archaeological evidence from PPNA-PPNB skeletal relics (Molleson 1994; Peterson 1997).

Analysis of mortuary practices demonstrates that Early Neolithic communities tried hard to keep their society as egalitarian as possible (Kuijt 1996). In addition, the appearance of female figurines mentioned above (e.g., Cauvin 2000; Kuijt and Chesson 2005; Voigt 2000) heralds a departure from the Natufi an tradition that was based on depiction of animals. Although attributed to the domestic level of rituals, the small human figurines reflect a new ideological trend within the cosmological configurations with the human image occupying a major position (Cauvin 2000; Marshack 1997). The change epitomizes a departure from being equal partners within natural surroundings to humans as major players on the scene. Sedentism of small or large communities of cultivators definitely resulted in changing attitudes toward the immediate environments and by inference, to nature as a whole.

Within Farming Societies: From Corralling to the Domestication of Mammals

Cultivation continued to be the main source of staple food during what we call the PPNB (starting ca. 10,500 cal b.p.) with additional plants in the fields, which surrounded the village, such as broad bean, flax, and chickpeas. Palaeoclimatic data indicate a generally higher annual precipitation than
Van Zeist (1986), when examining the carbonized cereal seeds from the northern Levant already suspected that winter precipitation was higher, or irrigation was practiced in the marginal eastern belt. Wheat seeds from PPNB Tell Halula on the banks of a tributary of the Euphrates River were tested for the ratios of stable carbon isotopes, the results supporting this contention (Araus et al. 2001). Prehistoric crops enjoyed better water supplies than those available today through winter rain or irrigation. A detailed field research around several PPNB mounds through test pits might uncover the oldest irrigation canals that could not yet be seen in aerial photos, thus increasing our knowledge concerning the changes in the landscape on the outskirts of the settlements.

Villages in the Levant accommodated rectangular buildings built on stone foundations with mud brick or adobe walls. In south Jordan, two-storey houses are common, such as in Basta, Ghwair, and Ba‘aja, as well as “Corridor type” houses, such as in Beidha (Kuijt and Goring-Morris 2002), and had an elevated floor above what seems to have been a basement. The unanswered question is—why did people at that time need two-storey houses? Was there a limitation on village space and the wish not to build over agricultural land? Does it reflect defensive needs, since many of such buildings were arranged in compounds?

Along the Euphrates River (for example, Bouqras) and mainly on the Anatolian plateaux in PPNB sites such as Asikli höyük or Çatalhöyük are the walls of the houses with one or two storeys attached to each other or leaving a very narrow space in between that was used for dumping “garbage,” creating a dense settlement plan that would resemble what we would see as the ants’ perception of their village and the territory around would seem to have been a basement. Hence, the inhabitants’ perception of their village and the territory around would resemble what we would see as the dichotomy of “inside” versus “outside.”

The domestic toolkits of the early farmers included axe/adzes, either bifacially shaped with transverse blows producing a sharp cutting edge common in the southern Levant, and sometimes polished celts that were the standard tool in the northern Levant and Anatolia. All these tools were employed in wood-working activities, including tree-felling and clearing, shaping wooden objects, and building of sea craft that was used to cruise the Mediterranean Sea. Harvesting equipment included simple sickles, V-shaped bone tools for stripping the seed heads from straw, and later the threshing board or _tribulum_ (Anderson 1998).

Storage facilities were special built-in installations in PPNB sites such as Asikli höyük or Çatalhöyük. The domestic toolkits of the early farmers included axe/adzes, either bifacially shaped with transverse blows producing a sharp cutting edge common in the southern Levant, and sometimes polished celts that were the standard tool in the northern Levant and Anatolia. All these tools were employed in wood-working activities, including tree-felling and clearing, shaping wooden objects, and building of sea craft that was used to cruise the Mediterranean Sea. Harvesting equipment included simple sickles, V-shaped bone tools for stripping the seed heads from straw, and later the threshing board or _tribulum_ (Anderson 1998).

Changes in the sizes and locations of storage facilities mark the shift in several PPNB sites from nuclear family consumption to larger social units and, perhaps, to an institutionalized control of public granaries.

In these early villages, penning of wild animals could have been an additional strategy for securing meat and hides. What was not a practical strategy for mobile foragers was a viable option for semisedentary or sedentary hunter-gatherers. Perhaps it is in this context that pigs were penned in Hallan Çemi around 11,000–10,500 cal B.P. (Rosenberg et al. 1998), although the proposal that these pigs were en route to be domesticated is unclear. Previously, a somewhat similar proposition was made concerning human intervention with gazelles, but their domestication was not a viable option, owing to a very short imprinting time since the birth of the kids. Therefore, most authorities agree that the paucity of goat, cattle, and pigs in Levantine PPNA lacks any morphometric signs for incipient domestication. During the same period, the proliferation of fox bones in these early villages speaks for their attraction to the garbage of human settlements. Fox hunting for their furs and canine teeth (extensively used already by the Natufians), near the villages, would be a possible explanation.

The recurrent questions of “when” and “where” the process of animal domestication began should direct us to “where” these species were being hunted by Epi-Palaeolithic foragers and whether modern or ancient DNA will point to the same locus (e.g., Albarella et al. 2006; Bradley and Magee 2006; Zeder 2006). The best evidence comes from cave sites such as Ökuzini at the foothills of the Taurus (Albrecht et al. 1992), where wild goat and sheep were hunted by local foragers. The “when” issue is today more complicated, because the faunal assemblages from early PPNB (ca.10, 200 cal B.P.) in Cyprus indicate that wild goat, sheep, cattle, and pigs (as well as the fallow deer and dogs) were transported over the Mediterranean Sea to the site of Shillourokambos (Vigne and Cucchi 2005; Vigne et al. 1999) with a later introduction of fox and cat. Hence, the corraling and tending of these species was the first step in a long process. Having goat, sheep, pig, and cattle as part of the daily or ritual meat supplies of early farmers (who continued to hunt) tells us that morphologically the shift from “wild” to “domesticated” took a long time and may not represent a simple dichotomy.

This discovery has more than one implication. First, characterizing Neolithic villages (based on their material culture and dates) as settlements of hunter-gatherers because the major por-
morphologically wild caprines, pigs, and cattle is an inaccurate socioeconomic definition (see also Terrell and Hart, this volume for a different slant on this issue). Obviously, the overall picture is more complex in Anatolia, where those species were corralled or hunted in their natural habitats. The situation was different in the Levant. Wild goats were common in mountain areas such as the Lebanese mountains. The aurochs was present but was not an important source of meat, as in Anatolia. Wild boar was common, and sheep were absent altogether. Second, the Cypriote findings support an earlier contention that goat, sheep, and cattle were herded south from the foothills of the Taurus into the Levant (Bar-Yosef 2000). The process of adopting animal husbandry in the northeastern Levant began during the Early PPNB (Peters et al. 1999; Zeder 1999) and proceeded later, mainly in the course of the Middle and especially the Late PPNB into the central and southern Levant (Horwitz et al. 1999; Martin 1999). The herding of these animals could have been part and parcel of the long-distance exchange of obsidian. Needless to stress, the visible signs of animal domestication become available during mid or late PPNB with the introduction of goat and sheep.

Cattle domestication, whether for religious reasons (the “bull-cult” [Cauvin 2000]) or for economic ones occurred mainly during the PPNB period. Similar to other animals, cattle (mostly bulls) were slaughtered, possibly during ceremonial feasts, as clearly indicated in the assemblage at Göbekli Tepe (Peters et al. 1999).

In sum, the fully developed Neolithic economy, with its domesticated species of plants and animals, seems to have emerged earlier in the northeastern Levant (southeast Turkey and northern Syria) than elsewhere. Owing to geographic proximity, innovations did not escape notice by the inhabitants of the central and southern Levant, and the resulting regional network formed the PPNB interaction sphere (Bar-Yosef and Belfer-Cohen 1989).

Interactions between farmer-herders and contemporary mobile foragers (Figure 32.2) possibly played a role, although this is not yet fully researched. Special type of rocks, such as limestone from the Syro-Arabian desert, the Negev, and Sinai, and marine shells from the Red Sea could have been exchanged for other products such as grain (Bar-Yosef Mayer 1997). Mutualistic interactions between these two societies could have been in constant flux, either amicable, which may have led to intermarriage, perhaps with forager women marrying into farming communities as suggested by ethnographic records, or hostile, leading to stress, the visible signs of animal domestication become available during mid or late PPNB with the introduction of goat and sheep.

Other archaeological markers of farmer-forager interactions are the game drives known as “desert kites.” These were probably laid out during the PPNB period by foragers to hunt gazelles or onagers. Employing this technique, which is also known from other locations in the world, must mean that there was a demand for meat, hides, and horns. In one Jordanian site (Garrard et al. 1994), a rectangular house in a foragers’ camp of rounded dwellings might be interpreted as a “merchant’s temporary home.” Indeed, the boundaries between farmer-herders and foragers in semiarid or mountain regions were probably rather fluid. Thus it can be suggested that the perception of the landscape, between what is “ours” and that of “others,” became more entrenched than the boundaries between neighboring tribes of farmers.

The economic dichotomy between farmer-herders and pastoral nomads had emerged and became more established in the following millennia after the collapse of the PPNB. Members of both economic regimes continued to hunt and trap, as well as to gather wild plants, seeds, and fruits for various purposes, including medicine.

In sum, from the villages of the PPNA period through the complex social system during the PPNB period when clearly regular villages of farmer-herders coexisted with central ceremonial settlements such as Göbekli Tepe or Ba’aja (Kuijt and Goring-Morris 2002), a considerable number of socioeconomic changes can be recognized archaeologically. Population increase along with economic improvements led to the appearance of numerous PPNB sites of different sizes and a territorial distribution that is seen as several “amphictionies,” each being a loose territorial organization of villages and towns sharing religious centers (Belfer-Cohen and Goring-Morris 2002). Individual settlements kept ownership of land—that is, the individual village (along with its surrounding lands) was itself a territorial unit. Thus boundaries were created, and although being permeable those of the “sown land” differed from those of the “arid lands” where hunter-gatherers continued to survive, possibly through the 7th millennium cal B.P.

**Pre-Pottery Neolithic B Socioeconomic Territories**

Employing the accumulated evidence concerning palaeoclimatic fluctuations during the Holocene, calibrated radiocarbon dates, archaeobotanical and genetic studies of successful or failed “founder crops” when available (Weiss, Kislev, and Hartmen 2006), as well as studies of ancient DNA of domesticated
eastern Anatolian landscapes are more complex. As done elsewhere (Bar-Yosef 2001), mapping the proposed tribal territories within the PPNB interaction sphere becomes a feasible option and a base for further elaborations and corrections (Figure 32.3).

The prominent markers of each territory are the ceremonial centers. In addition, subregional domestic house types, technological variations in the flaking or polishing of heavy duty tools such as axes and adzes, variations in the frequencies of projectile point types, occurrences of modeled skulls, stone masks, “white ware” vessels, stone bangles, and the like are elements in defining the territories of ethno-linguistic groups. Within the PPNB interaction sphere, one can identify similar beliefs and shared cosmologies. The modeled skulls found in various sites may hint at the presence of elite members or chiefly families. However, no uniquely rich tombs have been discovered to date, and thus we cannot classify PPNB societies as chiefdoms. Still, with ongoing fieldwork, this situation may change in a few years.

Evidence for what should have been organized efforts is available. The quarrying, shaping, and carving in low relief of mammals, birds, and reptiles on the numerous T-shaped pillars limited objects in the rural village of Nevali Çori (Hauptman 1999), were not just family affairs but the concerted efforts of many people. Later, the filling of house buildings and ceremonial centers with village garbage, such as in Çayönü or Göbekli Tepe, testify not only to their increasing isolation from “life” but also to the energy expenditure that although great was religiously required (Özdogan and Özdogan 1998).

An additional example is the complex operation of colonizing Cyprus that speaks for the presence of leaders. The building of seafaring craft, transporting of animals, and crossing of waters by several groups is attested at several early PPNB sites on the island (Vigne and Cucchi 2005).

Marking of personal property, whether of individuals or extended families, is probably indicated by the rare engraved flat pebbles, and stamp seals, in the PPNB. The engravings on these objects, as noted by Cauvin (2000), resemble pictographs used in early writing. Similarly, tokens in PPNB contexts are interpreted as elements of a counting system (Schmandt-Besserat 1990). Traded or exchanged items indicate a much wider interaction sphere in which sources and producers were located beyond the permeable boundaries of the PPNB Levantine-Anatolian civilization (e.g., Aurench and Kozlowski 1999).

Figure 32.2 A simplified geographic model of territorial interactions between farmers and foragers. A few examples of archaeological sites are added.
Among the better-known exchanged materials are obsidian, chlorite bowls, asphalt, cinnabar, and marine shells.

**The Collapse of the Levantine PPNB and the Emergence of New Territorial Concepts**

During the two millennia of the PPNB, only a few settlements survived through many centuries. The issue of why villages had a limited life span has hardly been discussed. Options vary from the role of diseases or even epidemics of zoonotic diseases caused by the advanced and spread of domesticated cattle, over-exploitation of the fields, climatic fluctuations of decadal scale, conflicts among neighboring villages, and the like. A well-recorded stratigraphic gap between the PPNB and the Pottery Neolithic is established for certain parts of the Levant and the Anatolian plateau (Aurenche and Kozlowski 1999; CANeW Project 2007; Özdogan and Basgelen 1999), indicating widespread village abandonment in those areas. However, river valleys continued to be occupied. Good examples are Mezra’a Tlelat on the bank of the Euphrates River (Karul, Ayhan, and Özdogan 2002; Özdogan 2003) and Sha’ar HaGolan in the Jordan Valley (Garfinkel and Miller 2002).

Given this observation, the proposal to explain the collapse of the major village of ‘Ain Ghazal in Jordan as due to local environmental over-exploitation by felling trees and herding goats (e.g., Rollefson, Simmons, and Kafafi 1992) seems inadequate. The most likely explanation for the general abandonment across the Levant is the abrupt and adverse climatic change around 8,400–8,200 cal B.P. (Bar-Yosef 2001) that is well-recorded in ice cores (Alley et al. 1997) and in the stalagmites of Soreq cave (Bar-Matthews et al. 1999), as well as in eastern Mediterranean deep sea cores (Rohling et al. 2002). Tribal societies that subsisted on farming and herding, in which
drew the flow of prestige goods, could not continue to accumulate the needed surpluses when hit by a series of droughts. Shifts in the patterns of seasonal precipitation necessitated a search for pastures further away and resulted in lower yields of summer harvests. Digging wells, a technology known from Shillourokambous, Miloukhtia, Atlit-Yam, and Sha‘ar HaGolan, could solve the problem of drinking water only when the water table was not too deep for the available techniques. Shifts in the size of territories were expected. The advent and expansion of certain cultural groups is evident from the beginning of the 8th millennium cal B.P. (Cruells and Nieuwenhuyse 2004; Flannery 1999).

A good example is the Halafian culture that occupied a larger area across the northern Levant and northern Mesopotamia. From that time the presence of Mesopotamian cultures in the northern Levant becomes a permanent phenomenon that reflects the rapid development of complex social structures in this vast region, and a decrease in the economic and social importance of the Levant as a region vis-à-vis Mesopotamia, or the Nile Valley.

The new conditions in the Levant enhanced reliance on a more flexible subsistence strategy of farming and herding and increased the presence of pastoral societies after 8,000 cal B.P. The collapse of the PPNB could have been the trigger for several major phenomena. Among these were the colonization of new areas such as the Nile Delta by sea (Bar-Yosef 2002), long after Thessaly was settled by Neolithic farmers from Anatolia (Perlès 2001, 2005). Terrestrial routes through the Balkans led Neolithic farmers into some other new lands as they probably did while entering the Caucasus inter-montane valleys or moving to the east of the Caspian Sea.

Owing to the processes of frequent socio-economic and territorial changes described above, we may expect shifts in the perception of immediate and distant landscapes among the late foragers, farmers-hunters, farmers-herders, and pastoral societies that emerged in a rather fast evolutionary trajectory over the first millennia of the Holocene.

The emergence of new territorial concepts allowed Neolithic farmers to incorporate the sea into their unbounded homelands, or extended interaction sphere. The inclusion of different landscapes such as the high mountains (Zagros and Taurus) into their territorial perceptions possibly led to the creation of common worlds’ beliefs that later became the basis for Near Eastern cosmologies. Their natural environment included “boat people,” mountain hunters, and the forest animals, while the villages of those farmers were built along river-banks in Egypt or Mesopotamia.

In sum, the outcome of the Neolithic Revolution within the social realm was a major change in the concept and perception of territories and their actual landscapes. From the more resilient perceptions of late Palaeolithic mobile foragers in their variable landscapes, a world of bounded entities of farmers and herders emerged over six or five millennia.

References


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