

Neolithic Settlement Patterns in Northern Jordan and Palestine

Introduction

Settlement pattern studies normally are possible only when detailed reports concerning surveys and excavations are available. In view of the relatively recent nature of so many of the research projects in Jordan in general, and northern Jordan in particular, the current status of publications is such that it is difficult to integrate the new material in a systematic manner.

The purpose of the present study is to summarize what is known of the distribution of Aceramic Neolithic sites in Palestine (where the long and intensive history of prehistoric investigation has produced a considerable body of information) and northern Jordan and to try to account for perceived changes in those patterns over time.

The PPNA Period (c. 8500-7600 B.C.)

The development of cereal agriculture by the middle of the ninth millennium in the Levant marked an enormously different relationship between human society and the environment. The Pre-pottery Neolithic A (PPNA) period witnessed the culmination of a process of sedentarism that had begun earlier in the previous Natufian period, but it achieved greater stability as a consequence of the abundant productivity and eminent storability of domesticated wheat and barley. Nevertheless, meat protein in PPNA diets was still obtained solely through the hunting of a wide variety of wild animals.

The immediate consequences of farming *sensu stricto* were not evidently "revolutionary" in the sense that the populations of Jordan and Palestine underwent sudden increases in absolute sizes or densities. The list of PPNA sites in Jordan is very short, known only at what appears to be a temporary camp at Šabra, in the Petra region (Gebel and Starck 1985: 112), and at a possible hamlet in Wadi al-Ḥasa (Site 1008; cf. MacDonald *et al.* 1983). In fact, throughout the southern Levant there are only a handful of known PPNA hamlets and villages (e.g. Kenyon 1979: 26-30; Noy *et al.* 1973; Bar Yosef *et al.* 1980; Bar Yosef

n.d.; Noy *et al.* 1980; Lechevallier *et al.* n.d.). There are recent claims of newly discovered PPNA sites on the western side of the lower Jordan Rift system (cf. Rollefson n.d.a), but no systematic investigations of them have been initiated. In any event, it is noteworthy that the number of recognized PPNA sites is not much larger than the number known from the previous thousand years.

The Earlier PPNB Period (c. 7600-6500 B.C.)

It is towards the end of the eighth millennium that changes in settlement patterns in Jordan and Palestine become vivid. While the earliest manifestations of the Pre-Pottery Neolithic B (PPNB) cultural complex are better documented in northern Syria and southern Anatolia (Cauvin 1987: 328-333; cf. Rollefson n.d.a), it was not until about 7200 B.C. that the "classic" PPNB settlements such as PPNB Jericho, Beidā and 'Ain Ghazal were founded. Settlement sizes ranged from small hamlets (e.g. Wadi al-Ḥasa Site 892 [MacDonald *et al.* 1983]) to small villages of about 4 hectares or less in extent (e.g. Jericho, early 'Ain Ghazal, Tell Abu aṣ-Ṣuwwan). In addition to settlements of larger size, the number of PPNB sites grew appreciably larger than for the PPNA period, and virtually every major areal survey has revealed evidence of PPNB hamlets and villages (e.g. MacDonald *et al.* 1983; Rollefson 1987a; Rollefson n.d.b) in the arable parts of Jordan and temporary camps or semipermanent settlements in the eastern steppe and desert (e.g. Betts 1988; Garrard *et al.* 1988; Muheisen n.d.).

It is apparent that this period witnessed a major increase in population in Jordan and Palestine, testimony to the effectiveness of cereal agriculture and the newly domesticated pulses such as peas and lentils. Another new element undoubtedly made a major contribution to the population expansion as well, for by the beginning of the seventh millennium, goatherding was widely practiced throughout the southern Levant¹ as an integral part of the subsistence economy (Köhler-Rollefson n.d.a). By the middle of the

¹Except in the coastal and highland areas of northern Palestine, such as at Yiftahel (Garfinkel 1987) and Horvat Galil (Gopher, pers. comm.) where hunting continued to be the sole means of obtaining meat throughout the earlier PPNB period.

seventh millennium goats contributed approximately one-half of the meat in PPNB diets, the rest obtained from hunting a broad array of wild animal species (Köhler-Rollefson *et al.* 1988).

The Late PPNB Period (6500-c. 6000 B.C.)

At about 6500 B.C. Jordan and Palestine experienced a major upset in settlement patterns. Many farming villages and hamlets were abandoned in a relatively short period of time (cf. Rollefson n.d.c), their populations dispersing into the countryside to other locales that would support an agricultural existence. As the older sites were abandoned, newer ones were established for the first time in terrain and ecological settings as diverse as those of Mossad Mazal near the Dead Sea, Abu Ghosh high above Jerusalem and Beisamoun in the northern Jordan Valley. Not all of the earlier PPNB settlements were abandoned, on the other hand; one exception, at least, was 'Ain Ghazal, which continued to thrive throughout the seventh millennium.² Some of the post-6500 B.C. settlements remained on the smaller end of the scale of site size: Khirbet al-Ḥammam in Wadi al-Ḥasa, for example, was a hamlet of only about 2 ha in area (Rollefson and Kafafi 1985), and Abu Gosh and Mossad Mazal were smaller than Jericho. Thus while the settlement pattern *shifted* from some specific sites to other locales, the pattern in these cases was not otherwise altered.

What is striking about the settlement patterns in the second half of the seventh millennium is the immense size that some of the settlements attained. 'Ain Ghazal more than doubled in size shortly after 6500 B.C., and it increased by double once again to about 10 ha by 6000 B.C. (Rollefson and Simmons 1988). Similarly, Beisamoun covered more than 10 ha, as did Khirbet Sheikh 'Ali (Rollefson 1987b; cf. Gebel 1984), and Baṣṭa approached 14 ha (Nissen *et al.* 1987). The enormous surface scatter of Late PPNB lithics at Kharaysin (Edwards and Thorpe 1986), in the greater Jarash region, suggests another gigantic late seventh millennium town. Farther afield, Syrian sites reached 6-11 ha in extent (Rollefson 1987b).

Hard evidence to explain the mid-seventh millennium site abandonment is not available, nor is it clear why the "megasite" phenomenon developed at the same time. As to the former event, it seems highly unlikely that deteriorating climatic conditions were responsible, since as a regional phenomenon alterations in weather should have had similar impacts on all sites throughout Palestine and Jordan, and this clearly was not the case. Instead, it is more probable that under certain ecological conditions the destructive effects inherent in the integrated farming and goatherding economy practiced by earlier PPNB inhabitants had degraded the microenvironments of many of the permanent settlements. This culturally-induced degrada-

tion included the destruction of natural habitats of wild animal species during the clearing of vegetative cover for farming plots and the removal of trees for housing construction, plaster manufacture, and domestic fuel requirements. The close-browsing habits of goats prevented effective regeneration of trees and other vegetation, exposing the delicate and often shallow soils to erosion by wind and precipitation, and the decrease in soil fertility and outright soil loss over an extended period of constant cropping evidently made farming unproductive within reasonable distances from permanent sources of fresh water (Rollefson and Köhler-Rollefson 1989; Köhler-Rollefson and Rollefson n.d.; cf. Rollefson n.d.c).

It is also highly unlikely that the growth of the megasites can be attributed to enormous birth rates among the populations of certain settlements. In other words, it must be admitted that at least some of the areal expansion of settlements in the latter half of the seventh millennium was the result of a collapse of previously autonomous settlements into focal areas that were ecologically suitable to sustain unprecedented population densities (e.g. Köhler-Rollefson *et al.* 1988).

The persistent growth of several megasite settlements in Jordan and Palestine is an issue of great complexity. Certainly the scale of population concentration reached at 'Ain Ghazal was not the inevitable outgrowth of PPNB subsistence strategies or cultural preferences, for the presence of much smaller contemporaneous sites is enough to argue against such an assessment. Nevertheless, it is apparent that the mixed herding and farming economy was sufficiently productive to feed large clusters of people, and the permanent interaction of so many inhabitants at each of the megasites must have entailed some cultural adjustments in order to temper increasingly conflicting demands in such areas as access to farmland and pasturage, storage of food, and such cooperative exploits as harvesting, housebuilding, trade and incipient economic specialization, to name a few.

But despite the vigor of Late PPNB settlements after 6500 B.C., the florescence came to a relatively abrupt halt by about 6000 B.C. As had been witnessed on a smaller scale some 500 years earlier, farming villages and towns were once again deserted on a grand scale, including *all* of the known PPNB sites in Palestine.

The PPNC Period (6000-c. 5500 B.C.)

After 6000 B.C. we have evidence of permanent settlements only at Tell Ramad in the Damascus Basin (de Contenson 1985), 'Ain Ghazal, Wadi Shu'eib (Simmons *et al.* 1989) and possibly at Baṣṭa and the people living at these locations must have represented only a small fraction of the total regional population of the late seventh millennium.

²The case for PPNB Wadi Shu'eib remains unclear. While it is certain that the site was occupied throughout the latter half of the seventh millennium, it is unknown when the site was originally established (cf. Simmons *et al.* 1989).

The reason(s) for the severe disruption of settlement patterns at about 6000 B.C. remains hypothetical at the present time, but it would appear that decreased rainfall cannot be cited (e.g. Perrot 1968; Mellaart 1975: 67-68). Once again, if rainfall was insufficient to sustain the Late PPNB farming communities of Beisamoun and Abu Ghosh, farming should not have been possible at 'Ain Ghazal or Wadi Shu'eib. Again, it is likely that economic mismanagement continued, as earlier at Jericho, to decimate the local environments, but this time on a larger scale.

How then was it possible that Wadi Shu'eib persisted, and that 'Ain Ghazal even continued to grow in size? We suggest that two related factors operated to temper the effects of the cultural degradation of the environment around these sites, permitting the sustained presence of large and dense populations in a limited number of cases.

The first factor concerns the greater ecological setting of Wadi Shu'eib and 'Ain Ghazal (and probably Bas̄a and Tell Ramad). These sites were situated in relatively close proximity to habitats that had been largely underexploited by PPNB agricultural groups: The non-arable steppes and deserts of eastern Jordan. It is likely that hunting by settled farming populations from the fringes of the area continued to play a substantial role in feeding families back in the village. Furthermore, in these unarable regions the relatively sparse plant cover could nevertheless be converted to abundant "harvests" by transforming it to meat protein. By taking herds of goats (and possibly sheep by the beginning of the sixth millennium) away from the villages to the seasonally available vegetation during and after the winter rains, sixth millennium inhabitants of 'Ain Ghazal and Wadi Shu'eib could achieve two important results simultaneously: First, they could diminish the harmful effects of browsers on the fragile soils immediately around the permanent villages. Second, the previously untapped productivity of the steppe/desert vegetation could greatly increase the stable supply of goat meat to compensate for the diminished wild animal resources of the badly deteriorated habitats near the permanent settlements. Furthermore, the absence of a possibly large proportion of the village population for several months at a time would have reduced the stresses on the agricultural productivity of the land around the villages (Köhler-Rollefson 1988; n.d.b).

The second factor that served to allow continued occupation at 'Ain Ghazal and Wadi Shu'eib is in the cultural modifications that were installed by the beginning of the sixth millennium (cf. Rollefson and Simmons 1986: 155-161), and these differences may be taken to represent accommodations of varying degrees to the stresses engendered by the long duration of demands of a growing population in a deteriorating environment. In addition to the increased utilization of the resources of the arid steppe and desert, the local agricultural component of the economic system may also have undergone some change, for sickle blades and grinding stones from PPNC contexts at 'Ain Ghazal (and perhaps at Wadi Shu'eib?) occur in

much rarer relative frequencies than in PPNB times. It is possible that the methods of harvesting and processing domesticated crops may have changed, and that even the kinds of crops relied upon may have altered considerably (flotation samples have been entirely negative in this regard).

One important question about the PPNC period remains a major enigma: What happened to all the people who used to live at those Late PPNB sites that were in fact abandoned? Earlier interpretations suggested that the greater part of Palestine and Jordan were essentially evacuated, and that the PPNB inhabitants moved *en masse* to areas of the north (e.g. Mellaart 1975: 68). If this were so, one would expect to see a significant increase of sixth millennium sites in Lebanon and Syria, but this does not appear to be the case.

The following scenario seems more plausible. Although the arable land around the larger permanent sources of fresh water (e.g. at Beisamoun, Khirbet Sheikh 'Ali, etc.) would have been devastated under the conditions of the Late PPNB overexploitation described above, considerable areas of land suitable for farming undoubtedly remained available in Palestine and Jordan near springs that could supply the needs of smaller, hamlet-sized communities. Cultural adjustments were adopted to prevent the widespread environmental degradation that characterized the seventh millennium. The smaller farming communities could maintain a pastoral component of the subsistence economy only if they relied on domesticated cattle and pigs, leaving goat husbandry to those populations in close proximity of the steppe/desert habitats. Small herds of cattle and pigs would be productive in terms of meat, but they would not interfere with habitat maintenance or regeneration under subsistence economy conditions (Köhler-Rollefson and Rollefson n.d.). One early sixth millennium site from Palestine that might reflect such a focus is Hagoshrim (e.g. Ducos 1968), although details on the material culture from this site are admittedly scant.

Another factor is related to the impact of changes in PPNC chipped stone tools and their impact on the "visible" record available to survey teams. Lithic scatters from the normally small PPNC farming communities tend to be relatively light and diffuse compared to the norm for the larger and more densely populated PPNB sites; therefore it would be less likely that PPNC hamlets would be recognized at all. Furthermore, the differences between PPNB and PPNC lithics are more in the realm of degree rather than kind (Rollefson and Simmons 1986: 157; 1988: 404-405). Under these conditions, then, even if small PPNC surface scatters were discovered by survey teams, it is very possible that the artifacts would be mistakenly identified as "Late PPNB".

The Aceramic-Ceramic Neolithic "Interface"

It is a popular idea of long-standing that held that pottery manufacture was "invented" in the northern Levant (e.g.

Kenyon 1979: 41,49; Mellaart 1975: 238-241), and that under the "exodus" model prominent in the 1950s-1970s, when Palestine and Jordan were "repopulated", colonies of immigrants brought the new technology with them to the south.

Because we do not accept the "exodus" and "repopulation" models for the sixth millennium in the southern Levant, it is necessary to question the idea of a "northern invention" and "importation" of pottery manufacture into Palestine and Jordan.

Evidence for an *in situ* transition across the PPNC-Yarmoukian "interface" has been suggested by the results of the 1988 and 1989 seasons at 'Ain Ghazal, including a small sample of atypical potsherds from PPNC contexts, architectural continuity from one phase to the other and close similarities in lithic production and other aspects of material culture (Rollefson *et al.* 1989). Such a link between the end of the Aceramic Neolithic and the beginning of the Pottery Neolithic reinforces the model described above for the cultural modifications and predictable changes in settlement pattern for the main PPNC and Yarmoukian periods in Palestine and Jordan. Yarmoukian settlements in Jordan, at least, are known principally from small hamlets such as Tell Abu Thawwab and other nearby sites (Kafafi 1988) and 'Ain Rahub (Muheisen *et al.* 1988), situations that would be anticipated under the ecological conditions stipulated in the model. Other aspects of continuity are seen in the persistence of the large and dense settlements at those former PPNC concentrations such as Wadi Shu'eib and 'Ain Ghazal located near the edge of the steppe/desert.

Concluding Remarks

The explanations presented above for changes in settlement patterns during the Pre-Pottery and Pottery Neolithic periods in Palestine and Jordan are hypothetical, although preliminary assessments of the results of the recently concluded field seasons at 'Ain Ghazal and, to a lesser extent at Wadi Shu'eib, suggest that the proposed models are preferable to previous scenarios based on much more limited information. Only continued excavation, on the one hand, and intensified surveys on the other, not only from northern Jordan but from the rest of the country as well, will establish to what degree the new models are applicable.

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