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A Household Perspective towards the Pre-Pottery Neolithic to Late Neolithic Cultural Transformation in the Southern Levant

Seiji KADOWAKI*

Besides the economic transition from foraging to agriculture, researchers of the southern Levantine Neolithic have investigated the issue of cultural transformation from the Pre-Pottery Neolithic (PPN) to Late Neolithic (LN) period. This archaeological phenomenon, formerly explained as *hiatus palestinien*, is currently understood as a structured cultural change involving reorganizations in settlement systems, subsistence activities, tool-production technology, social organization, and ritual practices. Causes for these changes have been sought in several factors, including climatic shift, environmental deterioration, increasing reliance of farming, population increase, social crowding, and the decline of communal rituals.

This paper proposes a household perspective on this issue to effectively interlink ecological and social factors. To this end, the paper first reviews current understanding of PPNB households and then examines archaeological records indicative of household size, household activities, and the social relationship among households. In this discussion, archaeological data are interpreted by drawing on the anthropologically expected relationship between household size and the degree of economic interdependence among households, i.e., communal or autonomous performance of production and consumption activities.

As a result, I suggest that the increase in household size during the Late PPNB and LN, as indicated by multicellular, two-story houses and courtyard buildings, was caused by the increasing autonomy of households in the performance of production and consumption activities since the Middle PPNB. The latter process is explicable as a response to the reduced opportunities for forming communal works due to diversified subsistence activities and conflicting labour scheduling among households. These transformations of households can be considered as a significant aspect in the reorganization of settlement systems and related cultural changes at the transition from the PPNB to LN.

Keywords: Neolithic, Cultural transformation, Southern Levant, Household, Communal activity

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I. Introduction

Current archaeological records in the southern Levant indicate a clear increase in the size of settlements at the transition from hunting-gathering economy to the farming of domesticated plants and animals, the process of which covers the archaeological time range from the late Epipalaeolithic (i.e., Natufian) through the Pre-Pottery Neolithic period. The increase in settlement size during these periods is prominently shown by a series of Late Pre-Pottery Neolithic B (PPNB) "mega-sites" with estimated sizes around 10-14 ha, which greatly exceeds the mean size (0.1-0.5 ha) of the largest Natufian hunter-gatherer settlements (Kuijt 2000b, 80-83; Kuijt 2008, 291-293). Although the discoveries of such unexpectedly large Neolithic settlements prompted debates on the possibility of Neolithic urbanization (Beinert et al. 2004), many researchers do not regard this Mega-Site Phenomenon as representing "Proto-Urbanism" for various reasons (Gebel 2004; Hole 2000). For example, some researchers are concerned with the contemporaneity of buildings that constitute the site (Kuijt 2008, 290; Verhoeven 2006). This means that occupied areas at a single time may have been much smaller than the surface extent of archaeological sites. Other researchers point out the fundamental socio-economic differences between Neolithic "mega-sites" and conventional cities in subsequent periods (Düring 2007; Gebel 2004). Furthermore, it is well known among Near Eastern archaeologists that Neolithic large settlements did not continue their development towards the emergence of cities in the Bronze Age.

The decline of large Neolithic settlements at the transition from the PPNB to the Late Neolithic (LN) period[1] is often called the "collapse" of early agricultural villages, raising questions as to the causes that cannot be explained by the unilinear, i.e., progressive, model of cultural evolution. To provide a household perspective to this cultural transformation, this paper first reviews explanations that various researchers have suggested for the PPN-LN cultural transition and then reconsiders current understanding of PPNB households by examining archaeological records indicative of household size, household activities, and the social relationship among households. In this discussion, archaeological data are interpreted by drawing on the anthropologically expected relationship between household size and the degree of economic interdependence among households, i.e., communal or autonomous performance of production and consumption activities. Although the discussion focuses on the southern Levantine Neolithic, it also refers to some relevant archaeological data and studies for the middle Euphrates region and northern Mesopotamia.[2]

II. Models for the Abandonment of PPNB Aggregate Settlements: Adaptation to Changing Environments and Social Segmentation

During the 1960s and 1970s, the small number of known LN sites led archaeologists to hypothesize an occupational hiatus in the southern Levant after the PPN period (de Vaux 1970, 519). After the discoveries of many LN sites filling this occupational gap, the abandonment of most PPNB villages is currently recognized as a realignment of the settlement system that occurred over ca. 300-600 years at the transition from the PPNB to LN rather than a regional abandonment by large-scale emigration.

This settlement reorganization involved population dispersal from many PPNB agglomerated villages and the establishment of small, dispersed settlements in the southern Levant (Banning 2001; Gopher and Gophna 1993, 303-307; Köhler-Rollefson 1988). Furthermore, many researchers point out that this settlement shift was a part of a structured cultural change involving reorganizations in subsistence activities, tool-production technology, social organization, and ritual practices (Banning et al. 1994; Gopher 1989; Köhler-Rollefson 1992; Kuijt 2000b; Nishiaki 2000; Quintero and Wilke 1995; Rollefson 2000; Simmons 2000; Verhoeven 2002) (Fig. 1). The exact timing and the nature of this Neolithic cultural change may have varied from one settlement to another in the southern Levant, and even greater variability is expected for Mesopotamia and Anatolia. However, these cultural and social changes appear to have occurred in wide geographic areas in the Near East (Fig. 2).

Various accounts have been proposed for this Neolithic cultural transformation and the settlement reorganization. Some researchers consider that climatic aridification deteriorated the environment around the PPNB settlements, eventually forcing the inhabitants to move to other areas (Bar-Yosef 2001; Bar-Yosef and Meadow 1995, 45; Moore 1985, 52). This climatic change, even if it did occur, is not likely to correspond to the 8.2 ka event despite such suggestions by some (see Maher et al. 2011, 17-18 and Simmons 2007, 185 for reviews on this issue). This is because the recent estimated date for the end of Late PPNB precedes the 8.2 ka event by 500-800 years, and the probability that the 8.2 ka event came before the beginning of the earliest LN culture, i.e., Yarmoukian, is less than 0.01 (Maher et al. 2011, 17-18). As another climatic view, Simmons (1997) points to the possibility of torrential summer rain during the PPNB period, which contributed to soil erosion and the loss of fertile sediments. In addition to climatic changes, researchers also attribute the environmental deterioration to human activities, suggesting that the vegetational resources around the PPNB villages became culturally depleted by long-term land use for

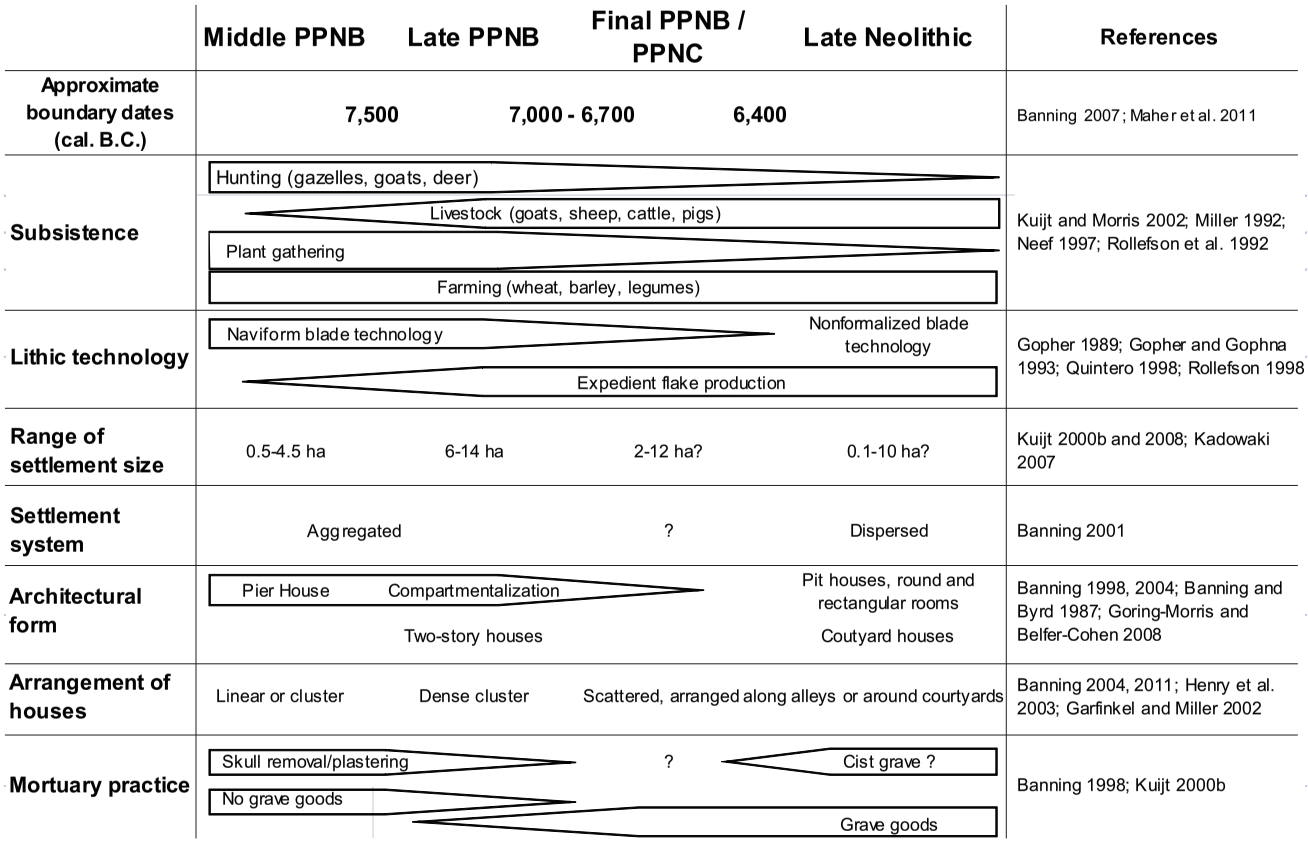

Figure 1: Schematic Diagram Showing Changes in Archaeological Records from PPNB to Late Neolithic in the Southern Levant

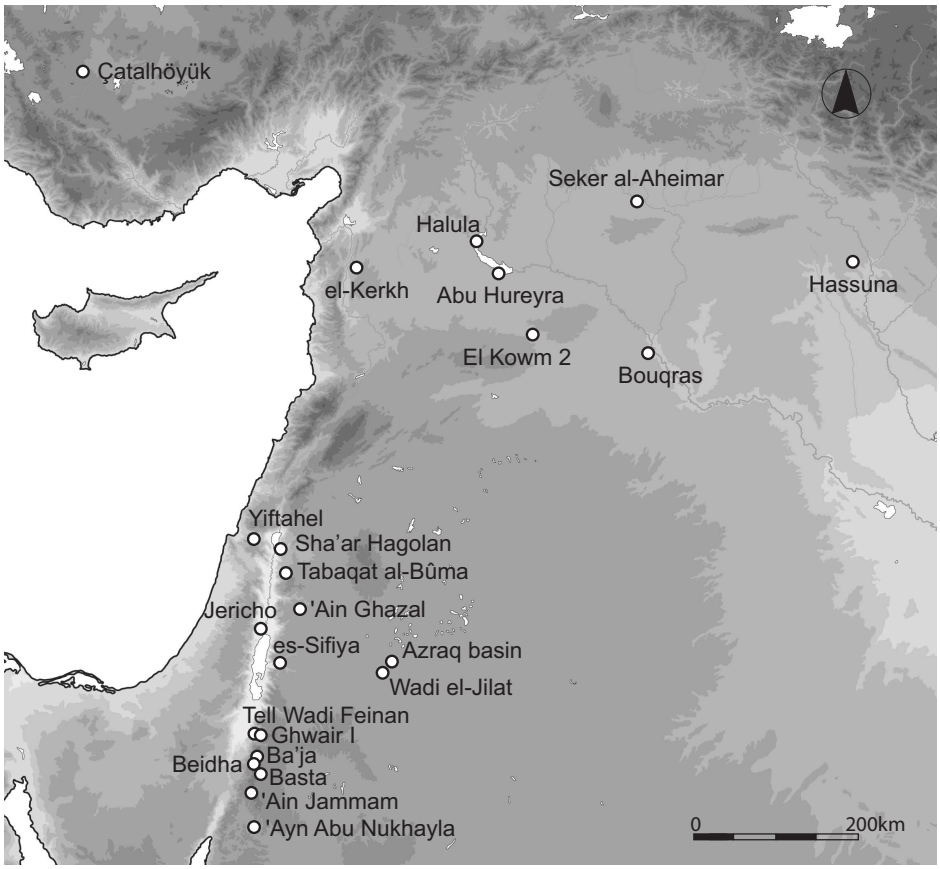

Figure 2: Neolithic Sites Mentioned in the Text

agriculture, herd-grazing, and woodcutting for house construction and plaster production (Köhler-Rollefson 1988, 1992; Moore 1985, 52; Moore et al. 2000; Rollefson and Köhler-Rollefson 1989; Rollefson et al. 1992; Simmons 1997).

Along with these environmental changes, Köhler-Rollefson and Rollefson also propose that the collapse of the aggregated PPNB village at 'Ain Ghazal is closely related to the development of nomadic pastoralism and the concomitant changes in settlement patterns. According to them, the bifurcation into farmers and herders occurred as a means to solve the conflict between the demand for agricultural land and that for pasture in order to support increasing population at the site. They propose that, during the PPNC and Yarmoukian periods, the population at 'Ain Ghazal fluctuated as pastoralist components of the settlement made seasonal movements between the site and the desert with flocks of sheep and goats to reduce the impact on agricultural lands near the settlement (Köhler-

Rollefson 1988 and 1992; Rollefson 1997).

Banning (2001) relates the shift from the PPNB to LN settlement system to the development of the food-production economy and population growth during the Late PPNB. These economic and demographic factors led to competition for agricultural land and pasture among PPNB villagers. The inevitable expansion of agricultural fields raised the cost of travel to the fields, which in turn increased the cost of crop transportation. A favourable solution to these economic problems was provided by locating settlements close to widely dispersed fields, as seen in the LN settlement system (Banning 2001, 153).

In contrast to the above explanations focusing on climatic, environmental, and subsistence factors, Kuijt considers the collapse of the Late PPNB villages as a process of social change, mainly induced by social crowding (Kuijt 2000b). Based on the careful examination of regional population growth, Kuijt suggests that the Late PPNB "mega-sites" may represent large, aggregated villages that experienced unprecedented stress from social crowding. The examination of Late PPNB architecture leads him to suggest that community members responded to social crowding by constructing two-story, highly compartmentalized buildings in an effort to maintain space for privacy and secure storage (Kuijt 2000b, 87-89). He argues that there is an inherent physical limitation in the strategy of spatial compartmentalization but, more importantly, he points out its conceptual influence on social, economic, and political relationships among community members (Kuijt 2000b, 96). He suggests that social crowding and its resulting social segmentation among households led to (1) the diminishing ability of "House, ritual, and economic leaders to effectively manage and organize all segments of the community" and (2) "the emergence of politically, economically, and socially more powerful Houses or lineages" (Kuijt 2000b, 95). These two phenomena may have resulted in the reduced frequency of communal rituals and the emergence of burial goods during the Late PPNB. He argues that the communal rituals, in particular mortuary practices during the PPNB, functioned to reiterate an egalitarian ethos and sustain shared authority and power among many lineage lines to maintain community solidarity (Kuijt 1995, 108-110 and 2000b, 96). He suggests that the reduced frequency of communal rituals by the Late PPNB represents a process of changing social relations that finally resulted in the fragmentation of aggregated, Late PPNB villages. Kuijt, however, does not clearly explain how the process of social change is related to ecological settings, such as environmental deterioration, or changing subsistence activities, e.g., the decline of hunting and the introduction of domesticated animals.

The ecological, demographic, and social factors considered in the above models are not mutually exclusive but can be complementary as they represent different aspects of the same phenomenon. I suggest that a better understanding of the Neolithic settlement shift can be gained by meaningfully inter-relating these factors. For this purpose, the following will discuss several issues on Neolithic households, such as the size and activities of households and the social relations among households.

III. Autonomy of Households and Community Regulatory Mechanisms

Based on his stratigraphic and spatial analyses of building remains at a Middle PPNB site of Beidha, Byrd stresses the overall trend towards a more restricted social network among households for sharing production and consumption activities (Byrd 1994, 2000 and 2005). This trend is also phrased as increasing household autonomy over time, which is supported by the archaeological record that indicates a diachronic trend towards (1) increasingly restricted visibility and access into buildings, and (2) the elaboration of indoor features, including storage facilities (Byrd 1994 and 2000). The latter evidence was also pointed out by Flannery (1972, 1993 and 2002) and Kuijt (2000b, 87-94 and 2008, 301), who also examined other PPNB sites including Yiftahel, Jericho, and ‘Ain Ghazal. In particular, Flannery suggests that the communal use of storage during the Natufian and PPNA periods changed to the privatized use of storage by individual households during the PPNB period.

Along with the increasing autonomy of households, Byrd emphasizes “the development of more formal community regulatory mechanisms” in the transition to sedentism and food production (Byrd 1994, 642). He argues that this mechanism was needed to “deal with conflict resolution and to promote group cohesiveness” in response to the reduced sharing networks and the increased competition among households (Byrd 1994, 643). He specifically indicates that community regulatory mechanisms functioned to facilitate communal works (e.g., harvesting and construction of public buildings), community decision making, conflict resolution, and group rituals (Byrd 1994, 660).

The concept of community regulatory mechanisms is similar to Kuijt’s argument with regards to mortuary rituals during the PPNA and PPNB periods (Kuijt 1995, 2000a and 2000b). He stresses ideological aspects of rituals that reiterate egalitarian ethos among community members, arguing that the community-level power prohibited the establishment of authority by a single lineage or a few individuals (Kuijt 2000b). However, Byrd’s concept of

community regulatory mechanisms involves the practices of other communal activities, such as the construction of public buildings and agricultural activities. Referring to two general political-economic strategies (corporate-based and network-based) that lead to social inequality (Blanton et al. 1996; Feinman 1995), Byrd indicates that the Levantine Neolithic communities followed a corporate-based pathway, which is characterized by community activities, strong kinship relations, and collective rituals (Byrd 2000, 91). Ethnographic records in the description of corporate-based strategies show a variety of communal activities, which include community hunts, horticultural cleaning, planting, harvesting, food distribution, initiation rituals, and construction of public buildings (Feinman 1995, 264-268).

IV. Households during the PPNB Period and the Social Significance of Daily Practices

1. Reconsidering the Significance of Communal Work by PPNB Households

Despite the difficulty of assessing the autonomy of households and identifying community regulatory mechanisms archaeologically, the above explanatory model from a perspective of households can be a useful theoretical framework, in which we can discuss the social significance of daily production and consumption activities that are readily detectable in archeological records. For example, activities performed by individual households may reflect, or have functioned to enhance, the autonomy of households, while communal activities joined by multiple households may have had a role in maintaining solidarity among them. On the basis of this assumption, the following will review current pictures of PPNB households and the social relations among them in the performance of daily production and consumption activities.

A series of careful examinations of PPNB architecture by Banning and Byrd suggests that the nuclear household was the popular household type during the PPNB period (Banning 1996, 170; Banning and Byrd 1987; Byrd 2000). However, the exact identification of nuclear or extended household is archaeologically difficult because such categories are primarily defined by kinship. Thus, the usage of nuclear and extended households is meant here to represent their relative group size; the nuclear household is smaller than the extended household.

Byrd (2000, 90) argues that nuclear households were best suited to the situation of food-producing economy in the southern Levant, pointing out several ecological and social factors that include (1) “the utilization of relatively abundant but spatially restricted resources that can be effectively exploited as

small plots of land", (2) "a limited need for long stays outside the community by adult members of the family", (3) "a lack of multiple simultaneous tasks", and (4) the presence of "a lean season during which stored resources could be utilized". Additionally, Byrd also considers nuclear households as "the most effective way of passing resources from generation to generation since there is less conflict over inheritance" (Byrd 2000, 90).

If PPNB households were as small as nuclear households, they are likely to have faced problems in labour organization and labour scheduling. This is because each nuclear household had to manage a wide array of subsistence activities that faunal and botanical remains from some PPNB villages indicate (Banning 1998, 212-215; Hillman 2000; Köhler-Rollefson et al. 1988). Byrd (2000, 90) points out that PPNB domestic activities are characterized by "a limited need for long stays outside the community by adult members of the family" and "a lack of multiple simultaneous tasks". However, the wide range of PPNB subsistence activities, including collective hunting, wild-plant gathering, agriculture, and animal herding, indicates that the above two conditions were not always met. Specifically, the seasonal-resource exploitation at PPNB Abu Hureyra shows that early summer was the very critical period for the procurement of several resources, including crop harvesting and gazelle hunting (Moore et al. 2000, 499) (Fig. 3). This means that some subsistence activities may have been complex simultaneous tasks and required some adults to work away from their houses during the period of intensive-resource exploitation, particularly for collective hunting, as suggested by the analyses of death seasonality and age composition of gazelle remains at Abu Hureyra (Legge and Rowley-Conwy 2000, 435-450). Legge and Rowley-Conwy (2000: 442-447) also refer to the historical use of "kite sites" distributed across the desert areas in Jordan and Syria (Betts 1998; Helms and Betts 1987) as auxiliary evidence for the practice of community drive hunting during the Neolithic period. If this view of PPNB subsistence activities and scheduling is correct, how would nuclear households manage to conduct complex subsistence activities successfully?

According to anthropological household studies, nuclear households form community labour groups when they need large labour forces for land clearance, planting, or group hunting (Wilk and Rathje 1982, 623). Among modern Kekchi Maya, nuclear families in the villages with plentiful land usually work separately in a linear manner, but in the event of a "bottleneck", when a large pool of labour is needed for clearing, planting, or harvesting of corn, households exchange labour within a community labour group to cope with these complex simulataneous tasks (Wilk 1984, 232-3). It is likely that PPNB households

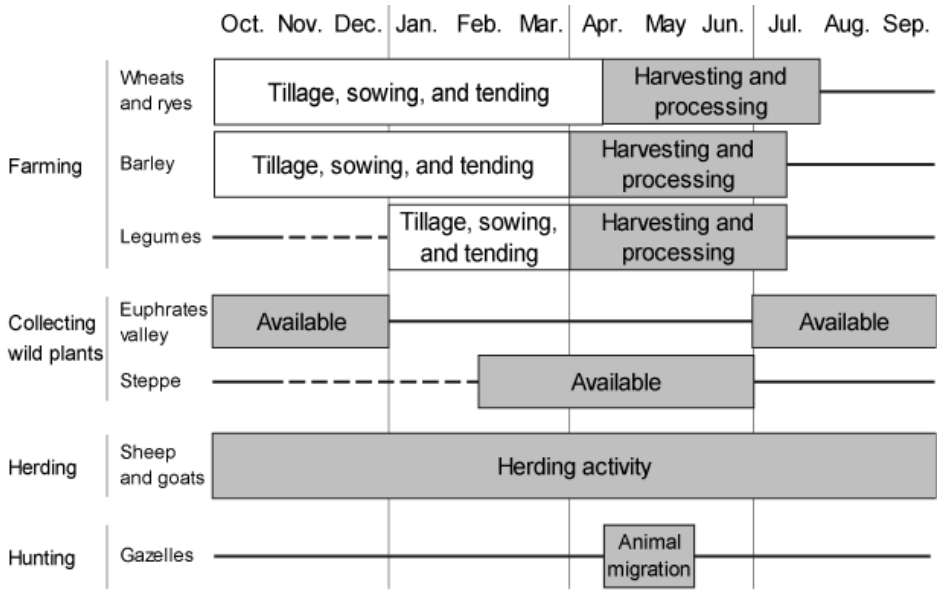

Figure 3: Annual Schedule of Subsistence Activities at Abu Hureyra 2A (Middle PPNB)
Estimated period of food use in storage: ——
(After Moore et al. 2000: Fig. 14.4)

employed a similar strategy to organize their productive labour force.

Several kinds of communal activities have been suggested for PPNB communities. Already mentioned are collective drive hunting (Legge and Rowley-Conwy 2000) and community rituals (Kuijt 1995, 2000a, 2000b). Byrd's argument for cooperative construction activities at Beidha (1994: 660) is based on a village terrace wall in Phase A (Byrd 1994: 650) and seven large buildings, including Buildings 8 and 9 in Phase C, that differ from residential buildings in more elaborate architectural features and the lack of domestic residues (Byrd 1994: 653-657). The idea of the collective construction of large-scale walls is compatible with those of the Late PPNB terrace wall at Halula (Molist 1998: 123-126) and the PPNA walls of Jericho (Bar-Yosef 1986). Furthermore, the community-wide performance of some agricultural tasks, such as harvesting, has been suggested for the PPNB community at Halula (Borrell 2007: 66-67). This view, although it may be difficult to demonstrate archaeologically, is illustrated in some ethnographic records of present agrarian communities (e.g., Wilk 1984 and Stone 1993). Lastly, based on their examinations of the spatial distribution of milling tools at Beidha, Byrd (2000:

87-88) and Wright (2000: 109-111) suggest that food processing during Phases A and B (earlier phases of Beidha) was likely a group event possibly joined by members from different households.

Although the above collective tasks may have had a role in maintaining social cohesion among PPNB households, it would not have eliminated competitions for power or conflict among community members. Apparently "non-utilitarian" community activities, such as rituals, could have functioned as regulatory mechanisms that maintained community solidarity. My argument is that PPNB community solidarity was maintained, not only by communal rituals, but also by some daily production or consumption activities that community work groups conducted.

2. Autonomous Activities by PPNB Households

On the other hand, some activities appear to have been performed by each household individually in the PPNB period. As mentioned earlier, compartmentalized indoor space in Middle and Late PPNB houses is often interpreted as storage with restricted access in residential areas (Byrd 1994 and 2000; Kuijt 2008). Although the preservation of stored foods is very rare, there are some discoveries of stored tools in narrow indoor spaces, such as clusters of ground stones at Beidha Phase C (Wright 2000: 112) and 'Ayn Abū Nukhayla (Kadowaki 2006: 57) as well as a sickle and other hunting/processing tools at Tell Halula (Borrell 2007). These storages in secluded domestic areas may represent a phenomenon that Flannery interpreted as the risk acceptance at the level of the household or the privatization of storage (Flannery 1993 and 2002, 421).

While the ownership of storage is a significant factor in the consideration of inter-household relations, researchers also studied the social contexts of some production and consumption activities for the same purpose. For example, Wright (2000) examined diachronic changes in the locations for milling, cooking, storage and dining from the Natufian to Late PPNB period in the southern Levant. She suggests that milling and cooking during the Middle PPNB were often practiced in open social settings, such as near the house entrance or outdoor areas between houses, while the Late PPNB food-related activities usually took place in more closed settings inside houses (Wright 2000: 101-114). The excavations of Late PPNB multi-cellular buildings of Area B at es-Sifiya uncovered "five complete limestone querns, two stone bowls, six pestles and two unbaked clay vessels laying directly on the floor" (Mahasneh 2004: 48, 60), indicating a specialized use of this room for food preparation. The spatial

analysis of groundstones was also conducted using the floor assemblages of several buildings at the late Middle PPNB site of ‘Ayn Abū Nukhayla (Kadowaki 2002 and 2006), where the traces of food-processing activities were detected at indoor general activity areas associated with each of the residential units (Fig. 4).

Also relevant here are studies of the organization of craft production because they often discuss how households were involved in craft production activities. For example, Quintero (1998) examined the naviform core-and-blade technology employed in the PPNB occupations of ‘Ain Ghazal. Based on technological and spatial analyses, she suggested that the naviform technology, which requires high-quality raw material and substantial skill, was likely practiced by knapping specialists at workshops. On the other hand, she also suggests that expedient chipped-stone productions, i.e., nonformalized blades and flakes, were probably performed at the household level (Quintero 1998, 229-232). In contrast to the case study at ‘Ain Ghazal, the examinations of floor assemblages at ‘Ayn Abū Nukhayla show that wastes from naviform core reduction were associated with each of the excavated residential buildings, indicating that naviform blades were manufactured at the level of the household instead of the workshop (Henry et al. in press).

Another complex chipped-stone technology during the PPNB is the pressure-flaking production of obsidian blades and bladelets (Cauvin 2000, 86-88). Technology and spatial distribution of obsidian artifacts were analyzed for the Late PPNB and early LN levels of Seker al-Aheimar, northeast Syria (Kadowaki et al. in press). In these levels, several concentrations of obsidian waste from bladelet production were recovered in outdoor areas of the same location repetitively over several building levels. Although the localized distribution of production waste might indicate a specialized production system, examination of surrounding deposits, which also contain a wide range of domestic refuse, and the discard behaviour associated with the obsidian refuse suggest that obsidian bladelets were principally manufactured in domestic areas rather than workshops at this settlement.

In addition, the production loci for stone beads have been detected within residential buildings at some PPNB and early LN sites in the Jilat-Azraq basin (Wright and Garrard 2002). The authors point out that the bead production during the PPNB is smaller in scale than the LN one and generally associated with other domestic refuse (Wright and Garrard 2002, 272). As another type of non-utilitarian objects during the PPNB, a large amount of unfinished products of sandstone rings have been discovered at Ba’ja (Late PPNB, Gebel and Bienert

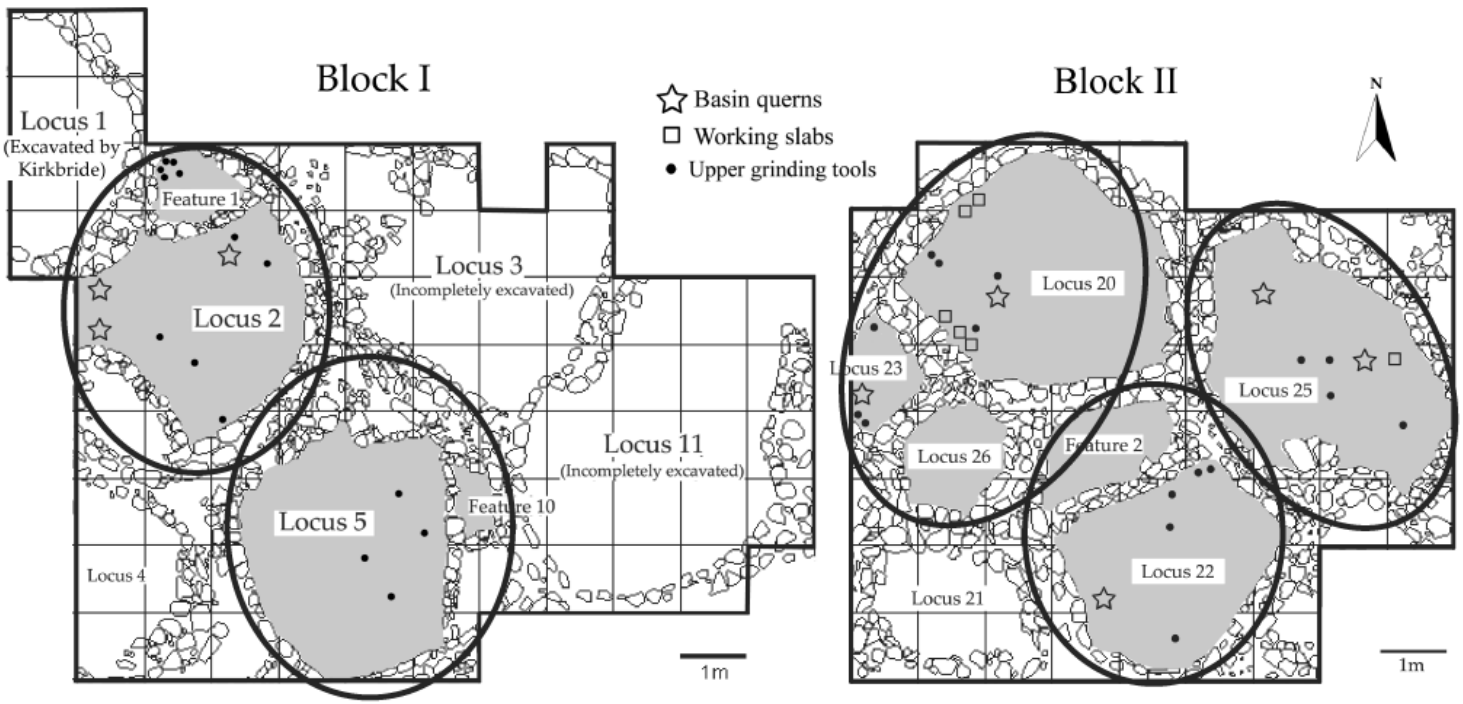

Figure 4: Spatial Distributions of Milling Tools on Building Floors at 'Ayn Abu Nukhayla, Southern Jordan. Circles indicate spatial units, where food-processing, storage, and craft production activities were performed, probably occupied by separate residential groups that can be called households. (After Kadowaki 2006)

1997, 252). The excavators consider that production took place in specialized households, but they are not certain about the scale of production.

The above activities performed at the level of the household, regardless of the degree of specialization, are likely to reflect, or have functioned to enhance, the autonomous character of households in their management of socio-economic activities. Although the social contexts of past activities are not always clear in archaeological records, the examinations of the locations and the scale of daily production and consumption activities, including storage, craft production, and food preparation, can be useful evidence regarding the social groups (i.e., specialists, households, or supra-household groups) that organized these activities.

V. Changing Households at the Transition from the Late PPNB to the LN

If the solidarity of PPNB communities was partly maintained by communal activities, any change in those activities may have had a significant impact on social relations. Indeed, it is likely that household activities were changing during the Late PPNB in face of resource depletion around villages (Köhler-Rollefson 1988 and 1992; Moore et al. 2000; Rollefson et al. 1992), the decline of hunting activities (Köhler-Rollefson et al. 1988; Legge and Rowley-Conwy 2000), the increasing importance of domesticated animals (Köhler-Rollefson et al. 1988; Legge and Rowley-Conwy 2000), and growing population pressure on agricultural land due to population increase (Banning 2001, 153; Kuijt 2000b and 2008).

Several studies of ethnographic households indicate two possible ramifications of resource scarcity. First, the inheritance of rights to scarce resources becomes an important function of households (Wilk and Netting 1984, 11; Wilk and Rathje 1982, 628). This practice enhances the private ownership of resources. In the Neolithic Levant, the increased size of private storage in Late PPNB two-story buildings may support the idea of enhanced private ownership and accumulation of surplus in this period. Second, growing population pressure on land and the depletion of adjacent resources would have made it necessary for villagers to travel farther away from their villages to obtain agricultural lands, pasture, or such resources as game animals for collective hunting (Banning 2001, 153; Trigger 1990, 35-6; Wilk 1984, 235). As a consequence, households would take a variety of strategies independently.

For example, among Kekchi farmers in modern Belize,

> those who want to maximize yield (usually younger men with few

> dependents) clear fields in closer low forest while men who want to minimize risk with a more reliable harvest (often older men with many dependents) grow their corn in distant high forest. (Wilk 1984, 235).

Lands at different locations and with different kinds of vegetation need different timings of clearing and different techniques, which makes it difficult to organize communal works for each case. In addition, the introduction of dry corn and rice to compensate for the decreased productivity of wet corn further complicates the labour scheduling of individual Kekchi households.

It is likely that the strategies of PPNB households also became diversified in response to resource scarcity. The introduction of domesticated animals may represent part of the diversified subsistence activities among PPNB households (Flannery 2002, 424). Köhler-Rollefson (1992), Rollefson (1997), and Simmons (2000) suggest the bifurcation of Neolithic villagers into farmers and pastoralists at the end of the PPNB. However, based on the above hypothesis, I suggest that, instead of bifurcation into two opposite subsistence modes, many households may have employed both farming and herding (and probably hunting and gathering) in different degrees. Ultimately, diversified subsistence activities and conflicting labour scheduling among households probably undermined the practicability of communal works. At the same time, the enhanced ownership of resources may have reduced the social network of sharing among households.

Under this social condition, it is interesting that Late PPNB houses are characterized by unprecedentedly great scale and complexity (Banning 1996; Kuijt 2000b; Goring-Morris and Belfer-Cohen 2008), as shown by building remains from Basta (Nissen et al. 1987), Ba'ja (Gebel and Bienert 1997; Gebel 2006), 'Ain Ghazal (Rollefson 1997), es-Sifiya (Mahasneh 1997 and 2004), and 'Ain Jammam (Fino 2004) among others. Gebel (2006: 68-69) suggests that domestic buildings of these sites share a common plan type, called "Basta House", consisting of a larger, central room surrounded by smaller cells, often interpreted as storage, although the plan can vary according to topographic constraints at the site. Evidence for a popular view that the Basta House plan represents a basement for an upper story (e.g., Banning 1996; Kuijt 2000b; Rollefson 1997; Simmons 2007: 138) has mounted through examinations of architectural features, room fills, and their formation processes (Gebel 2006).

Although it is difficult to determine if large and complex Late PPNB houses were occupied by single extended households or several nuclear households, the increased house size and a multi-room layout may indicate the increased size of households and increased demands for private storage and

indoor activity areas. These changes in household size and the space used for domestic activities can be understood as a consequence of reduced sharing of production and consumption activities, the conditions of which made mustering a large labour force and private storage within individual households advantageous (Banning 1996). It is possible that such changes in inter-household relationship and their manifestation in the built environment occurred earlier in some settlements, for example at Beidha Phase C and Ghwair I Phase III, where some researchers suggest the presence of late Middle PPNB two-story domestic buildings (Byrd 2005; Byrd and Banning 1988; Simmons 2007: 170-171; Simmons and Najjar 2006: 83).

The timing and the nature of changes in domestic buildings may have varied in other areas of the Near East. For example, at Abu Hureyra and Halula in the middle Euphrates, no apparent increase in the scale and complexity of houses is reported from the Middle to Late PPNB period despite a significant growth of the settlement in the former case (Moore 2000: 189-251; Molist 1998: 118-123). Both Middle and Late PPNB houses at these sites measure 46-82 m^2 in area (Akkermans and Schwartz 2003: 61) and are multicellular, consisting of three to five rooms of varying sizes. Larger rooms are often associated with hearths (Molist 1998), while smaller ones are interpreted as storage (Akkermans and Schwartz 2003: 61). In fact, at Halula, one of the smaller rooms contained a cluster of tools, including a sickle retaining its blade segments (Borrell 2007: 67-68). Examining how these Middle and Late PPNB houses compare to the buildings with courtyards or tripartite divisions at Late PPNB-early LN Bouqras (Akkermans et al. 1983) and Final PPNB El Kowm 2-Caracol (Stordeur 2000) would likely be worthwhile. At Bouqras, five excavation squares (15/13-19/13) that reached sterile deposits uncovered ten architectural levels showing a continuation of standardized house shapes and internal layouts. The houses usually include large areas that are interpreted as courtyards, which occupy 25-40% of the total area occupied by each of the houses (50-105 m^2 on average) (Akkermans et al. 1983: 340-343). The courtyards became narrower in upper layers (particularly levels 1-3), giving an appearance of a tripartite layout. The courtyards, installed with a horseshoe-shaped oven, are usually surrounded by small rooms with an oval oven or shallow floor bins on one side (Akkermans et al. 1983: 343) and a broad room without any installation on another side. Such multicelluar structure consisting of large and small rooms with specific functions is reminiscent of the Basta House plan in the southern Levant. Detailed examination is necessary to clarify how these architectural changes from the PPNB to early LN in the middle Euphrates may be related to the changes in

household size, household activities, and inter-household relations.

In the southern Levant, the possible increase of household size during the Late PPNB may have continued in the LN period, as indicated by the presence of courtyard structures. The excavations at the early LN site of Sha'ar Hagolan documented three large houses in Areas E and H, each with a courtyard flanked by several rooms (Garfinkel and Miller 2002; Garfinkel 2006). According to Garfinkel (2002, 258-262; 2006), extended families consisting of three or more nuclear families inhabited these houses. Each nuclear family had a dwelling room and an adjacent storage room. The emergence of extended households is also suggested by Flannery (2002), based on his studies of the layout of courtyard structures and the locations of storage and cooking facilities at Hassuna, a LN settlement in northern Mesopotamia. Buildings with courtyards have also been reported at a Yarmoukian layer of 'Ain Ghazal (Rollefson 1997) and at Tell Wadi Feinan (Qatifian, Najjar 1992) (Fig. 5). In addition, a farmstead of Phase 3 at Tabaqat al-Bûma (Wadi Rabah) has a central outdoor space that surrounding households used for food preparation and tool production. Despite the lack of patterned architectural plan (Banning 2004, 228), the use of a central activity area shared by multiple households is essentially similar to the space use of the courtyard structure (Kadowaki 2007).

However, it is necessary to be cautious about linking the simple presence of a courtyard structure to the residence of an extended household or multiple nuclear households because the courtyard structure can show variations in the number and arrangement of constituent houses and outdoor walls (z_4, z_5, and z_6 syntaxes in Banning 2011: 52). Even in the case that a single courtyard structure incorporates multiple residential units, such as at Sha'ar Hagolan, the social relationship among different residential groups sharing the same courtyard can vary from strong incorporation to loose cooperation in limited kinds of activities (Banning 2011: 73-75). Despite these considerations, the courtyard structure with multiple residential units (i.e., z_5 and z_6 syntaxes) can be interpreted as a material manifestation or a social action of closely related households that bounded themselves apart from other community members.

If multiple residential groups in courtyard compounds worked more or less cooperatively, their labour force should have been larger than that of Middle PPNB pier-house inhabitants. This is explicable as a consequence of social change since the Late PPNB period characterized by (1) the enhanced private ownership of resources and (2) the diversified subsistence activities and the concomitant decline of community-wide labour organizations. Despite the latter trend, we do have some LN architectural remains indicative of probable public

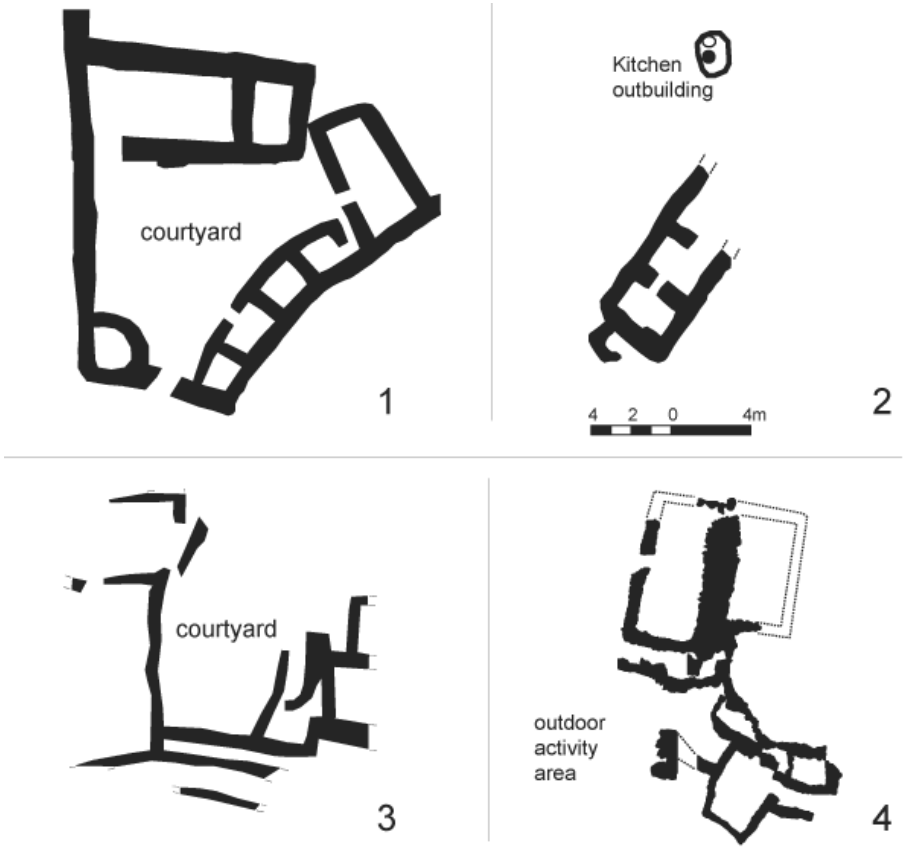

Figure 5: Late Neolithic Building Structures associated with Courtyards or Outdoor Activity Areas

1: Sha'ar Hagolan, 2: 'Ain Ghazal (Yarmoukian), 3: Tell Wadi Feinan, 4: Tabaqat al-Bûma (Phase 3)
(1: Garfinkel and Miller 2002, 2: Rollefson 1997, 3: Najjar 1992, 4: Kadowaki 2007)

construction and use, such as streets and alleys at Sha'ar Hagolan (Garfinkel and Miller 2002) and Yarmoukian 'Ain Ghazal (Rollefson and Kafafi 1994) and a well at Sha'ar Hagolan (Garfinkel et al. 2006). In interpreting the social significance of these cases, it is necessary to consider what social unit was relevant; rather than viewing streets and wells as either village-wide or household-based tasks, we can also assume intermediate scales of social groupings, which may correspond to "extended households" in Garfinkel's term (2002) or the "neighbourhoods" that Düring proposes (2007).

VI. Summary

As mentioned earlier, a wide range of cultural changes occurred at the transition from the Late PPNB to LN, which also manifested themselves as the drastic change in the settlement pattern from aggregated villages to a mixture of dispersed farmsteads and villages. Existing accounts for this Neolithic cultural change consider various factors, including environmental conditions, subsistence activities, population growth, and political dimensions of communities. To propose an alternative perspective on this cultural change, I argue that dynamic ecological, demographic, and social factors from the PPNB to LN period influenced the nature of Neolithic households, such as the size of households, the activities they performed, and the relationships among them.

The earlier discussions in this paper suggest that increase in the autonomy of households in the performance of production and consumption activities during the PPNB can be explained as a result of reduced opportunities for forming communal works in agricultural and hunting activities. Forming communal works was impractical because of diversified subsistence activities and conflicting labour schedules, which resulted from resource depletion around Neolithic settlements due to climatic change, overexploitation, and population growth. The introduction of domesticated animals and the concomitant decline of collective hunting were other factors contributing to the diversification of subsistence activities and the reduction of communal activities. The reduced sharing of community labour can explain the increase of household size in the Late PPNB and LN because it was advantageous for households to maintain a large labour force when they are mutually independent.

I argue that increase in the autonomy and size of households during the PPNB period provides a historical background for the ultimate change in settlement patterns at the transition to the LN. The reorganization of early agricultural villages would not have occurred without the alteration of households, which was induced by both ecological (environmental depletion, high population pressure on lands, etc.) and social conditions (enhanced private ownership and the decline of communal labour organization). I propose that there was a recursive relationship between households and social organizations in PPNB villages. Households were regulated by and, at the same time, created communal regulatory activities through their participation in both ritual and subsistence activities. Therefore, any subtle change in household activities could have had a significant impact on social rules, which recursively influenced the decision-making processes of households. In the case of PPNB villages, more complex labour scheduling among households undermined the foundation of

community labour organization that had previously both provided individual households with a necessary labour force and maintained community solidarity.

The model outlined in this paper is still preliminary, and requires further supporting evidence. To this end, in addition to architecture, analyzing the social contexts of daily production and consumption activities can be an effective method for obtaining insights into social relations at early agricultural communities in the Near East.

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Notes

[1] The Late Neolithic (LN) period in the southern Levant is also called the Pottery Neolithic because of the appearance of pottery at the beginning of this period. Moore (1973) defined the term Late Neolithic in opposition to the preceding time period, Early Neolithic, which corresponds to the Pre-Pottery Neolithic or Aceramic Neolithic (Rollefson 1998). The term Late Neolithic is used in this study because pottery is not usually associated with the Late Neolithic sites in the *badia*/eastern desert (Betts 1998).

[2] In these regions, only Abu Hureyra documents a growth and reduction of settlement size comparable to the scale and timing of the southern Levantine "Mega-Site" Phenomena (from Period 2B to 2C: Moore 2000: 267-275). However, the establishment of Late or Final PPNB settlements and their abandonment by the early LN, documented at Bouqras (Akkermans et al. 1983), El Kowm (Stordeur 2000), Sabi Abyad II (Verhoeven and Akkermans 2000), Seker al-Aheimar (Nishiaki and Le Mière 2005), Magzaliya (Bader 1993) among others, can be understood as reflecting the reorganization of settlement systems similar to the southern Levantine cases. In the northern Levant and Anatolia, however, the regional studies at the Rouj Basin (Tsuneki and Miyake 1996) and the Konya Plains (Baird 2005) suggest that the peak of aggregated occupations at el-Kerkh and Çatalhöyük was during the Late Neolithic, followed by a shift to dispersed settlement patterns.

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