

Settlement and Economy in Wādī Ziqlāb during the Late Neolithic

It is surprising how little we really know about settlement and economy of either the Early or Late Neolithic in Jordan. Despite the intensity of research, as indicated in other papers in this volume, it is likely that we have discovered only a fraction of the sites, plant preservation is often poor, and, although we can talk about some of the plants and animals that were domesticated, we do not really know how their economies worked.

Unanswered questions include the following and many others. Did Neolithic communities use slash-and-burn agriculture, or simple irrigation, or crop rotation? How did they solve conflict between the demands of agriculture and pastoralism for land? What kind of social and political systems did they have? Were settlements all autonomous, or did groups of settlements form regional polities? We still cannot even be sure in most cases that Neolithic sites were occupied year-round, rather than seasonally.

Our work-in-progress in Wādī Ziqlāb cannot yet answer these questions, and what follows is necessarily somewhat speculative. I offer, if you will, some hypotheses based on the emerging patterns in our continuing fieldwork.

Changes in settlement density and distribution from the Late Pre-Pottery Neolithic B (LPPNB) to the Late Neolithic appear so abrupt that for many years there appeared to have been a complete settlement disruption in the late ninth millennium bp.¹ The further fact that many Middle and Late PPNB sites were abandoned and left unoccupied for more than a millennium led authors such as Kenyon (1957), Perrot (1968) and de Vaux (1966) to infer that the Mediterranean woodlands of the southern Levant were completely uninhabited until pottery-using immigrants recolonized them during the Late Neolithic. More recent research, especially in Jordan, now suggests that, in some parts of the southern Levant at least, occupa-

tion continued throughout the eighth millennium bp, but settlement pattern differed. Our understanding of the form of these differences remains unclear, with some authors suggesting that the relatively low obtrusiveness of eighth-millennium sites was due to a shift from settled agriculture to nomadic pastoralism (e.g., Köhler-Rollefson 1992) in the Mediterranean corridor. Our understanding of the reasons for the shift shows even less agreement, with explanations ranging from climatic change to anthropogenic deforestation (Rollefson and Simmons 1987; Simmons *et al.* 1988; Rollefson and Köhler-Rollefson 1989).

In Wādī Ziqlāb, in al-Kūra district of northern Jordan, research since 1981 has provided another source of evidence on how the structure of settlement systems may have changed over this time. They appear to indicate, not a shift to nomadic pastoralism, but a shift to a more dispersed pattern of agricultural farmsteads and hamlets, possibly to improve the balance between agricultural and pastoral landuse among sedentary mixed farmers. While it is premature to generalize these patterns, they also indicate possible directions for research in other parts of Jordan's Mediterranean regions, and provide a possible explanation for past difficulties in identifying eighth-millennium settlement.

Sketch of Neolithic Settlement in Wādī Ziqlāb

A combination of surface survey, sub-surface survey and guidance from local informants has led to the discovery of a number of confirmed, and several more possible Neolithic sites in Wādī Ziqlāb (Banning 1995; 1996; Banning *et al.* 1989; 1992; 1994; 1996; Field and Banning 1998).

Apart from a single al-Khiam point found at Ṭabaqat al-Būma (site WZ 200), the earliest confirmed evidence for the Neolithic in Wādī Ziqlāb to date comes from the site of 'Ayn Jahjah (WZ 120)² next to the spring of the same name in Wādī Ziqlāb's canyon on the confluence of

¹ All dates expressed in this paper will be in radiocarbon years bp unless shown in brackets, in which case they are in calibrated years BCE, with 95% confidence intervals.

² Previous papers erroneously reported this site as 'Ayn Šabha, which is actually the name of the spring on the opposite side of the canyon. A local guidebook unusually reports its name as Tall Anita.

Wādī 'Ayn at-Tays. An exposed section at this site shows LPPNB plaster floors founded on sterile sub-soil and associated with charcoal dated to 8430 ± 70 bp (7550-7305 BCE) and 8100 ± 70 bp (7290-6790 BCE). Deposits with occasional sherds showing Yarmoukian decoration immediately overlie the LPPNB stratum. It is difficult at present to estimate the size of the site, because deep overlying deposits and a pomegranate grove impede visibility, but it is probably the remains of a small village between 0.75 and 1.0 ha in size, occupied from about 8300 to about 7000 bp. We hope that excavations at this site in 1999 will help us to describe its settlement history more fully. If, as at 'Ayn Ghazāl and Wādī Shu'ayb, there is not break in settlement over this sequence, it would be one more case showing that, in the hill country of Jordan, at least, PPNB sites were not routinely abandoned at the end of the eighth millennium bp. Indeed, it is probably one more site founded in Late PPNB, and therefore possibly one of the locations colonized by people who abandoned one of the PPNB sites west of the Jordan River.

Subsurface survey in 1987 discovered site WZ 200 at Ṭabaqat al-Būma, farther up Wādī Ziqlāb's canyon at the confluence of its two most important tributaries, which provides our best evidence to date for the Late Neolithic in the valley. A series of small settlements at this site, each probably representing a farmstead, followed use of the site for some cist-graves, and the combination of radiocarbon dates and stratigraphy indicates occupation from some time probably in the late eighth millennium bp almost to the end of the seventh millennium (FIG. 2, and Blackham 1994; 1998).

The first phase of Neolithic use of the site is of uncertain date, but probably no later than 7000 bp, based on the dates of later phases. It began with the construction of at least two substantial cist graves, dug into earlier Epipalaeolithic deposits and covered with large stone slabs and, probably, earthen tumuli. One of these contained a number of intact and nearly intact vessels and a stone spindle whorl, along with the remains of two adult individuals. The other contained a subadult showing extreme bilateral enlargement of the tibia and proliferation of the endosteal surface, along with an infant wearing a shell necklace. Both histological and macroscopic examination of the tibiae suggests that the subadult suffered from a very early case of treponematosi, possibly bejel (endemic syphilis) (Shafiq 1996; Shafiq, Schultz and Banning n.d.). Interestingly, the vessels show some similarities to those of the Yarmoukian in the overall shape of the jars, but there are also important differences that we will probably understand better once Yarmoukian material from 'Ayn Jahjah becomes available for analysis.

Later in phase 1, two rectangular structures, of which little remains, were built on the site, apparently with levelling of the F34 grave tumulus.

By phase 2 (ca. 6600 bp; 5600 cal BC) the site constituted a small farmstead with one or two families and small-scale storage represented by a clay-lined silo in one building. Phases 3 (ca. 6500 bp) and 4 (ca. 6200 bp) show similar character, usually with two or three buildings in use at any one time, and domestic facilities such as stone platforms and a large mortar. Abandoned buildings were used as burial places, with small stone cists in phase 3 giving way to simpler burials in phase 4. The lithics of all phases are mainly unretouched flakes struck from single-platform cores, the relatively rare formed tools consisting mainly of denticulated sickle blades along with some scrapers and axes/adzes. The pottery of phases 2-3 consists mainly of simple, undecorated bowls and small or medium jars, some of which are probably cooking pots. Decoration, although rare, occurs on bowls and small jars, and is usually limited to a simple band of red-brown paint at the rim, with occasional bowls also showing groups of painted diagonals. By phase 4 we have incised and combed, and occasionally punctate, decoration, similar to that found at sites of the Wādī Raba complex farther west.

Only about 600m west of this site, site WZ 310 seems to have been founded not long before the abandonment of site WZ 200. The Late Neolithic material we have found there, however, has been redeposited above a series of EB I pits and against what appears to be the remnant of an EB I wall. It appears that a small Late Neolithic settlement, approximately contemporary with phase 4 at site WZ 200, that once lay upslope from our excavations has completely eroded away.

Other evidence that may belong to small Late Neolithic sites comes, like site WZ 310, from soundings with which we have sampled stream terraces along the central stretch of Wādī Ziqlāb and its major tributary, Wādī 'Ayn Sirin (Banning 1996). A few tantalizing artifacts from soundings at WZ 300, 301, 307 and 313 (the latter showing large numbers of cores) are not enough, however, for us to conclude that they represent settlement sites. They may instead represent extensive activities around sites WZ 200 and 310, such as flint quarrying and some flint-knapping upslope of WZ 313.

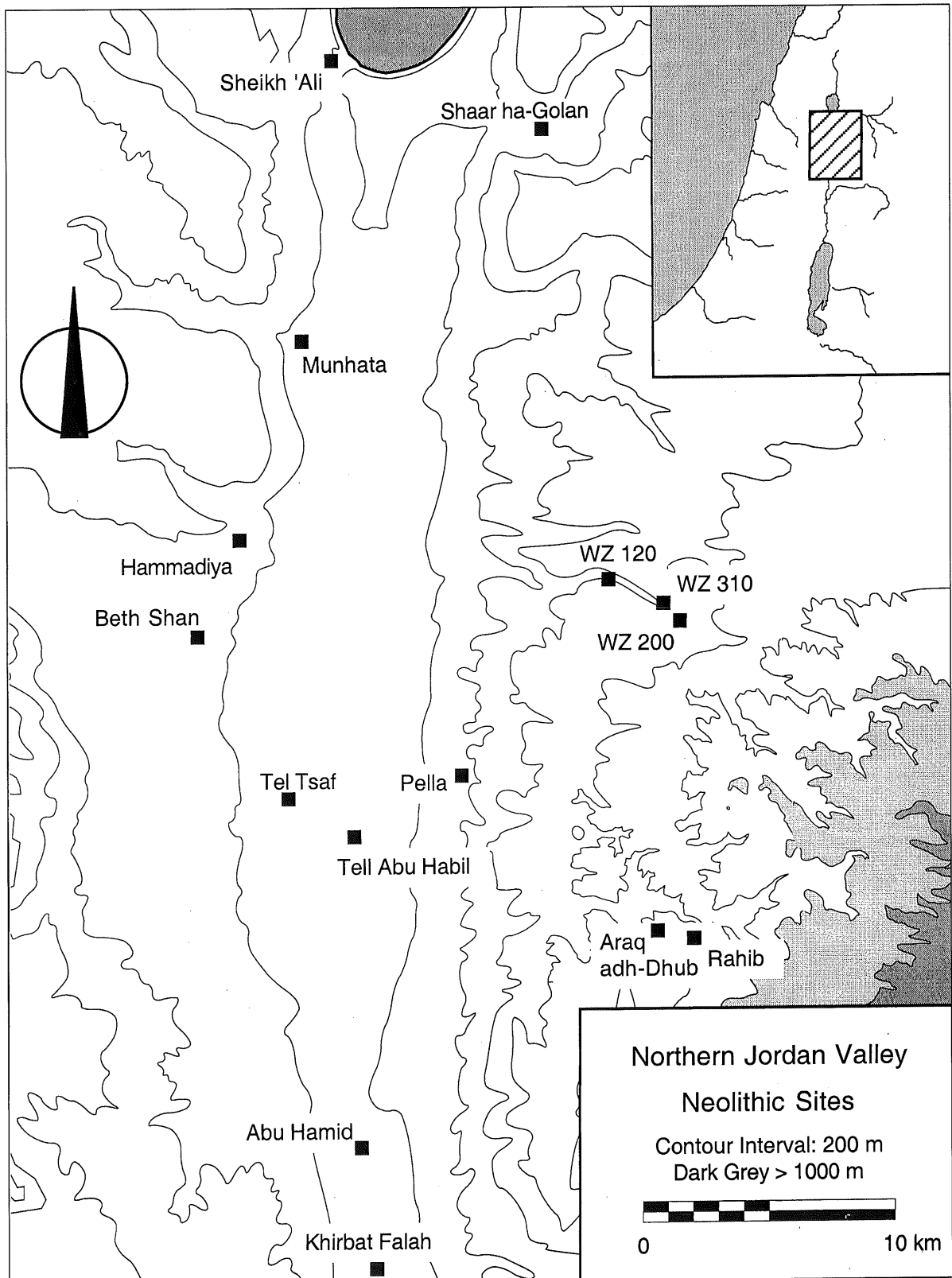
The 1981 surface survey of Wādī Ziqlāb also recorded 18 rather unremarkable lithic scatters that did not include diagnostic formed tools, but could belong to the Late Neolithic. Unfortunately we cannot be sure of this, while it is also possible, once again, that they represent extensive activity rather than loci of settlement.

Models of Neolithic Settlement Systems

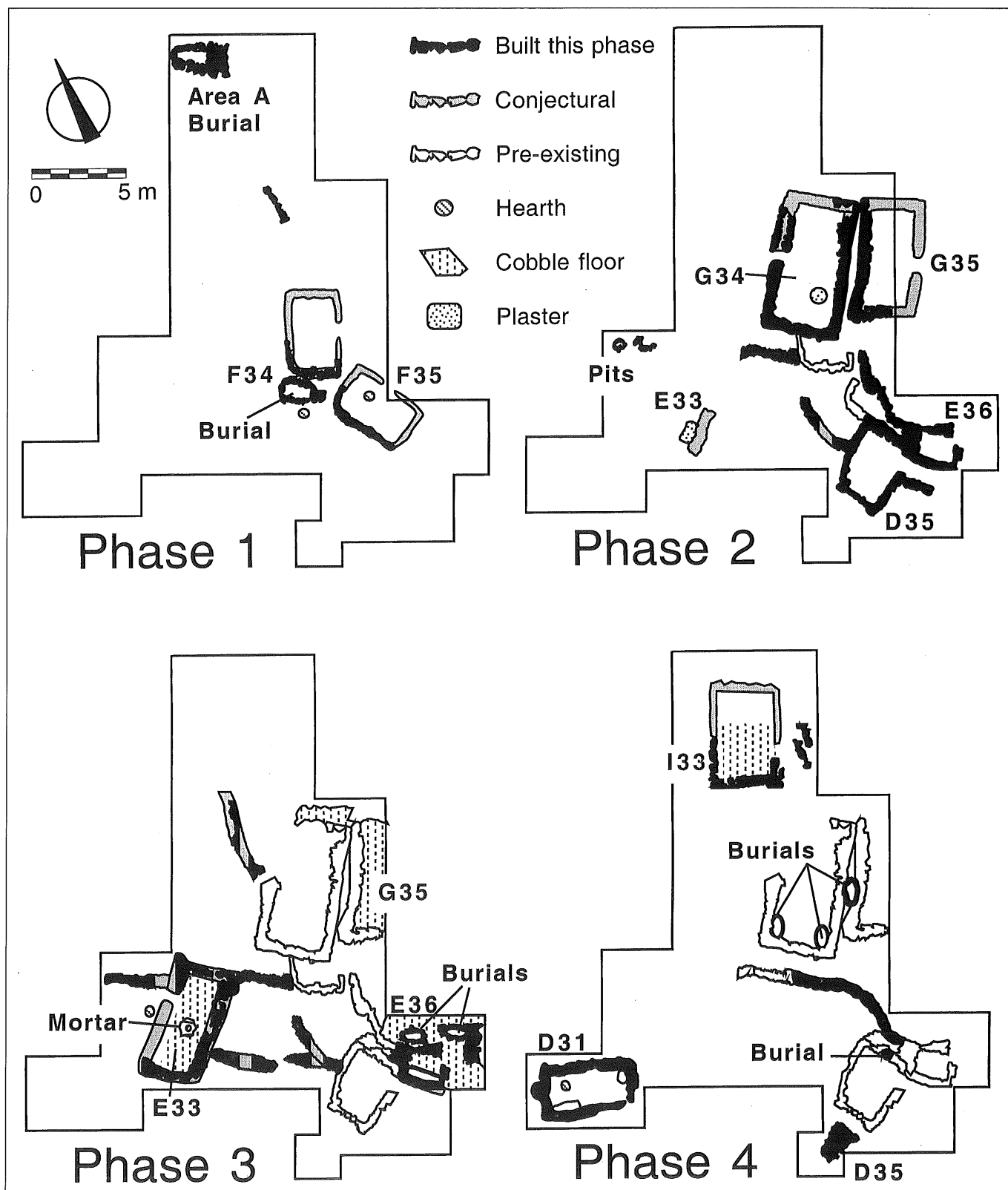
Our data and that from other Neolithic sites suggests the following possible scenario to account for differences in Late Neolithic settlement and economy different from those of the preceding Late PPNB.

Although PPNB sites vary a great deal in size and

SETTLEMENT AND ECONOMY IN WĀDĪ ZIQLĀB DURING THE LATE NEOLITHIC



1. Location Neolithic settlements in Wādī Ziqlāb and the northern Jordan Valley.



2. Four phases of construction at site WZ 200, Ṭabaqat al-Būma.

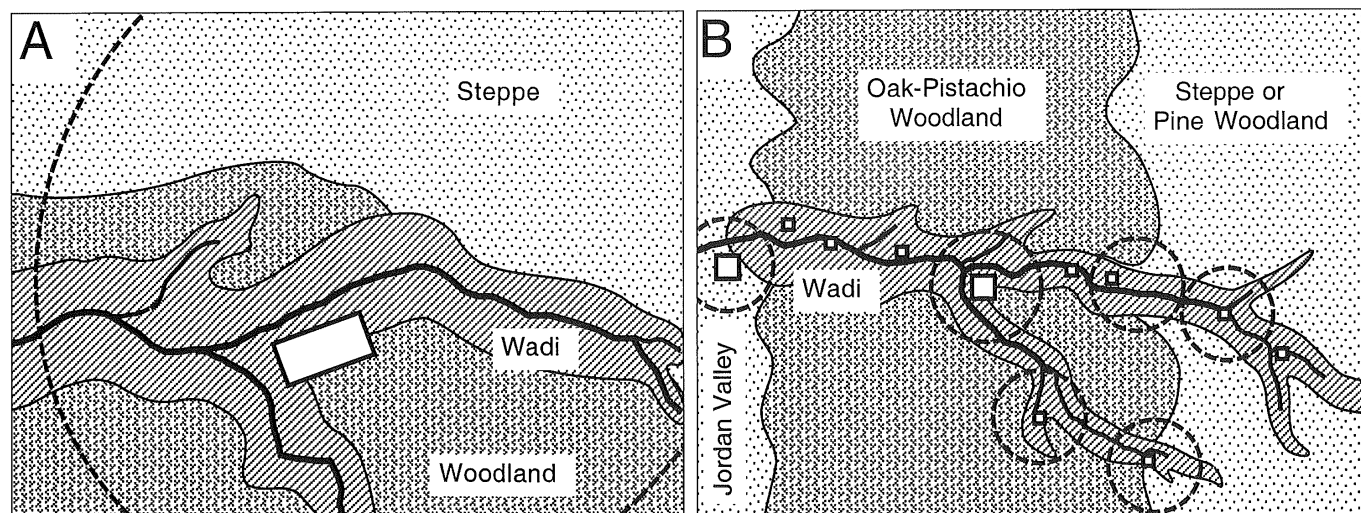
character, they may still be characterized as agglomerated settlements. They range in size from small villages to what some authors describe as “mega-villages” more than 10 ha in size, but even relatively small sites, such as Bayḍa, are rather densely built up with clusters of structures. This does not mean that there were no open spaces in PPNB settlements, but only that population densities were fairly high, households were adjacent to and probably shared many outdoor spaces with neighbouring households, and all settlements were made up of many families that were not necessarily close kin.

In addition, these agglomerations of settlement tend to be located on the lower slopes of hills, near major springs, often at stream confluences and near the ecotones between Mediterranean woodland and more steppic territories (FIG. 3a). This placed their inhabitants where they would have reasonably convenient access to timber and woodland game, such as deer, in one direction, steppe resources, including gazelle and onager, in another, and streamside resources, such as abundant water, poplar or tamarisk poles, reeds, and perhaps fish or wild boar, nearby. However, good agricultural land within close proximity to the settlement may have been rather limited. During Late PPNB, as agriculture and herding became quite important, villagers would have had to travel increasing distances to fields and pastures, as local population density probably exceeded the potential of the most conveniently located agricultural fields and pastures.

By contrast, Late Neolithic settlement in Jordan may have been much less aggregated. The interim evidence from Wādī Ziqlāb suggests the possibility that the aggregated settlement system was replaced some time in the

eighth millennium bp by a more dispersed settlement system that may have been linear or dendritic in organization (FIG. 3b). The stream systems of wadi drainages may have provided the organizing principle for sets of generally smaller settlements, with farmsteads and small hamlets strung along the stream channels associated with villages that served as central places, even though they were usually much smaller than even average-sized PPNB villages. The inhabitants of many such small settlements in one wadi system may have thought of themselves as a single community, perhaps focussing its identity and ideology on a single village in the system where integrative rituals and other social activities perhaps took place. It is noteworthy, for example, that Late Neolithic village sites have yielded many distinctive human figurines, which may have been involved in these ceremonies or festivals, while farmsteads such as Ṭabaqat al-Būma apparently had no figurines at all.

A more dispersed, dendritic settlement system would have quite a number of advantages for an early mixed-farming society. Because settlement would be more evenly distributed on the landscape, there would be less competition for agricultural land, shorter distances to fields, and less conflict between agricultural and pastoral land use. Competition between agricultural and pastoral land use, furthermore, could be resolved by spacing and scheduling much more easily than when settlement was agglomerated. The fact that the wadis usually cross-cut micro-environments ranging from cooler highlands with mean annual rainfall around 500 mm to hot, drier alluvial fans in the Jordan Valley means that the extended community would be able to exploit directly a larger number



3. Idealized models of settlement location and catchment areas (broken circles) for (a) an aggregated Pre-Pottery Neolithic B village (white rectangle) near the ecotone between Mediterranean and Steppe territories, on a lower slope, and near a spring, and (b) for a “dendritic” Late Neolithic settlement system, with several small farmsteads and hamlets (white squares) dispersed along the banks of streams and associated with one or two small villages. Maps are not to scale, and real catchment areas would not be circular.

of resources than an agglomerated community of similar size. It would spread agricultural risk with different crops at different altitudes, and permit labour-sharing as harvests occurred earlier at lower elevations and later in the highlands. The wadis themselves provided easy communication between different parts of the settlement system, thus enabling sharing of labour and resources through intra-community exchange. Such a settlement system need not involve a hierarchy in the sense of any community controlling other communities — it could even have much the same social system as earlier prevailed in Late PPNB but spread out along wadis instead of concentrated in villages — except that one or two places would have been the focus for community activities, such as festivals and perhaps some kinds of exchange.

New Horizons

If the two models I have just presented bear any resemblance to reality, the question remains why such a change from an agglomerated to a dendritic settlement system should have occurred when and where it did. As it happens, the Neolithic was a time of many quite striking changes, and it is not difficult to see how some of these could have been interrelated with the changes in settlement.

Arguably the most important change was that, by the end of Late PPNB, agriculture and herding had almost completely displaced hunting and gathering as the subsistence base of the community. Faunal diversity, for example, decreased at the same time that dependence on domesticated animals increased markedly (e.g., Köhler-Rollefson *et al.* 1988). Risk of crop failure or poor health of herds may now have been a much greater concern than failure of a hunt. Presumably this meant that allocation of labour and other requirements of agriculture and herding began to take precedence over the requirements of hunting. For example, access to good gazelle-hunting territory would now be much less important than access to good farmland or pasture for goats. As we have seen, the latter was probably in short supply in the immediate vicinity of large PPNB settlements. A Late Neolithic farmstead such as Ṭabaqat al-Būma, by contrast, would have quite adequate pasture for about 200 goats on the hillsides around it, along with small fields on the stream terraces nearby adequate to produce wheat and legumes for one or two families. Spreading herds out like this not only eased pressure on pasture, but would have decreased the risk of disease transmission among the animals.

The new pre-eminence of food production in the subsistence economy, furthermore, would have a number of interesting implications. We might expect changes in the technology and organization of food storage, and indeed stone-lined pits begin to be common in the Late Neolithic (increasing further in the Chalcolithic). It is likely that

there were changes in the technology of food preparation, including suddenly the widespread use of cooking pots and perhaps the invention of some new foods and beverages. The latter could have included yoghurt, cheese and beer, although we await good evidence of these introductions.

While the new settlement-economic system had many advantages, it also entailed new risks (Banning and Siggers 1998). Early farmers now so dependent on their crops and herds would have had to worry about crop failure, about pests ruining their stored crops, and about disease transmission among their herds. And a more dispersed settlement system might entail the risk that kin-based or other kinds of alliances might be more difficult to maintain at the same time that the other risks made such alliances as important as ever.

Some of the important changes that occurred in the Late Neolithic may have helped to curtail such risks. The suddenly widespread use of pottery, for example, may be seen in this light. Perhaps the most obvious explanation for pottery's rapid adoption would be to provide secure storage for grain, yet most of the pottery we find in Late Neolithic sites is not very suitable for this purpose. Rather than many large jars, we find mainly small jars and large numbers of bowls, almost all of which seem more likely to be involved in the preparation and serving of food. Given that we would expect a single large storage pithos to break into many more sherds than would several small jars and bowls, it is unlikely that this dearth of large jars is illusory, even if storage jars had a longer use-life. Some of the small forms that were probably serving dishes are also decorated. One possible explanation for this constellation of pottery is that networks of hospitality along the dendritic settlement system were important for maintaining social allegiances and spreading economic risks now that close kin and other allies could no longer be found literally next door. Cooking and serving food to visitors and field hands from homesteads farther upstream or downstream would reinforce social ties, impose future obligations, and allow accumulation of prestige.

Under this admittedly conjectural scenario, we could perhaps even find the origins of Jordanian hospitality in the turbulent changes that accompanied the end of Jordan's PPNB "mega-sites."

Acknowledgements

Neolithic research in Wādī Ziqlāb Project has been funded by the Social Sciences and Humanities Research Council of Canada and the University of Toronto. I would like to thank the Department of Antiquities of Jordan, then its director, Dr Ghazi Bisheh, and Hikmat Ta'ani, our representative at site WZ 200, and all our project members and volunteers, for helping make the project a success. Illustrations are by the author except FIG. 2, which is a

composite of drawings by the author, Mark Blackham, Mark Campbell and Morag Kersel.

Bibliography

- Banning, E. B. 1995 Herders or Homesteaders? A Neolithic Farm in Wādī Ziqlāb, Jordan. *Biblical Archaeologist* 58(1): 2-13.
- 1996 Highlands and lowlands: Problems and survey frameworks for rural archaeology in the Near East. *BA-SOR* 301: 25-45.
- Banning, E. B., Dods, R. R. Field, J. Kuijt, I. McCorriston, J. Siggers, J. H. Ta'ani, and Triggs, J. 1992 Ṭabaqat al-Būma: 1990 excavations at a Kebaran and Late Neolithic site in Wādī Ziqlāb. *ADAJ* 36: 43-69.
- Banning, E. B., Dods, R. R. Field, J. Maltby, S. McCorriston, J. Monckton, S. Rubenstein, R. and Sheppard, P. 1989 Wādī Ziqlāb Project 1987: a preliminary report. *ADAJ* 33: 43-58.
- Banning, E. B., Rahimi, D. and Siggers, J. 1994 The Late Neolithic of the southern Levant: Hiatus, settlement shift or observer bias? The perspective from Wādī Ziqlāb. *Paléorient* 20(2): 151-64.
- Banning, E. B., Rahimi, D. Siggers, J. and Ta'ani, H. 1996 The 1992 season of excavations in Wādī Ziqlāb, Jordan. *ADAJ* 40: 29-49.
- Banning, E. B., and Siggers, J. 1998 Technological strategies at a Late Neolithic farmstead in Wādī Ziqlāb, Jordan. Pp. 319-31 in H. G. Gebel, Z. Kafafi and G. O. Rollefson (eds), *Prehistory of Jordan II*. Berlin: Ex Oriente.
- Blackham, M. 1994 *Chronological Correlations of Archaeological Stratigraphy: An Intrasite Test at Ṭabaqat al-Buma, Jordan*. Unpublished M.Sc. diss. University of Toronto.
- 1998 Changing settlement at *Ṭabaqat al-Buma*, in Wādī Ziqlāb: A stratigraphic analysis. Pp. 345-60 in H.-G. Gebel, Z. Kafafi and G. Rollefson (eds), *Prehistory of Jordan II*. Berlin: Ex Oriente.
- Field, J. and Banning, E. B. 1998 Hillslope processes and archaeology in Wādī Ziqlāb, Jordan. *Geoarchaeology* 13(6): 595-616.
- Kenyon, K. M. 1957 *Digging up Jericho*. New York: Frederick A. Praeger.
- Köhler-Rollefson, I. 1992 A model for the development of nomadic pastoralism on the Transjordanian Plateau. Pp. 11-18 in O. Bar-Yosef and A. Khazanov (eds), *Pastoralism in the Levant, Archaeological Materials in Anthropological Perspectives*. Monographs in World Archaeology No. 10 Madison: Prehistory Press.
- Köhler-Rollefson, I., Gillespie, W. and Metzger, M. 1988 The fauna from Neolithic 'Ayn Ghazāl. Pp. 423-30 in A. Garrard and H. G. Gebel (ed.), *The Prehistory of Jordan*. BAR International Series 396 (ii) Oxford: British Archaeological Reports.
- Perrot, J. 1968 *La Préhistoire Palestinienne*. Supplément au Dictionnaire de la Bible VIII. Supplément au Dictionnaire de la Bible VIII VIII, columns 286-446. Paris.
- Rollefson, G. O., and Köhler-Rollefson, I. 1989 The collapse of early Neolithic settlements in the southern Levant. Pp. 73-89 in I. Hershkovitz (ed.), *People and Culture in Change*. BAR International Series 508 (i). Oxford: British Archaeological Reports.
- Rollefson, G. O. and Simmons, A. H. 1987 The life and death of 'Ayn Ghazāl. *Archaeology* 40: 38-45.
- Shafiq, R. N. 1996 *Investigation of a Late Neolithic Agriculturist Settlement in Northern Jordan*. Unpublished M.Sc. diss. University of Bradford.
- Shafiq, R. N., Schultz, M. and Banning, E. B. n.d. Diagnosis of an early treponematoses in a Late Neolithic burial from Wādī Ziqlāb, Jordan. Unpublished.
- Simmons, A., Köhler-Rollefson, I. Rollefson, G. O. Mandel, R. and Kafafi, Z. 1988 'Ayn Ghazāl: a major Neolithic settlement in central Jordan. *Science* 240: 35-39.
- de Vaux, R. 1966 *Palestine during the Neolithic and Chalcolithic periods*. Cambridge Ancient History. Cambridge Ancient History fascicle 47. Cambridge: Cambridge University Press.