Highlighting the PPNB in the Southern Levant

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Introduction

The Pre-Pottery Neolithic B (PPNB) represents the 'hard core' of what has been conceived as the Neolithic transformation of Near Eastern human societies, *i.e.* the shift in the Mediterranean zone from primarily mobile foragers to largely sedentary village communities subsisting mostly by small-scale horticulture and herding. Accordingly, during the course of its almost two millennia span (Table 1 and Fig. 1A), the PPNB epitomizes:

The culmination of the lengthy (10,000+ yrs) shift to productive economies, *i.e.* the transition to habitual plant cultivation and animal husbandry.

- A pan-Levantine koiné, whereby the whole of the Levant, under different environmental conditions, shares distinctive material culture and technological traits, *e.g.* the bidirectional ('naviform') chipped stone technology and large-scale plaster production, amongst others.
- The emergence of large-scale villages ('mega-sites').
- The shift from circular to quadrilateral architecture (Fig. 2).
- Distinct ritual and symbolic systems, some pan-Levantine, others more regionally or temporally focused (Figs. 3-4)

Entity	calBCE
PPNA (Khiamien)	~9.750-9.500
PPNA (Sultanian)	9.500-8.500
Early PPNB	8.500-8.150
Middle PPNB	8.150-7.500
Late PPNB	7.500-7.000
Final PPNB (incl. Tuwailan	7.000-6.400
Late Neolithic 1 (Yarmukian)	~6.400-5.750
Late Neolithic 2 (Jericho IX/ Lodian)	~5.800-5.500

Table 1 Chronological framework for the PPNB in the Southern Levant.

These characteristics are most obviously observed in the Middle/ Late PPNB, which represents the 'classic' stage of the 'Neolithic [agricultural] revolution' as envisioned by research in its early stages. Moreover, at the time, and in the absence of absolute dates, it was assumed that the duration of the Neolithic transformation was rather brief, happening quite rapidly, thus justifying the use of the term 'Revolution'. Since then research has progressed exponentially, and today, we are more than aware that developments evolved over a prolonged period, so that the Neolithic transformation may be envisioned as a rather long and not necessarily linear '(r)evolutionary' process (see Bar-Yosef 2017; Ibáñez *et al.* 2018; and references therein). It has become apparent that within the PPNB koiné, *i.e.* southwestern Asia (the Fertile Crescent/ Near East), where such developments took place, they did not occur simultaneously throughout the area. Some processes took place in isolation within a specific region, but also sometimes in parallel and, other times, in tandem in different regions. Indeed, recent genetic evidence demonstrates the presence of three distinctive groups of 'initial farmers' within this very same area (Lazaridis *et al.* 2014, 2016).

Examining the archaeological record provides ample evidence for significant regional variability with regards the appearance and character of the Neolithic as a whole and, more specifically, of the PPNB. Obviously, changes occurred at different paces for different variables, without being part of a larger 'plan'. Accordingly, we believe that, if one has to use a catch phrase to describe Neolithisation processes it should be "non-directed, mosaic developments". In the following essay we attempt to illustrate selected aspects of some such processes as reflected in the material culture record of the Levant.

The PPNB in the Levant

During the initial stages of research the general chronological and geographical framework for the Early Neolithic in the Levant was, in the absence of evidence from more northerly parts, primarily based on data from the south (*e.g.* de Vaux 1966; Perrot 1968; Cauvin 1972; Mellaart 1975). It was only through subsequent studies, from the 1970's onward, following research along the Euphrates and Tigris rivers, that temporal/ cultural differences between the southern and northern Levant became apparent (*e.g.* Bar-Yosef 1981, 1991; Cauvin 1989). Hence, it was believed that, while the southern Levant was the centre for Epipalaeolithic developments, a geographic shift occurred with the onset of the Neolithic when the focus of innovation moved northwards. Thus, it was assumed that during the PPN all innovations derived from the northern Levant, to disperse southwards, westwards and eastwards (*e.g.* Cauvin 1994; and references therein). The most obvious reason for such an assumption was the purported absence of Early PPNB occurrences in the southern Levant and the supposedly later ^{14}C dates for the local PPNA (Kuijt 2003; Edwards *et al.* 2004).

However, more recently it has transpired that this division is not that simple, once again illustrating the complexity of the processes taking place throughout

the area (*e.g.* Gebel 2004; Belfer-Cohen and Goring-Morris 2014; Goring-Morris and Belfer-Cohen 2016). It appears that an Early PPNB phase is present in the southern Levant, as reflected by recent research at various sites in southern Syria, Israel and Transjordan (Fig. 1A), *e.g.* Aswad, Tell Qarassa, Ahihud, Kfar HaHoresh, Nesher Ramla, Motza, Wadi Mushash 163, Harrat Juhayra 202, amongst others (Yizhaq *et al.* 2005; Khalaily *et al.* 2007; Ibáñez *et al.* 2010, 2014; Stordeur *et al.* 2010; Tuross and Goring-Morris 2011; Caracuta *et al.* 2015; Lelek Tvetmarken and Bartl 2015; Toffolo *et al.* 2017; Borrell *et al.* 2019; Fujii *et al.* 2019; Rokitta-Krumnow 2019). It is a relatively brief phase (c. 350/ 400 years, see Table 1), thus 'bridging' the end of the PPNA and the emergence of the 'classic', fully-fledged Middle/ Late/ Final PPNB villages, *e.g.*`Ain Ghazal, Jericho and Yiftahel (Kenyon 1981; Kenyon and Holland 1983; Garfinkel *et al.* 2012; Rollefson and Kafafi 2013). Still, some researchers continue to adhere to the notion that the PPNB originated in the northern Levant (Edwards 2016); and there remains an ongoing debate as to where plant domestication first appeared, and whether it represents monocentric as opposed to polycentric phenomena (*e.g.* Abbo *et al.* 2012; Abbo and Gopher 2017; contra Asouti 2013; Willcox 2013; and see discussion in Bar-Yosef 2017).

Aspects of Continuity

While one needs to take into consideration the differences within the southern Levant between the west and the east, the south and the north, as well as between 'the sown' and 'the desert', various strands of evidence do indicate that some of the quintessential PPNB features originated in and continued from the local Epipalaeolithic (*i.e.* the Natufian) and PPNA. These are incorporated and reflected within various realms of existence, both mundane and ceremonial/ ritual.

Subsistence

As noted above, the PPNB, especially in its later stages, portrays a fully-fledged agricultural existence. Nonetheless, recent research, especially from Cyprus, illustrates the complexity of subsistence shifts from 'wild' and 'feral', to 'tamed', 'cultivated' and fully 'domesticated' for both plants and animals; shifts that can be described as part of the "bumpy ride to village life" (Belfer-Cohen and Bar-Yosef 2000; Vigne *et al.* 2009, 2011, 2012, 2015; Zeder 2011; and see also Keeley 1995). Indeed, experimentation with cultivating locally available plant resources in the Levant dates back to at least the Early Epipalaeolithic at Ohalo II (Snir *et al.* 2015), some ten millennia prior to its widespread adoption during the PPNB[1]. Furthermore, during the PPNA, cultivation included certain species that were domesticated only much later, for example oats – *Avena sterilis* – at Gilgal I (Weiss *et al.* 2006)[2]. Particularly illustrative is the recent evidence of local resource exploitation, namely the faba bean (*Vicia faba*) in the Carmel/ Galilee region during the Natufian and its subsequent domestication during the Early PPNB; it is of interest that, to date, no wild representatives of this or closely related species have been found (and see Caracuta *et al.* 2015, 2016).

The economic drive for domestication of faunal resources appears to have been primarily a northern phenomenon, although the local domestication of the dog (*Canis familiaris*) during the Natufian was most probably triggered by a combination of a hunting aid/ commensal/ symbiotic/ social causes associated with increasing sedentism, rather than by alimentary needs (Davis and Valla 1978; Tchernov and Valla 1997).

Architecture (Figs. 2-3)

Though it is during the PPNB that we observe a general shift to the use of quadrilinear structures, first noted in the Early PPNB, *e.g.* Motza (Khalaily *et al.* 2007), the building materials continued to be the same as those used locally during the PPNA, such as fieldstones, mudbrick, wattle and daub, etc. (Fig. 2).

Coevally, there is an intensification in the use of lime-plaster, a particularity of the southern Levantine Mediterranean zone[3]. First produced in small quantities by at least the Middle Epipalaeolithic in the southern Levant as an adhesive for hafting chipped stone microliths (Bar-Yosef and Goring-Morris 1977; Kingery *et al.* 1988), plaster was already being used in (usually ritual?) architectural contexts during the Natufian (and see Perrot 1966; Garfinkel 1988; Rollefson 1990; Malinowski and Garfinkel 1991; Goring-Morris *et al.* 1999; Goren and Goring-Morris 2008; Friesem *et al.* 2019). Asphalt (bitumen) from the Dead Sea was also employed as both an adhesive for flint tools, as well as for lining baskets as documented during the PPNA (*e.g.* Nadel 1997; Schick 1997, 2010; Wicks 2007; Dag *et al.* 2010).

There are also other architectural traditions that continue, such as the use of slab-lined floors for special structures, *e.g.* Beidha (Kirkbride 1967), a phenomenon first observed in the Natufian (Henry 1976; Belfer-Cohen 1988a; Goring-Morris and Belfer-Cohen 2003, 2010a, 2013a).

Ideology/ Ritual Lexicon and Practice

Skull removal, first observed during the Natufian, continued throughout the PPNA, unto the PPNB (and even later) when, in addition to the removal of the skull, in certain cases it was also modified and plastered in a variety of ways – a phenomenon known only from the southern Levant with but rare exceptions (*e.g.* Belfer-Cohen 1988b; Bonogofsky 2006; Kuijt 2008; Testart 2008; Goring-Morris and Belfer-Cohen 2014a).

So, too, it appears that what was considered by Cauvin (2000) as a 'northern' phenomenon characteristic of the PPNB, namely the 'cult of the

Fig. 1A Early PPNB site distributions in the Southern Levant. (Map: authors)

Fig. 1B Middle PPNB site distributions in the Southern Levant. (Map: authors)

Fig. 1C Late PPNB site distributions in the Southern Levant. (Map: authors)

Fig. 1D Final PPNB (PPNC) site distributions in the Southern Levant. (Map: authors)

bull', seemingly has its roots in earlier practices in the southern Levant. Indeed, a focus on *Bos primigenius* in ritual feasting contexts was documented already in the Late Natufian at Hilazon Tachtit Cave, while a PPNA burial of a female with a bucrania was recovered in Hatoula (Munro and Grosman 2010; Goring-Morris and Belfer-Cohen 2011, 2013b).

Another example relates to the use of stelae/ monoliths from the Natufian onwards (Kirkbride 1967; Henry 1976; Galili and Rosen 2011; Edwards 2013; Goring-Morris and Belfer-Cohen 2013a).

Long-Distance Connections

The PPNB is clearly the period with the most prolific evidence regarding long-distance interactions throughout the wider region of the Near East/ Fertile Crescent – the material culture basis for the term the 'PPNB koiné' (Bar-Yosef and Belfer-Cohen 1989). By the PPNB the range of desirable items exchanged ('exotics') increased markedly, yet many made their initial appearance during the course of the Natufian. These include obsidian, a wide range of (often colourful, including green/ blue-hued) minerals, as well as marine and freshwater molluscs, not to mention basalt as raw material (Weinstein-Evron *et al.* 2001; Bar-Yosef Mayer 2005; Delerue 2007; Bar-Yosef Mayer and Porat 2008; Bar-Yosef Mayer and Zohar 2010; Khalaily and Valla 2013; Alarashi 2014; Delage 2018).

Obsidian first appeared in the southern Levant in some numbers at the end of the Natufian (Khalaily and Valla 2013), and just as all through the Early Neolithic PPNA-PPNB sequence, it derived almost exclusively from Cappadocia (Delerue 2007). So, too, during the Late Epipalaeolithic molluscs from the Mediterranean, the Red Sea and even the Indian Ocean as well as Nilotic and other freshwater sources are documented (Bar-Yosef Mayer 2005, 2017). With regards at least the obsidian, the relative quantities recovered indicate that distribution mechanisms included the use of regional exchange nodes already during the Natufian, *i.e.* Eynan, and PPNA, *i.e.* Jericho (Ibáñez *et al.* 2015; Goring-Morris and Belfer-Cohen in press).

Crafts (Fig. 5)

It is difficult to identify clear-cut evidence for craft specialization during the Epipalaeolithic and PPNA, with the possible exception of limestone and basalt groundstone tools (Belfer-Cohen 1988b; Wright 1991; Weinstein-Evron *et al.* 2001; Belfer-Cohen and Hovers 2005; Rosenberg 2008).

The markers of Neolithic lithic assemblages – bifaces and arrowheads – first appear during the Late Epipalaeolithic Natufian and Harifian (Garrod 1957; Goring-Morris 1991). Axes and adzes with distinctive tranchet working ends only appeared during the PPNA, continuing into the Early/ Middle PPNB, to then be replaced by more sturdy polished working ends (Barkai 2005). Sickle blades/ reaping knives first appear sporadically during the earlier Epipalaeolithic (Groman-Yaroslavski *et al.* 2016), but only become habitual during the Natufian, their relative frequencies increasing thereafter through the PPNB and later (Belfer-Cohen 1994; Yaroshevich *et al.* 2013a, b; Brailovsky-Rokser 2015; Brailovsky-Rokser and Goring-Morris 2019). Dating the timing for the invention of the bow and arrow is contentious[4]; but the symmetric aerodynamic arrowhead certainly appears during the Harifian (coeval with the Final Natufian) to become a distinctive feature of the PPN, each phase being characterized by a particular type (Gopher 1994). Amongst the groundstone tool repertoire, querns (involving grinding) replaced the previous emphasis on mortars (pounding with a pestle)(Wright 1991; Belfer-Cohen and Hovers 2005).

The earliest preserved evidence for basketry and weaving derives from sites in the lower Jordan Valley dating to the end of the Natufian and the PPNA, *i.e.* Wadi Murabba'at, Gilgal, Jericho and Netiv Hagdud (Kenyon and Holland 1983; Schick *et al.* 1995; Schick 2010). However, it is likely to date much earlier, certainly by the Early Epipalaeolithic, if not the Upper Palaeolithic, given the presence of twisted fibre fragments at Ohalo II (Nadel *et al.* 1994).

Uniquely PPNB Phenomena

Clearly, a defining characteristic of the MPPNB/ LPPNB in the southern Levant was a population explosion as illustrated by the founding of many new settlements and, in particular, the emergence of the 'mega-site' settlement phenomenon.

H.G.K. Gebel (2004) postulated in his working hypothesis of "the Jericho and mega-site phenomenon" that areas west of the Rift valley were depopulated and vacated with the onset of the 'classic' Middle PPNB (Table 1) and that communities shifted eastward to found new settlements in the Mediterranean zone east of the Rift valley, especially along what was later termed the 'Kings Highway'. These settlements rapidly expanded to become mega-site communities by the Late PPNB and Final PPNB (PPNC). Indeed, 'population pressure' and 'stressed habitats' in Cisjordan initially appeared to be logical and parsimonious explanations of the observed developments. However, more recent research has documented numerous sites also west of the Rift valley, and little evidence for 'degraded habitats' (Sapir-Hen *et al.* 2016). Actually, quite a number of Middle PPNB settlements were recorded in and west of the Rift valley[5], though the numbers of sites do drop significantly in the region during the Late PPNB (Birkenfeld 2018; and pers. obs.). Also one should note that most villages west of the Rift valley were more modest in size and scope relative to the 'mega-site' phenomenon oriented north-south in and east of the Rift, though there is currently evidence from the new excavations at Motza near Jerusalem that it should be interpreted as a mega-site (Reshef *et al.* 2019; Khalaily and Vardi, pers. comms.).

This profound change in the size and density of settlements would have had major ramifications in terms of social, economic and ritual practices, whether at the level of inter-personal, community and inter-community relationships (a topic that merits a separate and detailed discussion; and see below).

Additionally, a clear dichotomy between the 'sown' and the 'desert' areas is observed, mostly due to the growing divergence in the respective subsistence systems, with fully fledged agricultural villages vs mobile hunter-gatherers, later replaced by nomadic herders. This dichotomy is archaeologically mostly observable through the differences in architectural features and lithic assemblages, as preservation of plants and faunal remains often leaves much to be desired. Following a virtual hiatus at the end of the Late Epipalaeolithic Harifian, the Negev and Sinai deserts appear to have been slowly re-populated only at the beginning of the PPNB. Subsequently, there is evidence for complex interactions between the sedentary farming communities in the Mediterranean zone, newly emergent early pastoralist groups in the eastern steppes, and mobile foragers in the Negev and Sinai.

The interactions between the different regions likely comprised extensive exchange networks, whether of marine molluscs from the Red Sea, desirable minerals from sources in the south and east, and/ or even meat, *e.g.* Nahal Issaron,`Ain Abu Nukheila, and sites in southern Sinai (Bar-Yosef and Belfer-Cohen 1989; Bar-Yosef Mayer 2005; Bar-Yosef Mayer and Porat 2008; Bar-Yosef Mayer and Zohar 2010; Henry and Beaver 2014).

Subsistence

It is during the Middle/ Late PPNB that one can finally identify an agricultural 'package', *i.e.* domesticated species of cereals and legumes – some introduced from the north, *i.e.* wheat and barley (*e.g.* Colledge 2004; Zohary *et al.* 2012; Asouti and Fuller 2013; Abbo and Gopher 2017), others, *e.g.* faba beans, likely of local origin (Caracuta *et al.* 2015, 2016)[6]. These fully-fledged horticultural communities lived in small to mega-sized villages with foraging and hunting continuing to play a significant role (Kuijt and Goring-Morris 2002). Previous estimates of community sizes appear to have been significantly exaggerated, as indicated by more recent studies, though nevertheless they represent a quantum increase in comparison to the scale of Natufian and PPNA communities (*e.g.* Campbell 2010; Goring-Morris and Belfer-Cohen 2014b; Birch-Chapman *et al.* 2017). This would have necessitated innovations and realignments in the realms of social relations within and between communities.

As for faunal resources, by the Middle PPNB the previous focus on hunting gazelle and deer was mostly replaced by the introduction of goat, sheep, pig, and cattle herding; however, the degree that they were all introduced from the north remains open to debate (Horwitz *et al.* 1999; Martin and Edwards 2013). Nevertheless, hunting still continued to play an important role, often related to ritual-communal events (Twiss 2008; Martin and Edwards 2013; Meier *et al.* 2016, 2017; and references therein; Munro *et al.* 2018).

Undoubtedly such simple husbandry dictated labor-intensive and arduous lifeways. Furthermore, the impact of such changes concerned not only the diet but also the well-being and health of communities (*e.g.* Horwitz and Smith 2000; Goring-Morris and Belfer-Cohen 2010b). The ecological impacts of such increases in settlement size and intensification would have begun to be significant (*e.g.* Rollefson and Köhler-Rollefson 1989). All-in-all, this major transformation from extractive to productive economies led to new social behaviours (*e.g.* privatization, and see below) and profound changes in the social fabric of communities.

Architecture (Fig. 2)

The shift in the Mediterranean zone from the oval/ circular architectural templates of the Epipalaeolithic and the PPNA to quadrilateral concepts occurred during the course of the Early PPNB, accompanied by a peak in the use of lime-plaster. A wide range of architectural plans for domestic structures during the Middle, Late and Final PPNB, seemingly irrespective of specific phase, includes: simple enclosed rectangular houses, sometimes with partitions, *e.g.*`Ain Ghazal, Jericho and Munhatta; and sometimes raised with a grid plan, *e.g.* Abu Sawwan; courtyard structures, *e.g.* Basta and es-Sifiya; two-storey pier-houses, *e.g.* `Ain Ghazal and Beidha; and more agglutinate arrangements, *e.g.* Ba`ja. Houses sometimes include private storage facilities and workshops, *e.g.* Beidha (Banning and Byrd 1987; Byrd 1994, 2005; al-Nahar 2010; Finlayson and Makarewicz 2018; Gebel and Kinzel 2007; Goring-Morris and Belfer-Cohen 2013a; Kinzel 2019; Kinzel *et al.* 2011: and references therein). By contrast, in the semi-arid marginal zone west of the Rift valley, circular plans and 'beehive' arrangements reflect the continued 'Epipalaeolithic' nature of mobile foraging adaptations there.

Communal structures include massive, long walls, *e.g.* Abu Gosh and Atlit Yam, the functions of which remain enigmatic, as well as the appearance of wells, *e.g.* Atlit Yam and Ainit Nissanit (Goring-Morris and Belfer-Cohen 2013a; Tepper 2014; and references therein). In and around the Jafr Basin in Transjordan, water barrages, check-dams and cisterns are documented at several sites, *e.g.* Wadi Abu Tulayha (Fujii 2010, 2013).

Ritual and Symbolism

The other obvious domain where one can observe growing differences between the 'sown' and the 'desert' during the PPNB is the 'spiritual', *i.e.* all that can be assigned to the spheres of 'ritual and symbolism'. The profound changes in lifeways demanded equally

Fig. 2 Residential architectural styles. A Basta; B Yiftahel; C Abu-Sawwan; D es-Sifiya; E Beisamoun; F Ba`ja; G Shaqaret Msaied; H Eshta`ol; I `Ain Ghazal; J Ghwair. (Illustrations: courtesies of the various projects, compiled by authors)

Fig. 3 PPNB ritual localities and features: A Beidha cult area; B`Ain Ghazal 'temple'; C`Ain Ghazal 'sweathouse'(?); D Kfar HaHoresh L1604 podium; E Atlit Yam stelae; F Jericho stele; G Nahal Hemar Cave. (Illustrations: courtesies of the various projects, compiled by authors)

deep modifications in social concepts and regulations, monitored through codes of behavior as sanctified by ritual. At the time, people were naturally unaware of their being in the throes of the most profound change that occurred in human existence. Yet, it seems that they continued modifying their social protocols, retaining fewer and fewer of those components tied with their ancestral past as mobile hunter-gatherers, semi-sedentary complex hunter-gatherers, or initial cultivators.

Separate public/ communal/ ritual architectural features are present in many sites, whether as separate, dedicated sites, *e.g.* Kfar HaHoresh (Goring-Morris *et al.* 2008), Nahal Hemar (Bar-Yosef and Alon 1988), Nesher-Ramla (Toffolo *et al.* 2017; Ullman in press), Nahal Yarmuth 38 (Gopher *et al.* 2019); or at the edges of settlements, *e.g.* `Ain Ghazal, Atlit Yam and Beidha (Byrd 1994; Rollefson 2000; Galili and Rosen 2011). They include public ritual structures (sometimes monumental), *e.g.* Beidha, `Ain Ghazal and Kfar HaHoresh, as well as smaller circular buildings, perhaps akin to 'sweat lodges', *e.g.* `Ain Ghazal (Rollefson 2000; Goring-Morris 2008). These are sometimes accompanied by stelae/ masseboth, *e.g.* Atlit Yam, Beidha and Kfar HaHoresh, and massive groundstone receptacles, *e.g.* Atlit Yam and Beidha (Galili 2004; Byrd 2005; Goring-Morris 2008; and references therein).

The presence and abundance of ritual paraphernalia reaches a zenith during the Middle/ Late PPNB, exhibiting evidence for regional variability. They include: plaster statues and modelled skulls, *e.g.* Ramad, `Ain Ghazal, Jericho, Kfar HaHoresh and Nahal Hemar (Bonogofsky 2006; and references therein); stone masks from the southern Judean hills (Hershman 2014); stone, clay and bone figurines, *e.g.* Nahal Hemar and Tell Qarassa (Ibáñez *et al.* 2014); and even special purpose chipped stone tools, *i.e.* Nahal Hemar knives, spokeshave denticulates at Kharaysin (Borrell *et al.* 2019); not to mention basketry and woven items, *i.e.* Nahal Hemar (Bar-Yosef and Alon 1988; Bar-Yosef and Schick 1989; Goring-Morris and Belfer-Cohen 2001).

While the PPNB burials reflect continuity of traditions, there are quite a number of features that are distinctly characteristic of the PPNB. Indeed, the proclivity for sub-floor and intramural interments, as well as designated cemetery areas within settlements and separate cemetery sites illustrate the former. Whereas such a role as a cemetery-cum-ritual locality has long been proposed for the Galilean site of Kfar HaHoresh, Nahal Yarmuth 38 has also recently been interpreted as another dedicated PPNB mortuary site (Gopher *et al.* 2019). Many burials were covered by plaster surfaces or chalky material (Simmons *et al.* 2007). Post-mortem skull removal (never ubiquitous), continued to be practiced on certain chosen individuals, irrespective of gender or age. Yet the occasional embellishment of skulls by plastering is a PPNB innovation, *e.g.* Aswad, Beisamoun, Kfar HaHoresh, Yiftahel, Jericho and `Ain Ghazal (Strouhal 1973; Rollefson 2000; Goren *et al.* 2001; Stordeur 2003; Fletcher 2016). Another unique treatment includes drilling a hole in the skull, perhaps for its suspension and display, as at Kfar Hahoresh (Simmons *et al.* 2007: 17), a practice more recently described also at Göbekli Tepe (Gresky *et al.* 2017: 17 and Fig. 13b). During the LPPNB (including FPPNB/ PPNC) multiple, secondary burials became more common, sometimes involving intentional re-arrangement of bones, and/ or accompanied by animal remains, *e.g.*`Ain Ghazal, Kfar HaHoresh and Motza (Reshef *et al.* 2019; Rollefson 2000; Simmons *et al.* 2007). Lately, at Ba`ja, evidence for ranking has been proposed based on accompanying grave goods of a FPPNB cist-burial (Benz *et al.* 2019).

Feasting, whether in funerary or other contexts, continued to play an important role in social cohesion, sometimes in clear funerary contexts (Horwitz and Goring-Morris 2004; Goring-Morris and Horwitz 2007; Twiss 2012; Meier *et al.* 2017).

Long-Distance Exchange

Long-distance exchange networks expanded in intensity and in the range of desirables to incorporate new items. Thus, besides exotic materials known already from the Natufian and PPNA (and see above), a wide range of minerals (*e.g.* obsidian, cinnabar, jet, serpentine) was added, deriving from the Taurus, Cappadocia, northern Syria and/ or Cyprus; while turquoise, malachite and amazonite originated in the Arava Region, Sinai and even from northwestern Saudi Arabia (Delerue 2007; Bar-Yosef Mayer and Porat 2008; Alarashi 2016). The origins of the high quality, colourful (purplish) flints, especially during the Early PPNB, remains obscure, though sources in northern Jordan remain likely. Further south abundant flint sources west of the Arava, at Har Geviim and Ramat Tamar (Schyle 2007; Gopher and Barkai 2011), were likely systematically exploited by mega-site communities in the Transjordanian Highlands.

Fig. 4 (following page) Ritual and symbolic PPNB paraphernalia. 1 dagger (Ba`ja); 2 bullroarer (Nahal Hemar); 3 Human figurine (`Ain Ghazal); 4-5 figurines (Nahal Hemar); 6 obsidian pendant (Kfar HaHoresh); 7 mask (Nahal Hemar); 8 composite bangle (Ba`ja); 9 'hat' (Nahal Hemar); 10 obsidian Helwan point (Motza); 11 composite figurine (Basta); 12 plaster statue (`Ain Ghazal); 13 plastered skull (Jericho); 14 Nahal Hemar knives (Nahal Hemar); 15 human statue (Hemmeh); 16 figurine (Ramad); 17 anthropomorphic figurine (Tel Qarassa); 18 human statue (Ramad); 19 asphalt coated cobble (Kfar HaHoresh); 20 phallus (Kfar HaHoresh); 21 figurine (Motza); 22 zoomorphic figurine with halter (Aswad); 23 tattooed human figurine (`Ain Ghazal); 24 bird figurine (Wadi Tulayah); 25 headless zoomorphic figurine (Kfar HaHoresh); 26 votive picrolite axe (Kfar HaHoresh); 27 stabbed zoomorphic figurine (`Ain Ghazal); 28 beads and pendants of bone, stone, wood, clay and plaster (Nahal Hemar). (Illustrations: courtesies of the various projects, compiled by authors)


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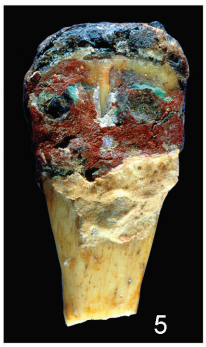
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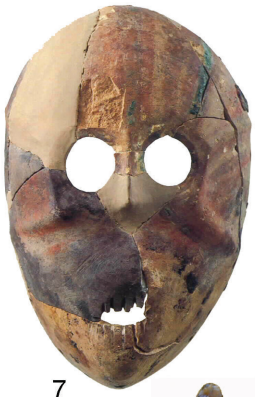
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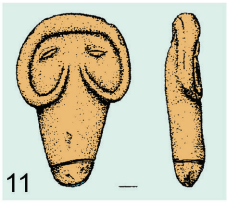
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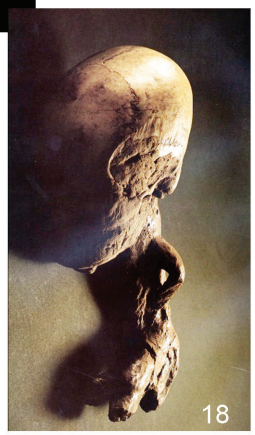
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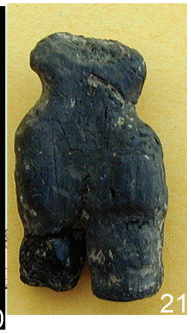
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Fig 5 Characteristic PPNB chipped stone tools. 1-2 Helwan points; 3-5 Jericho points; 6-8 Byblos points; 9 Amuq point; 10-15 denticulated sickle blades; 16-17 tranchet axes; 18 bifacial axe; 19 polished axe. (Illustrations: compiled by authors from various sources)

Crafts and Specialisation

With the emergence of the PPN there is clear evidence for craft specialization (*e.g.* Barzilai 2010; and see references above). This includes flint knapping, as well as basketry, weaving, plaster production, pottery, and basalt vessels, etc. (Kenyon and Holland 1983; Schick 1988; Goren and Goring-Morris 2008; Biton *et al.* 2014).

The appearance of the bidirectional naviform lithic technology during the Early PPNB in the southern Levant is one of the few unequivocal examples of an innovation definitely emanating towards the end of the PPNA from the northern Levant (Abbès 2003). It is notable that it employed distinctive raw materials,particularly exquisite in terms of the blanks so produced, *e.g.* Motza (Barzilai 2010), perhaps indicating that, at least initially, the distinctive technique and its products were disseminated by itinerant craft specialists, later to be 'imitated' by locals, during the Middle and Late PPNB, in areas adjacent to local sources, *e.g.* Yiftahel and Giv'at Rabi (East) (Barzilai 2013; Barzilai and Milevski 2015; and see Birkenfeld 2018). Here, it is of interest to note the choice of special raw materials (usually colourful and/ or translucent, including obsidian) especially for the hallmark type of the Early PPNB, the Helwan point (pers. obs.).

Concluding Remarks

While all of the above indicate aspects of both continuity and innovation, undoubtedly the domain most affected by Neolithization processes as observed during the PPNB was the social one; whether with regards the relationships within and between groups, as well as those of the individual versus the group (Benz *et al.* 2017 and references therein). While much of that was referred to in the previous paragraphs, one can add yet other aspects not mentioned before. For example, the shift to farming was accompanied by growing privatization, based around the nuclear and extended family, the clan, etc. This is reflected by the sizes and shapes of residential structures (Byrd 1994) and the disappearance during the PPNB of the communal storage facilities present during the PPNA (Kuijt and Finlayson 2009). Yet, the previous presence of communal plant processing bedrock facilities during the Natufian, *e.g.* Eynan, Hayonim, el Wad and Rosh Horesha, already shifts to domestic 'furniture' by the PPNA and PPNB, *e.g.* Netiv Hagdud and Hatoula (Belfer-Cohen and Hovers 2005; Rosenberg and Nadel 2017). With the shift to quadrilateral architectural concepts and more regulated approaches to farming at the beginning of the PPNB, we can speculate about the entrenchment of this trend towards property rights including house/ home, land and husbandry ownership, as well as access to resources.

The long-distance exchange in commodities and knowledge brought local communities in touch with individuals, far and wide, introducing them to a steady(?) stream of people arriving either with goods or with particular expertise. This might involve either single numbers or/ and perhaps small mobile groups peddling desirable goods and knowledge (from pyrotechnology to the naviform flint flaking) between communities, somewhat akin to the 'tinkers' of yesteryear (and see Belfer-Cohen and Hovers 2020). Archaeological data indicate that certain sites may have functioned as 'points of exchange' along central routes, heralding the future 'market places' of the Near East (Ibáñez *et al.* 2015; Goring-Morris and Belfer-Cohen in press; and references therein).

In conclusion, one can but state that space is short to enlarge upon each and every aspect raised in the present paper. Suffice it to illustrate this by mentioning relationships between the various PPNB communities. What dictated the nature of inter-group ties and how was that reflected (at least to a degree) in the archaeological record? Previously, the main factor monitoring such ties was the dictates of retaining a viable mating pool. Close and distant groups shared similar subsistence modes, and geographical proximity was crucial (even when mechanisms such as seasonal/ annual aggregation events were employed). Now, with the growing dichotomy between the 'sown' and the 'desert' – and with the emergence of new mega-sites, geographic proximity did not suffice. Similar subsistence modes and lifeways dictated as much of inter-group relationships, if not more, than simple geographic closeness. We believe that this aspect has not been emphasized sufficiently when describing those phenomena relating to a pan-Levantine PPNB koiné (*e.g.* Bar-Yosef and Belfer-Cohen 1989; Gopher 1994; Belfer-Cohen and Goring-Morris 2002; Schmidt 2005; Asouti 2006). This may explain many of the similarities observed between the southern and the northern regions of the Levant, with villagers sometimes having more in common with distant strangers rather than with nearby (in kilometres) 'ex-cousins'.

All-in-all, and taking into consideration the central place of the Levantine PPNB in the human transition from mobile hunting-gathering to sedentary village life, we still require further archaeological data in order to construct a solid foundation for innovative and original discourse on how this transformation came about.

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Endnotes

[1] With multiple radiometric dates c. 23,000 calBP (Nadel *et al.* 2001).

[2] Oats were domesticated only during the Bronze Age in Anatolia (Zohary *et al.* 2012).

[3] In contrast to an emphasis on gypsum plaster in the northern Levant (Kingery *et al.* 1988; Rehhoff *et al.* 1990;

Moorey 1994; LeBreton 2003).

[4] Upper Palaeolithic? (Bergman and Newcomer 1983; Bar-Yosef 1987; Valla 1987).

[5] *e.g.* Nahal Betzet (Gopher 1989), Tel 'Ali (Garfinkel 1994), Nahal Zippori 3 (Barzilai *et al.* 2013), Yiftahel (Garfinkel *et al.* 2012), Kfar HaHoresh (Goring-Morris 2008), Mishmar Ha'Emeq (Barzilai and Getsov 2008), Abu Gosh (Khalaily and Marder 2003), Motza Layer V (Khalaily *et al.* 2007), Nahal Yarmuth 38 (Gopher *et al.* 2019), Jericho (Kenyon and Holland 1983), Rabud (Gubenko *et al.* 2009).

[6] The domestication of flax (Linumsp.) is especially interesting as, in addition to its potential use as edible oil, it was also used for producing textiles (and see Kvavadze *et al.* 2009 concerning its use during the Upper Palaeolithic).

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