ARTICLES

The Natufian Culture in the Levant, Threshold to the Origins of Agriculture

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The aim of this paper is to provide the reader with an updated description of the archeological evidence for the origins of agriculture in the Near East. Specifically, I will address the question of why the emergence of farming communities in the Near East was an inevitable outcome of a series of social and economic circumstances that caused the Natufian culture to be considered the threshold for this major evolutionary change.[1–4] The importance of such an understanding has global implications. Currently, updated archeological information points to two other centers of early cultivation, central Mexico and the middle Yangtze River in China, that led to the emergence of complex civilizations.[4] However, the best-recorded sequence from foraging to farming is found in the Near East. Its presence warns against the approach of viewing all three evolutionary sequences as identical in terms of primary conditions, economic and social motivations and activities, and the resulting cultural, social, and ideological changes.

As with other crucial thresholds in cultural evolution, the impact of the "Neolithic Revolution," as it was labeled by V. G. Childe,[5] or the "incipient cultivation and domestication" as it was defined by R. Braidwood,[6] can only be evaluated on the basis of its outcome. I begin with a brief description of the cultural sequence of the late hunter-gatherers who inhabited the Near East until about 13,000 B.P.[7] These foragers, who had a variety of subsistence strategies and types of annual schedules, ranged from semi-sedentary groups to small mobile bands. The establishment of sedentary Natufian hamlets in the Levant (Fig. 1) marked a major organizational departure from the old ways of life. This was followed by a second major socio-economic threshold, characterized archeologically by Early Neolithic cultivators. This sequence of changes can only be understood within the context of the entire region and the shifting paleobotanical conditions of the Levant during this period.

I therefore begin with a brief description of the Levant and its natural resources during the terminal Pleistocene and early Holocene (18,000 to 9,000 B.P.: uncalibrated radio carbon years[8]). During this period, the landscape of the Near East was not dry, barren, and thorny as it appears today. Using palynological, paleobotanical, and geomorphological data, we are able to propose instead a reconstruction of the spatial distribution of an oak-dominated parkland and woodland that provided the highest biomass of foods exploitable by humans. This vegetational belt mostly covered the Mediterranean coastal plains and hilly ranges, as well as a few oases. Recently published reports from the excavated Late Paleolithic (or Epi-Paleolithic), Natufian, and Neolithic sites, together with this reconstruction of natural resources, allow us to answer the questions of when and where the Neolithic Revolution occurred. However, we are still far from providing a definitive answer to the question of why it occurred.

Within the large region of the Near East, recent archeological work has demonstrated the importance of the area known as the Mediterranean Levant. Today it is one of the most researched parts of the Near East.[1–4,9–18] It is therefore possible that the picture I will draw is somewhat biased due to the limited number of excavations elsewhere, such as in western Iran, northern Iraq, or southeast Turkey.[19–22] However, no field project outside of the Levant has yet exposed any indication of a prehistoric entity that resembles the Natufian. As will become clear in the following pages, such an entity can be recognized through its combined archeological attributes, including dwellings, graves, lithic and bone industries, ground stone tools, ornamentation, and art objects, as well as the early age of its sedentary hamlets among all foragers societies in the Near East.

THE REGION: RESOURCES AND POTENTIAL FORAGING PATTERNS

The Mediterranean Levant, about 1,100 km long and about 250 to 350 km wide, incorporates a variety of landscapes, from the southern flanks of the Taurus Mountains in Turkey to the Sinai peninsula (Fig. 1). The variable topography comprises a narrow coastal plain, two parallel continuous mountain ranges with a rift valley in between, and an eastward sloping plateau dissected by many eastward running wadis. The region is character-

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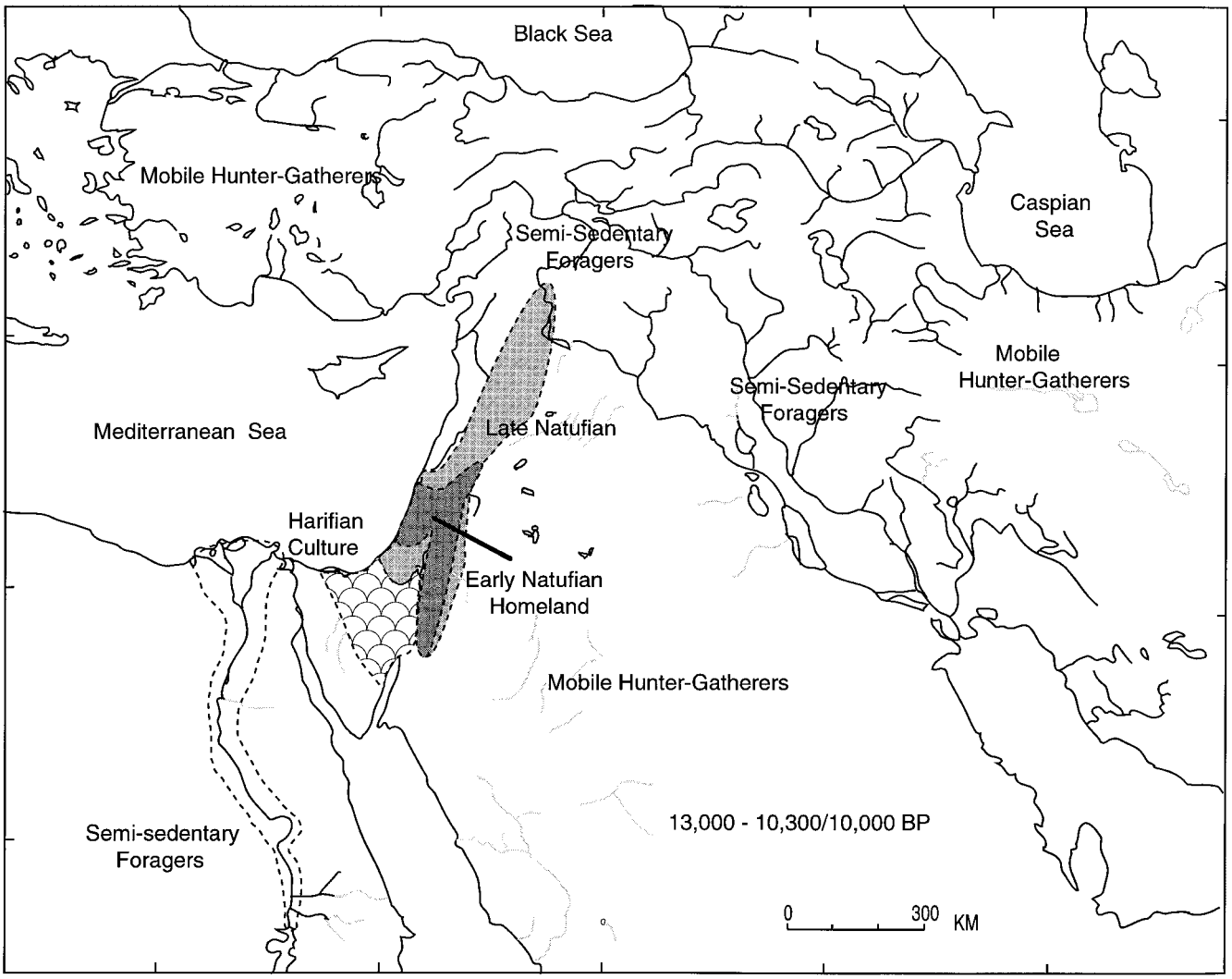

Figure 1. A map of the Near East indicating the territories of the Early Natufian homeland, the expansion of the Late Natufian culture, and the area of the Harifian culture, a desertic adaptation of the Late Natufian to the cold, dry conditions of the Younger Dryas.

ized by marked seasonality: winters are cold and rainy, summers are hot and dry. Mediterranean woodland and open parkland vegetation develop where annual precipitation reaches 400 to 1,200 mm a year. Shrub land, steppic vegetation (Irano-Turanian), and arid plant associations (Saharo-Arabian) cover the areas where annual precipitation is less than 400 mm (for the current situation see Zohary[23]).

Today, two annual patterns of winter storm tracks prevail. One carries humidity from the Mediterranean Sea to the southern Levant; the second arrives from northern Europe and turns to the northern Levant, leaving the southern portion dry. Chemical studies of the beds of Lake Lisan, an Upper Pleistocene lake in the Jordan Valley, and the early Holocene distribution of C3 and C4 plants in the Negev demonstrate that the geographic pattern of annual rainfall during the late Pleistocene and the early Holocene was similar to today's.[24] Decadal and centennial fluctuations of precipitation, more than temperature changes, were responsible for the expansion and contraction of the vegetational belts as reflected in the palynological sequences.[16,25]

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Floral resources in the Levant are seasonal, with seeds most abundant from April to June and fruits from September to November. Tubers are rare. Among the three vegetational zones, the Mediterranean is the richest, with more than one hundred edible fruits, seeds, leaves, and tubers.[23]

The faunal biomass gradually dwindles away from the Mediterranean core area. Dense oak forests, where precipitation surpasses 800 mm, maintain a lower biomass than do open parklands. Thus the mosaic associations of Mediterranean vegetation, bordering the Irano-Turanian shrub land, are the most optimal in terms of carrying capacity.[26,27] It is along the prehistoric position of this belt that

the major cultivating communities emerged.[28]

Game animals included the mountain gazelle (*Gazella gazella*), a stationary antelope with a small home range that varies from a few to as many as 25 square kilometers.[29] A larger home range can be inferred for *Gazella subgutturosa,* the dominant species in the Syro-Arabian desert. Other mammals included wild cattle (*Bos primigenius*), fallow deer (*Dama mesopotmaica*), roe deer (*Capreolus capreolus*), and wild boar (*Sus scrofa*). The rare wild goat (*Capra aegagrus*) occupied parkland areas while the ibex (*Cabra ibex*) inhabited the cliffy, drier landscapes.[27,30] The optimal foraging pattern of late Pleistocene hunter-gatherers, one that combined both residential and logistical movements, was probably the most efficient. Topography made anticipated moves of social units or task forces along east-west transects easier, for this route took advantage of the north-south layout of mountain ranges and vegetational belts. The optimum territory for a band of hunter-gatherers within the Mediterranean vegetational belt is estimated to be about 300 to 500 square kilometers.[2] In contrast, foragers in steppe or desert regions were required to monitor an area of 500 to 2,000 square kilometers as a buffer against annual fluctuations.

In this system, decreasing annual precipitation and shifts in the distribution of rains that diminished yields of wild fruits, seeds, and game animals would place stress mainly on the steppe and desert belts.[31] In contrast, resources in the Mediterranean belt would have been more stable. Levantine foragers would have had many ways to alleviate short- and long-term stresses: population aggregation in the Mediterranean core areas; social and techno-economic reorganization within the same territories that would affect the core area; immigration to adjacent regions northward or southward along the coastal ranges; or the use of warfare to take over territories, especially where bands did not belong to the same alliance.[28] Each of these strategies or a combination of several would have resulted in the emergence of new spatial alignment of the population, which would have been expressed in adjusted ideologies.

THE PALEOCLIMATIC RECORD

Paleoclimatic information is often derived from the records of oxygen isotope fluctuations registered in ice cores, deep sea cores, and terrestrial vegetational reconstructions based on pollen cores from lakes. The following sequence emerges when such data sets are supplemented with information from geomorphological sequences, bio-geographic interpretations of fluctuating faunal spectra, incomplete archeo-botanical records, and pollen from archeological sites:[2–4,16,17,32,33]

1. During the Late Glacial Maximum, dated to ca. 20,000 to 14,500 B.P. the entire region was cold and dry, but the hilly coastal areas enjoyed winter precipitation and were covered by forests.

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2. Precipitation over the entire region slowly increased beginning about 14,500 B.P. and more rapidly from 13,500 to 13,000 B.P. The rate of precipitation peaked around 11,500 B.P. in the southern Levant.

3. Rainfall decreased during the Younger Dryas period (ca. 11,000 to 10,000 B.P.).

4. Pluvial conditions returned around 10,300 B.P., indicating a very wet early Holocene in the northern Levant and Anatolia, but did not reach the previous peak in the central and southern Levant.[16,25]

5. A gradual rise in sea level after the Late Glacial Maximum until the mid-Holocene reduced the flat, sandy coastal plain of the Levant by a stretch 5 to 20 km wide and 500 km long. Given the poor aquatic resources in this section of the Mediterranean sea, the rise in sea level mainly affected the size of foraging territories and the collection of marine shells often used for decoration.

FROM MOBILE HUNTER-GATHERERS TO SEDENTARY FORAGERS

The archeology of the late Paleolithic foragers is relatively well-known.[1,34,35] Social units have been identified based on selective analysis of stone artifacts combined with other attributes such as site size and structure, the distribution of settlements, and the reconstructed pattern of seasonal mobility.[1–4,11,28,34,36–41] For instance, the Kebaran (ca. 18,000 to 14,500 B.P.) sites were limited geographically to the coastal Levant and isolated oases due the prevailing cold, dry climate. Geometric Kebaran foragers took advantage of the climatic amelioration around 14,500 to 13,000 B.P., expanding into the formerly desertic belt, which had became a lusher steppe.[39–41] Ground stone mortars, bowls, and cupholes, which first appeared in the Upper Paleolithic, are considered to indicate vegetal food processing.[42] The invention of these tools marks a revolutionary departure from Middle Paleolithic methods of plant food preparation. It not only heralds the "broad-spectrum exploitation" that was conceived as a prerequisite for the agricultural revolution, but also is supported by the recent discovery of carbonized plant remains in a water-logged site, Ohallo II, dated to 19,000 B.P.[43] The assemblage contains a rich suite of seeds and fruits, already known to scientists from the basal layers of Abu Hureira.[44] Both collections reflect intensified gathering of *r*-resources from a variety of habitats and plant associations. Fallow deer, gazelle, and wild boar were hunted in the central Levant, whereas gazelle, ibex, and hare were the common game in the steppic belt. Wild goat and sheep were common in the Taurus and Zagros mountains.

The climatic improvement after 14,500 B.P. seems to have been responsible for the presence of more stable

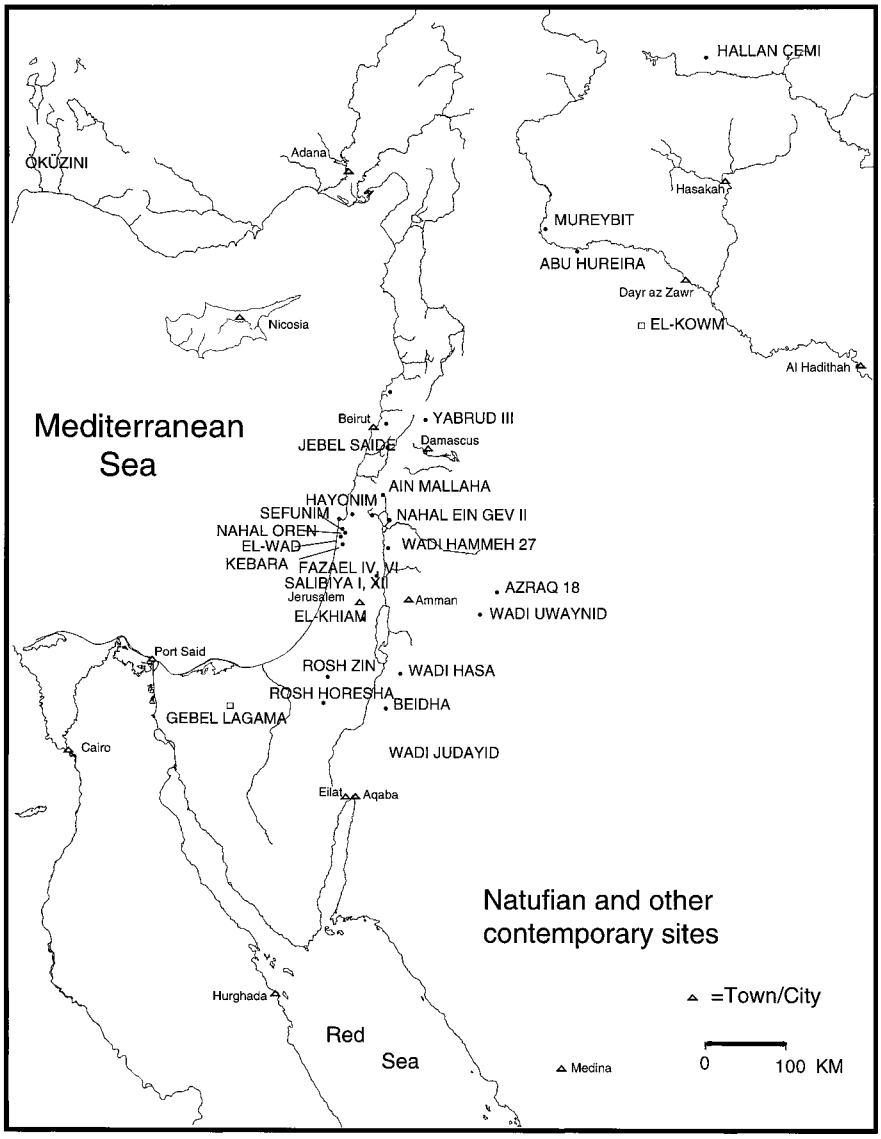

Figure 2. A map of the Levant with the location of most of the sites of the Natufian culture (after Bar-Yosef and Meadow[4]).

human occupations in the steppic and desertic belts. Groups moved into areas that were previously uninhabited, from the Mediterranean steppe into the margins of the Syro-Arabian desert. Others came from the Nile valley, creating an interesting social mosaic.[1,11,35,40,45]

THE EMERGENCE OF THE NATUFIAN CULTURE

The emergence of the Natufian culture around 13,000 or 12,800 B.P. was a major turning point in the history of the Near East.[1,28] Originally defined by Garrod and Neuville on the basis of the lithic, bone, and ground stone industries, as well as burials uncovered in their excavations in caves in Mount Carmel and the Judean hills, the Natufian culture has continued to attract the attention of archeologists.[5,46–48] Excavations during the 1950s in Ain Mallaha (Eynan), which exposed semi-subterranean houses, referred to as pit-houses in the American terminology, led J. Perrot to interpret the site as the remains of a village. Additional excavations were done at Nahal Oren,[49] Hayonim Cave and Terrace,[50–53] Rosh Zin[54] and Rosh Horesha,[55] Wadi Hammeh 27,[56] Wadi Judayid,[1] and the lower layers at Beidha,[5] providing a wealth of new data. These data have led to the recognition that a Natufian "homeland" existed in the central Levant (Fig. 1) and that the Natufians were secondary foragers and, perhaps, the earliest farmers. This information led to the recognition that the Natufian culture played a major role in the emergence of the early Neolithic farming communities, or what is known as the Agricultural Revolution.[1–4,12,28,58]

The main attraction of the Natufian cultural remains is the wealth of information uncovered in every site. Aside from settlement size, the dwelling structures, graves, and art objects in more than one site resemble the remains of Neolithic villages. In addition, lithics, elaborate bone industry, pounding and grinding tools, large quantities of marine shells, and animal bones have furnished the required information for a better reconstruction of past lifeways. Each of these aspects provide the basis for the various interpretations of the socio-economic system of the Natufian culture.

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Site Size and Settlement Pattern

All Natufian base camps in the "homeland" area were located in the woodland belt, where oak and pistachio were the dominant species (Fig. 2).[1,25] The undergrowth of this open forest was grass with high frequencies of cereals. The high mountains of Lebanon and the Anti-Lebanon, the steppic areas of the Negev and Sinai, and the Syro-Arabian desert in the east accommodated only small Natufian occupations due to both their lower carrying capacity and the presence of other groups of foragers who exploited this vast region. In general, Natufian sites fall into three size categories: small (15 to 100 m^2), medium (400 to 500 m^2), and large (greater than 1,000 m^2). Only during the Late Natufian were several larger sites es-

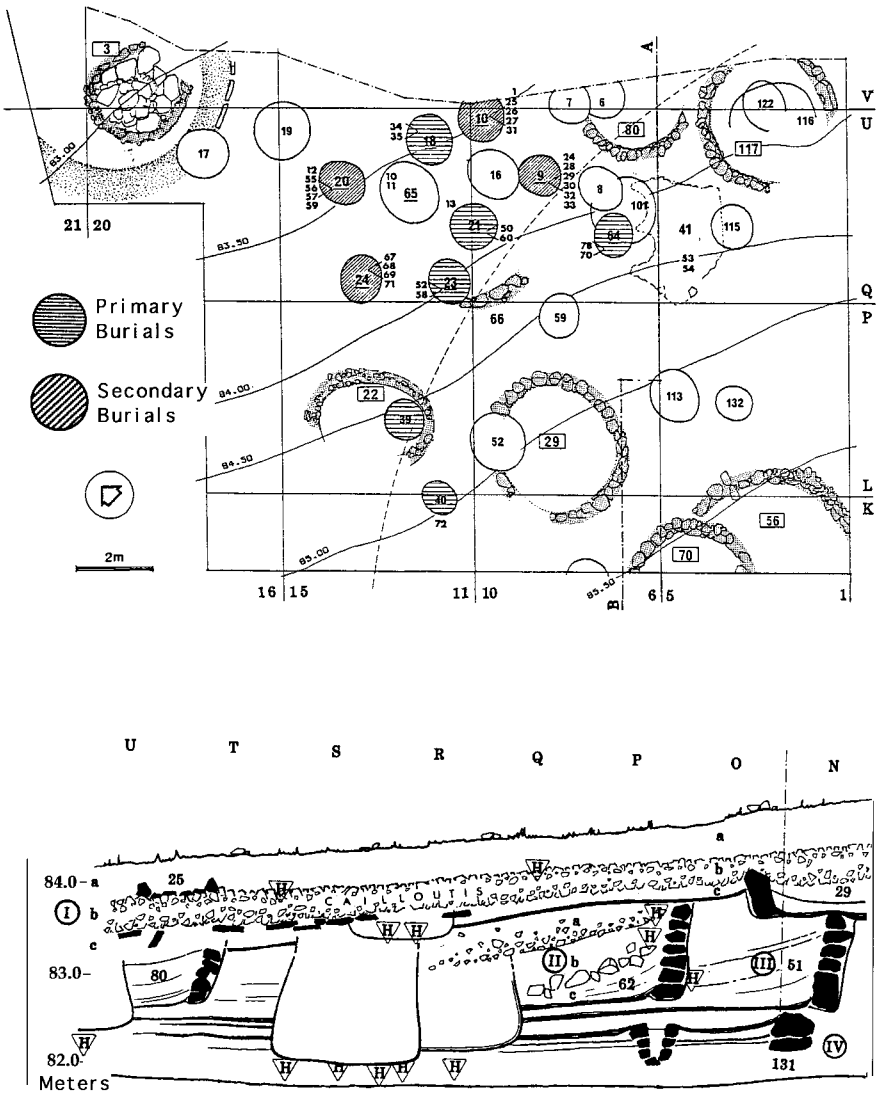


Figure 3. A: The Early Natufian habitations, primary and secondary burials, of the upper layers at Ain Mallaha. Note the special pit-house in the left upper corner. B: A cross section along the A-B line demonstrating the entire stratigraphy of Ain Mallaha. Note the dug-out pits (after Perrot and Ladiray[157]).

tablished within the steppic belt. Even so, none of the larger sites ever reached the size of a large Early Neolithic village.

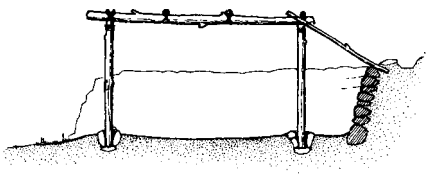
Natufian base camps are characterized by semi-subterranean dwellings (pit-houses). The foundations were built of stone and the upper structure was probably brush and wood. There is no evidence of the use of mud bricks or wattle and daub. Fine examples of Natufian houses were uncovered in Ain Mallaha (Fig. 3), Wadi Hammeh 27, and Hayonim Cave and Terrace. Every base camp suggests the rebuilding of houses, indicating temporary abandonment of the settlement.

Domestic structures were about 3 to 6 m in diameter, with either rounded or squarish fireplaces. Although the fills of the dwellings contained rich assemblages, identifying specific floors was not easy. A rare case is the semi-circular house 131 in Ain Mallaha (Fig. 4), which is 9 m in diameter, where a series of post holes was preserved. In certain areas of the floor, clusters of artifacts were uncovered. Worth noting is a small building in Ain Mallaha in which a rounded bench covered with lime plaster was preserved. This house is different from the domestic one and could have been used for ritual purposes by the leader or shaman of the group.

In Hayonim Cave, there is a series of small adjoining oval rooms inside the cave, each 2.5 to 3.5 m in diameter and built of undressed stones. There was a hearth or two in each room except one. Finds from the lower fill of every room indicated its domestic use, although this function seems to have changed subsequently: one room was first a kiln for burning limestone and later was the site of bone tool production.

Late Natufian sites have produced incomplete information. At Nahal Oren Terrace, elongated enclosure walls were uncovered. In a lower level of this site, a series of postholes surrounded a large fireplace amid a cemetery area.[49] Circular structures were exposed in Rosh Zin.[54] One room had a slab pavement and a limestone monolith 1m tall erected at its edge. This could just have been a domestic structure, but it is also possible that it served specific ritual purposes. At Jebel Saaîdé, a Late Natufian site in the Bekaa Valley of Lebanon, the remains of collapsed walls were identified, despite much destruction caused by modern terracing.[60]

Despite expectations to the contrary, storage installations are rare in Natufian sites. The few examples include a paved bin in Hayonim Terrace[61] and



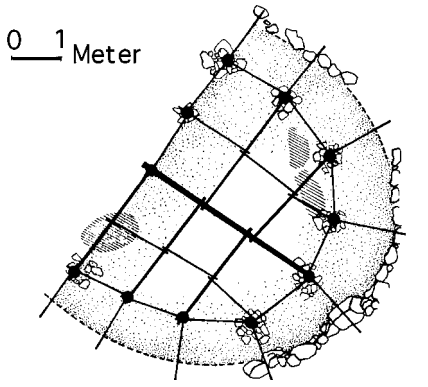


Figure 4. The large Natufian house in Ain Mallaha with a proposed reconstruction of its upper structure. Note the series of postholes and the number of hearths that seem to have been used for communal activities (after Valla[59]).

several plastered pits at Ain Mallaha, which could have served as underground storage facilities.[62] It is possible that baskets were used for aboveground storage. Indirect evidence for basketry comes from the special bone tools known from ethnographic studies to have been used in such activity.[63]

Graves and Burials

The Natufian population has been identified as being of Proto-Mediterranean stock.[64] Graves were uncovered in all base camps in the Natufian heartland as well as in smaller sites.[65,66] Stratigraphic indications from Hayonim Cave and Ain Mallaha demonstrate that graves were dug in deserted dwellings and outside of houses, but not under the floors of active households. Graves were in pits, either shallow or deep, and were rarely paved with stones or plaster. In several instances limestone slabs covered the graves, but graves generally were filled in with sediment from the site itself. That sediment contained cobbles, lithics, broken mortars, and animal bones. Sealed graves were marked at Nahal Oren by deep mortars called stone pipes. In Nahal Oren and Hayonim Cave, small cupholes pecked in rocks marked the location of graves.[67] In Nahal Oren, an exceptionally large fireplace, 1.2m in diameter and surrounded by limestone slabs, was placed in the center of a cluster of inhumations.[49]

The burials demonstrate variability in mortuary practices. The pattern of body disposition in primary burials is supine, semiflexed, or flexed, with various orientations of the head. The number of inhumations per grave varies from single to multiple. Collective burials are more common in the Early Natufian. Several cases of skull removals were observed in the Late Natufian context at Hayonim Cave, Nahal Oren, and Ain Mallaha,[12,67] heralding a Neolithic practice. Secondary burials were either isolated or mixed with primary burials. Secondary burials, which occur more often in the Late than Early Natufian, are interpreted as evidence of increased group mobility. Scattered human bones occur within the occupational deposits, indicating that the Natufians disturbed burials of their own people. Children comprise about one-third of the dead, indicating a relatively high mortality among those aged 5 to 7 years.[68] This is interpreted as evidence of growing stress within sedentary communities.[12]

A special type of mortuary practice is indicated by the joint human and dog burials in two graves, one in Ain Mallaha[69] and the other at Hayonim Terrace.[70] Both are interpreted as marking a departure from the Paleolithic vision of the natural world as a dichotomy between humans and wildlife.

Given the Natufians' habit of placing graves within their own sites and then refilling them with material from the pit and surrounding areas, only objects found attached to skeletons can be securely identified as grave goods. Common grave goods included head decorations, necklaces, bracelets, belts, earrings, and pendants made of marine shells, bone, teeth, and beads. A few objects such as a bone dagger (Hayonim cave), a bone figurine of a young gazelle (Nahal Oren), and a small model of a human head in limestone (El-Wad) were related by excavators to the buried individuals. It should be stressed that decorated burials particularly characterize the Early Natufian. Finally, the suggestion that differences in mortuary practices should be viewed as reflecting social hierarchy have recently been found to be untenable.[71,72]

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Lithic Assemblages

The production of stone tools is one of the most conservative human activities. Research on Upper Pleistocene sites has demonstrated that it is almost impossible to relate changes in lithic technology and the morphology of artifacts to environmental changes. Therefore, specific characteristics of knapping techniques, ways of snapping bladelets, and types of retouch among assemblages of Terminal Pleistocene and Early Holocene age in the Near East are employed in the search for identifiable social entities.[1,28] The Natufian has thus been subdivided into phases and regional groups based on the presence or absence of products of "microburin technique," a specialized blade-snapping method, and the size and type of retouch of lunates (backing versus Helwan). The average length of lunates, which has also been used as a chronological marker,[73] has recently been refined to include the regional-ecological location of the sites.[74]

The Natufian lithic industry is characterized by extensively used cores and the production of small, short, wide bladelets and flakes. Among the retouched pieces, frequencies of end scrapers and burins fluctuate considerably. Backed blades grade into the retouched and backed bladelets, defined as microliths. Microliths and geometrics reach 40% or more in every assemblage. In the Early Natufian, geometrics include Helwan and backed lunates, trapeze-rectangles, and triangles, but in the Late Natufian backed lunates generally dominate.[12,34,73–76]

Special tools that occur for the first time in the Natufian are picks and sickle blades. The first, considered the forerunner of the axe-adzes group of the Neolithic period, are 8 to 10 cm long and bifacially or trifacially flaked. The second, the sickle blades or glossy pieces as they are known today, are abundant in sites within the Natufian homeland (Fig. 6). These blades bear a gloss that covers a relatively wide area on both faces. Experimental and microscopic studies demonstrated that these were used for harvesting cereals.[77,78] The blades were hafted in bone or, probably more often, wooden handles. It is quite possible that they can be interpreted as tools used in early experiments in cereal cultivation. The use of sickles instead of beaters and baskets has the advantage of maximizing the yield harvested from a limited area.[79–82] It seems that the

Figure 5. An Early Natufian decorated skull from El-Wad, excavated by D. Garrod (photograph by S. Burger, Peabody Museum).

Natufians adopted the use of sickles for harvesting because of their need to maximize yield and minimize time, the reason being the limited availability of fields of wild stands.[3,82]

Ground Stone Tools

Such tools, including bedrock mortars, portable mortars, bowls of various types, cupholes, mullers, and pestles, occur in large numbers in base-camp sites, but are not as abundant in the more ephemerally occupied camps. The boulder mortars, sometimes called stone pipes, weigh as much as 100 to 150 kg and are 70 to 80 cm deep. When broken in their lowermost part, these objects were placed in graves. An archeometric study has indicated that basalt objects in the Mount Carmel sites were brought from the Golan Heights,[83] about 100 km away. Microscopic observations have demonstrated that ground stone utensils were employed for food processing as well as for crushing burned limestone and red ochre.[41,84]

Among the grooved stones are whetstones made of sandstone, which were used for shaping bone objects. Shaft straighteners, identified on the basis of ethnographic comparisons, have a deep, parallel-sided groove and bear burning marks. These marks, which resulted from straightening wooden shafts, indicate the use of bows by the Natufians.

Bone and Horncore Industry

The Natufian is marked by a bone industry that is far richer in quantity and contains more elaborate, varied morphologies than does any earlier or later Levantine archeological entity.[85–87] Objects were made of bone shafts and of teeth and horn-cores from gazelles, wolves, fallow deer, roe deer, and birds. Use-wear analysis indicates that bone tools were used for hideworking and basketry.[63] Barbed items have been reconstructed as parts of hunting devices (spears or arrows), hooks and gorgets for fishing, and hafts for sickle blades. Bone beads and pendants were shaped by grinding and drilling.[63] Many objects bear specific decorations. Among these are the carved hafts from El-Wad and Kebara Cave with young ruminants at the edge and the pieces from Hayonim Cave bearing net patterns.[47,58,88]

Ornamentation and Art Objects

Body decorations and ornamentations demonstrate variability between and within sites, as well as change over time. A variety of marine molluscs, bone, greenstone, limestone pendants, and beads were used by the Natufians in headgear, necklaces, belts, bracelets, and earrings (Fig. 6).

The Natufian is marked by a bone industry that is far richer in quantity and contains more elaborate, varied morphologies than does any earlier or later Levantine archeological entity.

Marine shells for Natufian jewelry were collected from the shores of the Mediterranean Sea or, more rarely, were brought from the Red Sea. Ain Mallaha stands out for having a tusk shell from the Atlantic ocean and a freshwater bivalve from the Nile river.[41,89] Greenstone and malachite beads were brought from as yet unidentified localities in the Levant. Other rare items include pieces of Anatolian obsidian found at Ain Mallaha in a Late Natufian context. The noticeable differences in jewelry between the sites is considered to indicate the existence

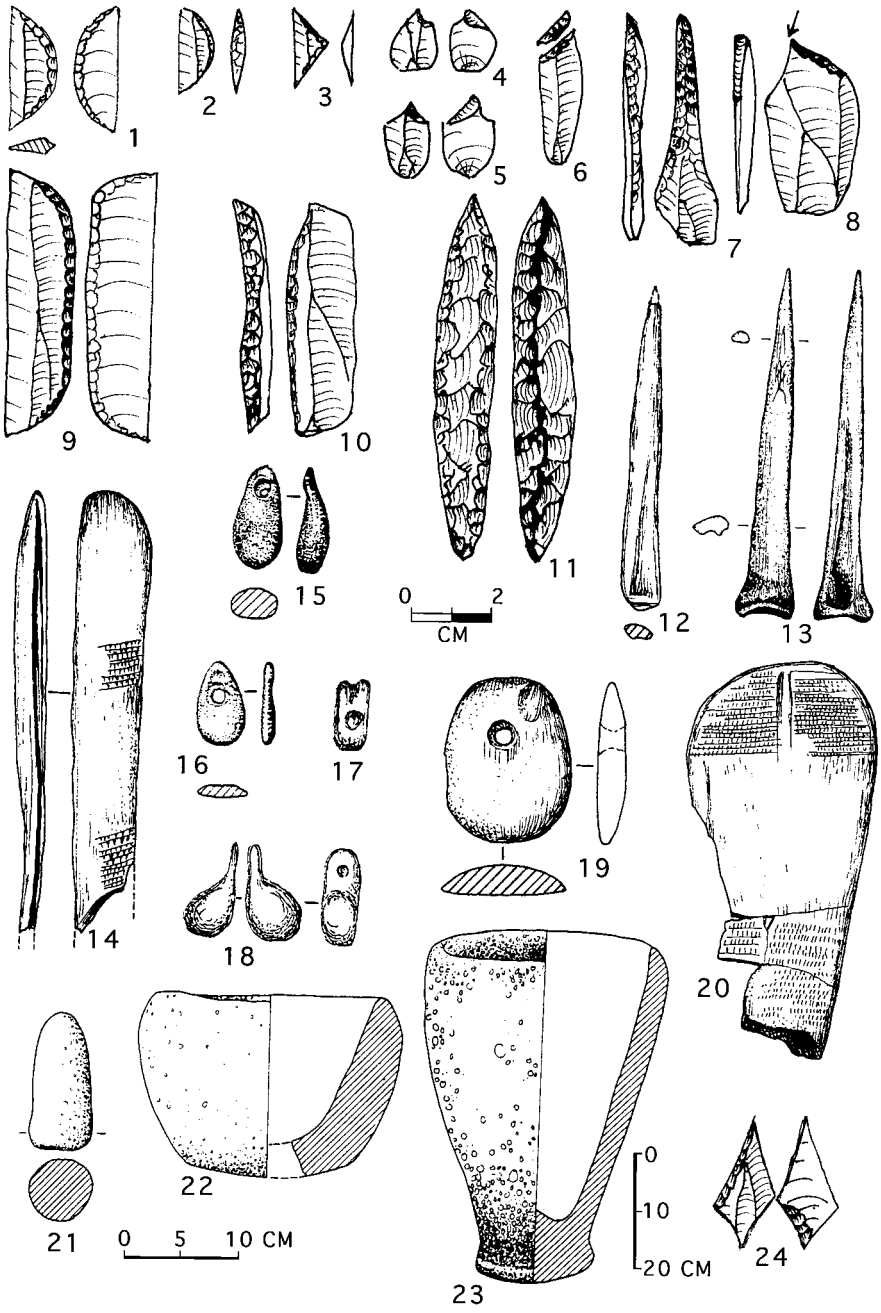

Figure 6. Natufian lithic, bone, and ground stone assemblage: 1, Helwan lunate; 2, lunate; 3, triangle; 4 and 5, microburins (products of a special snapping technique); 6, truncated bladelet; 7, borer; 8, burin; 9, Helwan sickle blade; 10, abruptly retouched sickle blade; 11, pick; 12 and 13, bone points; 14, decorated broken sickle haft; 15–19, bone pendants; 20, decorated bone spatula; 21, pestle; 22, mortar; 23, deep mortar made of basalt; 24, Harif point. Note that the ground stone tools have different scales than do the lithics and bone objects.

of distinct group identities.[67] Several limestone slabs recovered from the rounded structures inside Hayonim Cave are incised, mostly with the ladder-pattern motif interpreted as the accumulated effects of notational marks.[90,91] On one large slab, the rough form of a fish is deeply incised. Large carved limestone slabs with the meander pattern, also known from carved basalt bowls, were uncovered in one of the houses of Wadi Hammeh.[27,56,88]

Portable naturalistic and schematic figurines made of bone and limestone include carvings on sickle hafts and isolated bone pieces (Fig. 7). Several of these figurines depict young ungulates, possibly gazelles.[88] A limestone figurine from the Nahal Oren site has an owl at one end and a dog's head at the other. An additional item is a horn core with a man's head at one end and a bovid's head at the other end. This combination of human and animal might have emerged from similar ideological changes that led to the joint dog and human burials.[70]

Figurines that represent the human body or face are rare; only a few, made of limestone, have been found.[92] The exception is the Ain Sakkhri limestone figurine, interpreted as representing a mating couple. Zoomorphic figurines include a tortoise, a kneeling gazelle, and possibly a baboon.[88] The attention given to young ruminants[93] and their appearance as decoration on sickles is rather curious, but perhaps represents a totemic group idol.

Particular decorative patterns found on both bone and stone objects include the net, chevron (or zigzag), and meander patterns. Most appear on spatulas, stone bowls, shaft-straighteners, and the rare ostrich-egg shell containers found as broken pieces in the Negev sites.[54] Because these differ from site to site, they may further our identification of different Natufian groups. For the time being, we know that their frequencies are highest within the Natufian homeland in the central Levant.[94]

Subsistence

Most Natufian sites were excavated before the introduction, in the late 1960s, of recovery techniques such as systematic dry sieving and floatation. However, even in recent excavations water flotation has failed to retrieve sufficient quantities of floral remains. In some cases, the few grains found were later dated by accelerator mass spectrometry to recent times.[95,96] The poor preservation of vegetal remains in Natufian sites within the Mediterranean woodland resulted from the nature of the prevailing terra rossa soil. Occupational deposits in open-air sites are soaked each winter, then dry up and crack in summer. In the process, plant remains are destroyed; charcoal, small bones, and even lithics are subjected to both downward and upward movements. Better charcoal preservation is noted in the desertic loess in the Negev and drier deep deposits of sites

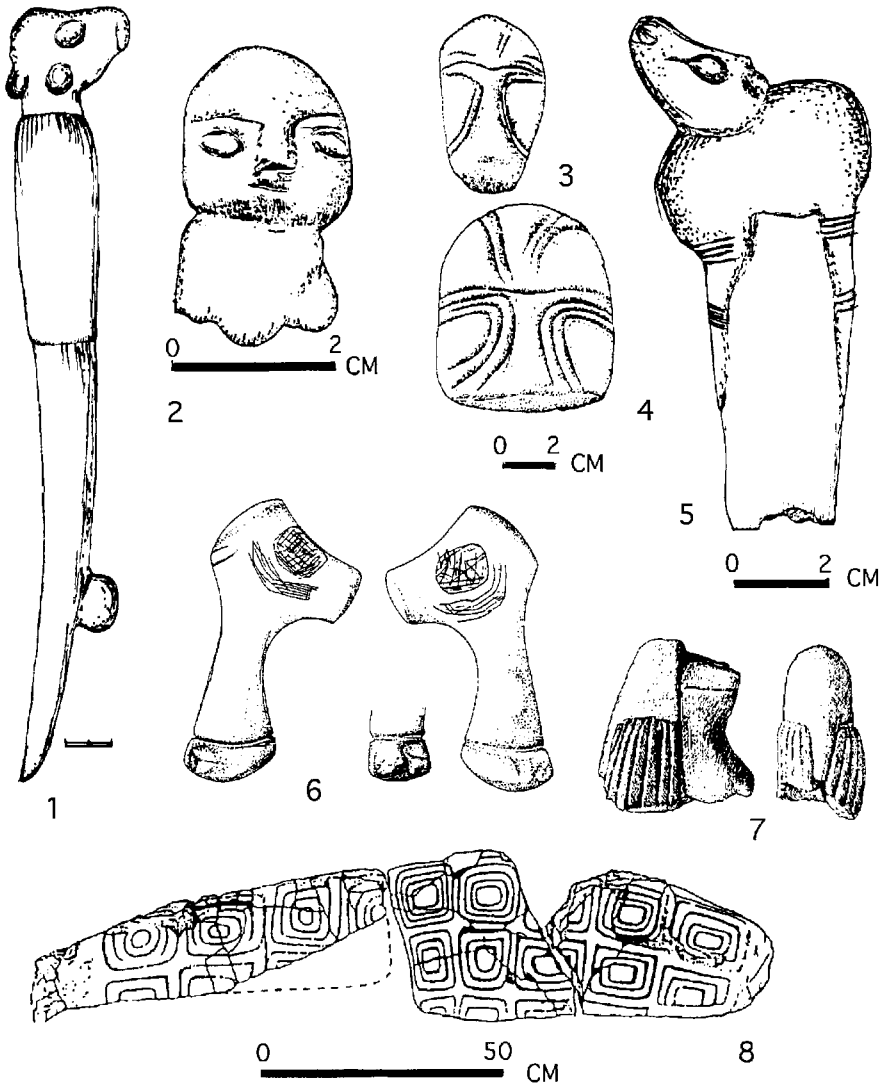

Figure 7. Natufian art objects: 1, decorated sickle haft (Kebara); 2, limestone human head (El-Wad); 3 and 4, schematic human heads (Ain Mallaha); 5, decorated sickle haft (El-Wad); 6, limestone figurines with two heads, a dog and an owl (Nahal Oren); 7, limestone animal head, possibly a baboon (Nahal Oren); 8, decorated limestone slab (Wadi Hammeh 27) (after Bar-Yosef[58] and Noy[88]).

in the Lower Jordan Valley. However, samples are still too small due to the limited number and size of excavations. The paucity of carbonized material is also expressed in the relative scarcity of charcoal radiocarbon dates.

Tools for food acquisition, such as sickles, and food processors, such as mortars, bowls, and pestles, are interpreted as evidence for harvesting and processing wild cereals and legumes. The few available seeds support the contention that pulses, cereals, almonds, acorns, and other fruits were gathered.[18] The list of species collected was probably even longer, as can be deduced from the list of plant remains from Ohalo II, the Late Paleolithic site mentioned earlier. Similar information comes from Tell Mureybet[97] and the Epi-Paleolithic layers of Abu Hureyra,[44] which are dated to Late Natufian age.

The idea that the Natufians were the earliest agriculturalists was first suggested by Garrod in 1932. Despite later criticism, that idea was revived by others[80] and supported in part by experimental studies of sickle blades.[77,78] It was also established that systematic cultivation would have caused the unintentional domestication of wheat and barley.[98,99] However, even the degree of domestication of cereals in the earliest Neolithic sites is still questionable on the basis of the morphological characteristics of carbonized seeds and rachis fragments.[100] A more cautious interpretation of these findings is that Natufian communities practiced intensive and extensive harvesting of wild cereals as part of an anticipated summer mobility pattern.

Good bone preservation in most sites has made faunal evidence the subject of numerous studies.[101–106] Natufians hunted gazelle and other game, depending on the geographical location of each site (Fig. 8). In the coastal ranges, deer, cattle, and wild boar were common, while in the steppic belt equids and ibex were typical prey. The attempt to explain the Natufian faunal assemblages as the result of net hunting[107] has not been well accepted,[108] and does not conform to the ethnographic evidence, which indicates that such a technique is best suited for forested areas where the degree of visibility is rather low.[109]

Water fowl undoubtedly formed part of the Natufian diet, especially in sites along the Jordan Valley, where both migratory and nesting ducks were gathered during the stress seasons.[110] Freshwater species of fish were caught seasonally in the Hula Lake, as indicated by thousands of fish vertebrae retrieved at Ain Mallaha.[111] Fishing seems to have been less important along the Mediterranean coast. However, fish remains, though scarce, together with the presence of bone gorgets and hooks, indicate that old excavation techniques often yield incomplete information.

THE NATUFIAN AND THE EMERGENCE OF NEOLITHIC FARMER-HUNTER COMMUNITIES

The emergence of the Natufian entity from a world of Levantine hunter-gatherers is seen as resulting from both economic and social circumstances. On the one hand, climatic improvements around 13,000 B.P. provided a wealth of food resources. On the other hand, contemporaneous population growth in both the steppic and desertic regions made any abrupt, short-term climatic fluctuation a motivation for human groups to achieve control over resources. The establishment of a series of sedentary Early

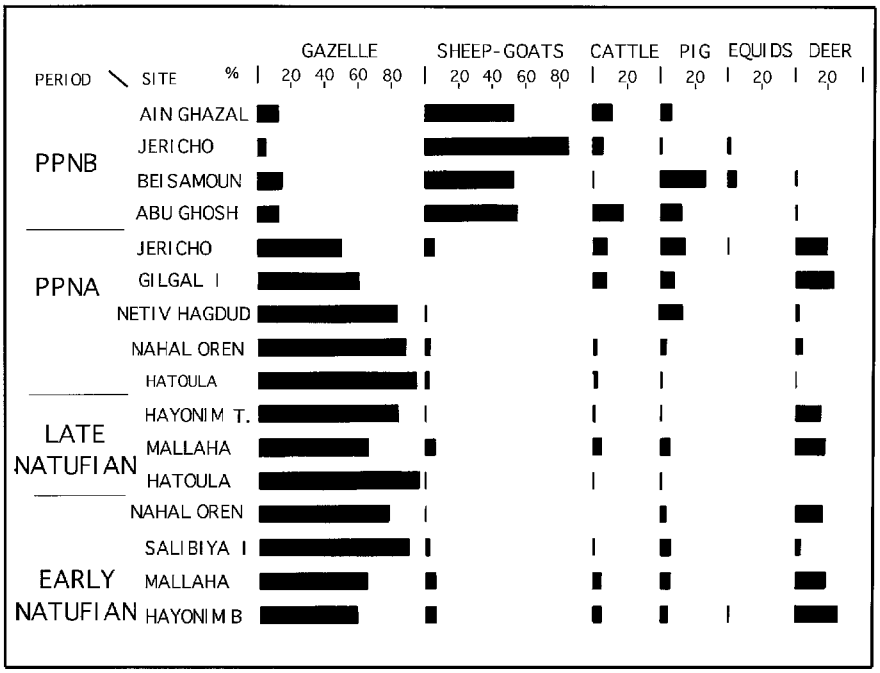

Figure 8. Frequencies of large and medium size mammals in Natufian and Neolithic sites. Note the dominance of gazelle in Natufian and PPNA sites and the shift to caprovines during the Pre-Pottery Neolithic B.

Natufian hamlets in a delineated homeland is seen as a reaction to an abrupt environmental change that necessitated a shift of resource scheduling. Previous patterns of semi-sedentism among Late Pleistocene foragers gave way to the acquisition of a firmer hold over territories.

The circumstances surrounding Natufian sedentism are interpreted in various ways. Some researchers contend that sedentism was enhanced by the need to intensify cereal exploitation.[1–4,112] Others suggest that sedentism itself increased the propagation of such annuals as cereals.[13] Unfortunately, as mentioned earlier, the storage practices of the Natufians are poorly known.

Archeologically, the criteria for recognizing sedentism include the presence of human commensals, such as house mice, rats, and sparrows, at higher frequencies among microfaunal assemblages than in forager sites.[113–115] Another biological marker is the study of cementum increments on gazelle teeth, which indicate that hunting by the inhabitants of Natufian base hamlets took place in both winter and summer. In addition, semi-permanent hamlets can be noted by energy expenditure, reflected in investments in leveling slopes for building purposes, the construction of houses, the production of plaster, and the transport of heavy undressed stones into cave sites. Finally, the digging of graves and rare underground storage pits, as well as the shaping of large, heavy mortars were activities that took place in such base camps, but generally not in locations that were exploited on a short-term, seasonal basis.

The climatic crisis of the Younger Dryas (ca. 11,000 to 10,300 B.P.) resulted in environmental deterioration. This climatic change, now recognized globally, had an impact on the Natufian population. It is suggested that the two major outcomes of the cold and dry conditions were a decrease in the natural production of C3 plants, such as the cereals,[4] and a reduction in the geographic distribution of natural stands of wild cereals to the western wing of the Fertile Crescent (Fig. 9). Environmental exploitation by sedentary Late Natufian communities as well as by their neighboring foragers further depleted plant and animal resources.[115] Social reactions to these new conditions differed within the Near East (Fig. 9).

In the Negev and northern Sinai, the Late Natufian improved their hunting techniques with the invention of the Harif point, an arrowhead that probably was more efficient.[36] Whereas the lithic and bone industries of Harifian sites are Late Natufian in nature, only the existence of the Harif point (Fig. 5) demonstrates the uniqueness of this entity. Animal bones represent the hunting of local fauna: gazelle, ibex, hare, and perhaps wild sheep. Grinding tools, mortars, and cup-holes indicate the processing of unknown plant food elements. Large collections of marine shells demonstrate tight relationships with both the Red Sea and Mediterranean shores.[41] The overall territory of the Harifian, as estimated from surveys, is about 8,000 km, but could have been as large as 30,000 to 50,000 km^2. However, given their archeological disappearance within two to three hundred years and the fact that this area remained essentially uninhabited for about one thousand radiocarbon years, the Harifian is interpreted as the unsuccessful effort of the local Late Natufian population to adapt to the prevailing Younger Dryas conditions in their territory (Fig. 9).

The establishment of a series of sedentary Early Natufian hamlets in a delineated homeland is seen as a reaction to an abrupt environmental change that necessitated a shift of resource scheduling.

In other areas, Natufian communities responded to the climatic changes by becoming more mobile, probably returning to a more flexible scheduling of resources. Several communities maintained social relationships with their original hamlets and returned there to bury their dead, as shown by the large number of secondary burials.[53,72] The first experiments in systematic cultivation most likely occurred during the Younger Dryas. The first Neolithic large villages, up to 2.5 hectares in size, seem to have relied, if not

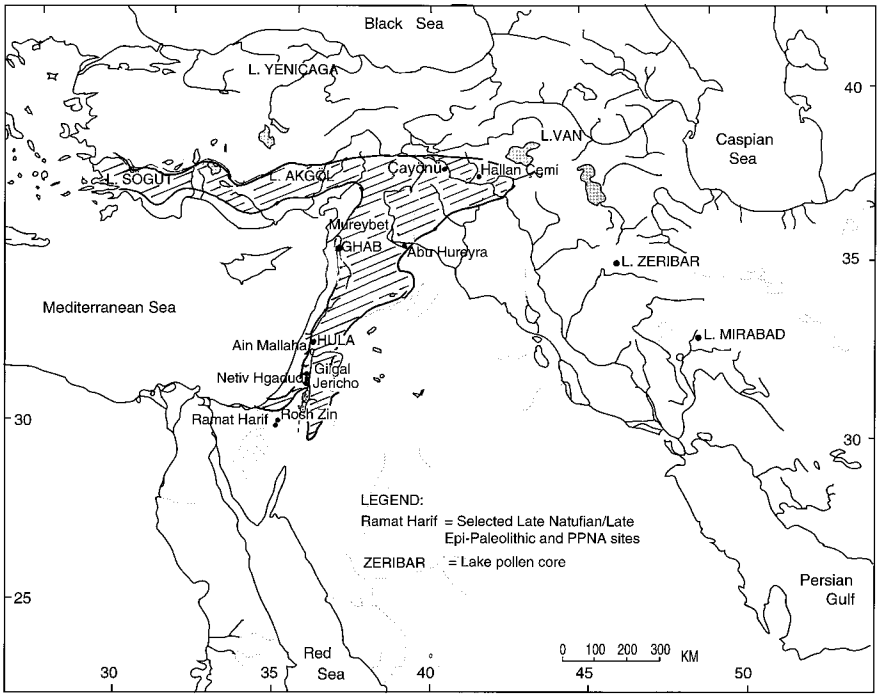

Figure 9. A reconstructed vegetational map of the Younger Dryas period. The hatched area delineates the belt in which wild cereals were present. Note the location of a few selected Late Natufian and Early Neolithic sites. Data are based on Hillman.[31] The location of lake pollen cores is also shown.

on domesticated barley and wheat,[18] then on planting their wild progenitors.[100] No one claims today that these early farmers were new people. In fact, ample evidence demonstrates that they were the descendants of the local Natufian population, which had undergone changes in material culture, social organization, and daily life ways.

THE EARLY NEOLITHIC ENTITIES

"Neolithic," meaning "new stone age," was first used with respect to the Near East in the twentieth century. Jericho was a key site: it was there that the excavations of K. Kenyon exposed a Neolithic sequence without pottery, which led to new terminology. Because all the other components, and especially the stone industry, resembled the European assemblages from which the designation "Neolithic" had originated, Kenyon suggested the taxon Pre-Pottery Neolithic. She further subdivided it on the basis of the Jericho stratigraphy into Pre-Pottery Neolithic A and B.[116] At the same time, R. Braidwood suggested an anthropologically oriented terminology, which incorporated excavated assemblages within a socio-economic interpretation; e.g., "level of incipient cultivation and domestication" and "level of primary village-farming communities."[117,118] Finally, the French school from Lyon adopted a subdivision by time horizons.[119,120]

Early Neolithic farming communities in the Levant were geographically distributed along today's boundary between the Mediterranean and the Irano-Turanian steppic vegetational-belts. However, the environmental conditions during the early Holocene were entirely different from those of today. Hence, these sites were located within the Mediterranean woodland, which was, at that time, the richest in vegetal and animal resources (Fig. 10). Recognition that the early farming communities were actually stretched along a rather narrow north-to-south belt led us to identify the Levantine Corridor as the locus of the origins of agriculture.[28] On both sides of that corridor, in the coastal range on the west and the steppic region in the east and south, small bands of foragers continued to survive (Fig. 10). Sites of these hunter-gatherers were excavated in the Anti-Lebanon mountains[121] and in southern Sinai.[122] Both areas provide ample evidence for the continuation of old life ways and the adoption of specific projectile tools from the neighboring farmers.

The first manifestation of the cultural change that heralded the "Neolithic Revolution" is known in the Levant as the Khiamian. This entity is still poorly defined, in part because the time span of its existence is hardly a few centuries of radiocarbon years, perhaps ca. 10,500 to 10,300/10,100 B.P. In addition, the available information on the Khiamian was obtained from very limited soundings and sites where mixing with earlier layers is likely to have occurred.[123–126] The lithic industry of the Khiamian comprises the aerodynamically shaped el-Khiam projectile points, asphalt-hafted sickle blades, some microliths, and high frequencies of perforators, a typical Neolithic feature (Fig. 11). Bifacial or polished celts, considered to be Neolithic "markers," are absent from the Khiamian contexts.

The first manifestation of the cultural change that heralded the "Neolithic Revolution" is known in the Levant as the Khiamian.

THE SULTANIAN ENTITY

We identify between 10,300 and 9,300 B.P. a few geographically delineated entities. The Sultanian, the one in the Jordan Valley, which includes the neighboring hilly ranges on both sides, is better known than those farther north. The main sites (Fig. 11) are Jericho,[127] Gilgal,[128] Netiv Hagdud,[129,130] Gesher,[131] Dra,[65] and several in the hilly region, including Hatoula,[125] Iraq ed-Dubb,[65] and Nahal Oren.[49] In the northern Levant, somewhat similar contexts represent other cultural entities. The main sites are Mureybet and Jerf el Ahmar (Syria),[97,120] Qermez Dereh (Iraq),[132] and the lower level at Çayönü (Turkey).[133] The following brief overview is therefore based mainly on the Sulta-

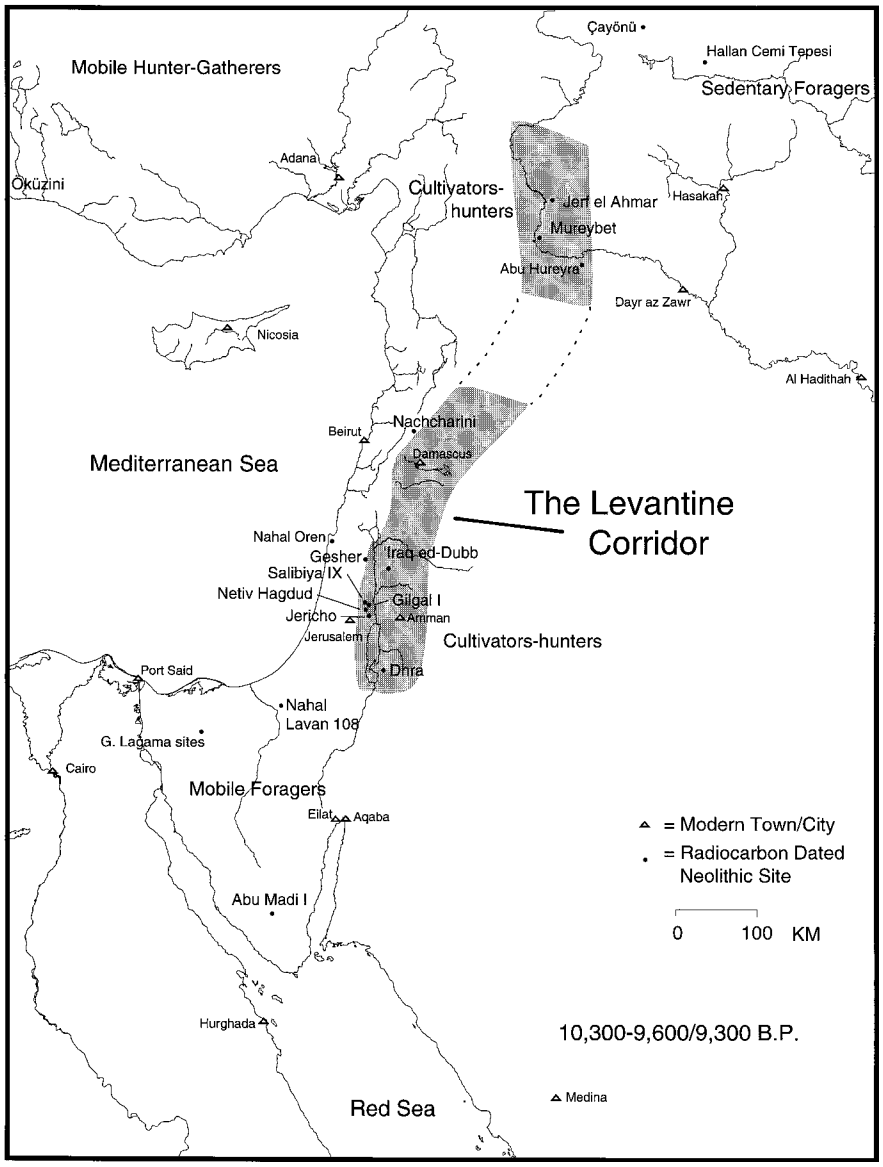

Figure 10. A map of the Levant showing the distribution of known Pre-Pottery Neolithic A sites, the area of the Levantine Corridor, and the presence of other socio-economic entities.

nian sites, with additional information from settlements elsewhere in the Near East.

Site Size, Intrasite Variability, and Settlement Pattern

The largest Neolithic sites, among them Mureybet, Jericho, Netiv Hagdud, Gilgal, and Dra, are at least three to eight times larger than the largest Natufian sites.[2,4] Intrasite variability indicates that there are clear differences between the large villages and the small hamlets. For example, in Netiv Hagdud the dwellings are large and oval, and each household is probably made of two rooms. There are open spaces between the houses where some of the domestic activities took place.[129,134] Similar observations can be made for Jericho and Mureybet. Nahal Oren, however, represents a small site where the rounded houses are clustered together like a compound of an extended family.

Sultanian and other PPNA houses are pit-houses, with stone foundations and superstructures of unbaked mud bricks, often with a plano-convex cross section (Fig. 12). The use of mud bricks along with considerable amounts of organic substances resulted in the rapid accumulation of deposits in Neolithic mounds. Therefore, Neolithic deposits generally have low frequencies of artifacts per volume-unit when compared to the previous Natufian sites.

Domestic hearths were small and oval with cobble floors. The use of heated rocks in cooking resulted in abundant fire-cracked rocks, which were uncommon in Natufian sites. Silos, either small stone-built bins or larger built-up mud-brick structures, were found in every site.

The best example as yet of communal building efforts are the walls and tower of Jericho. Kenyon[116] interpreted these as parts of a defense system against raids. However, Kenyon ignored the fact that a tower that is part of a defense system is usually built on the outer face of the walls to enable the protectors to shoot sideways at the climbing attackers. An alternative interpretation suggests that the walls were erected mainly on the western side of the site to protect the settlement against mud flows and flash floods[135] (Fig. 12). In addition, a topographic cross section through the entire tell indicates that there was probably only one tower. Although its function is unknown, it could have accommodated a small mud-brick shrine on the top. Although unequivocal evidence for public ritual is missing, the open space north of the tower may have been similar to the "plaza" in Çayönü (Turkey), which served as a place for public gatherings.[133]

Sultanian Tool Kits

Lithic technology exhibits cultural continuity from the Khiamian.[136] Blades were manufactured essentially for sickles and other cutting objects. Projectiles included el-Khiam points with additional varieties; perforators are frequent. Axes-adzes with a working edge formed by a transversal blow and polished celts made their first appearance during this time (Fig. 11).

A shift from the Natufian is evident in the abundant pounding tools, including slabs with cupholes, hand stones, and rounded, shallow grinding bowls. Only the rare mortar or deep bowl continued the previous tradition of heavy-duty kitchen equipment (Fig. 11).

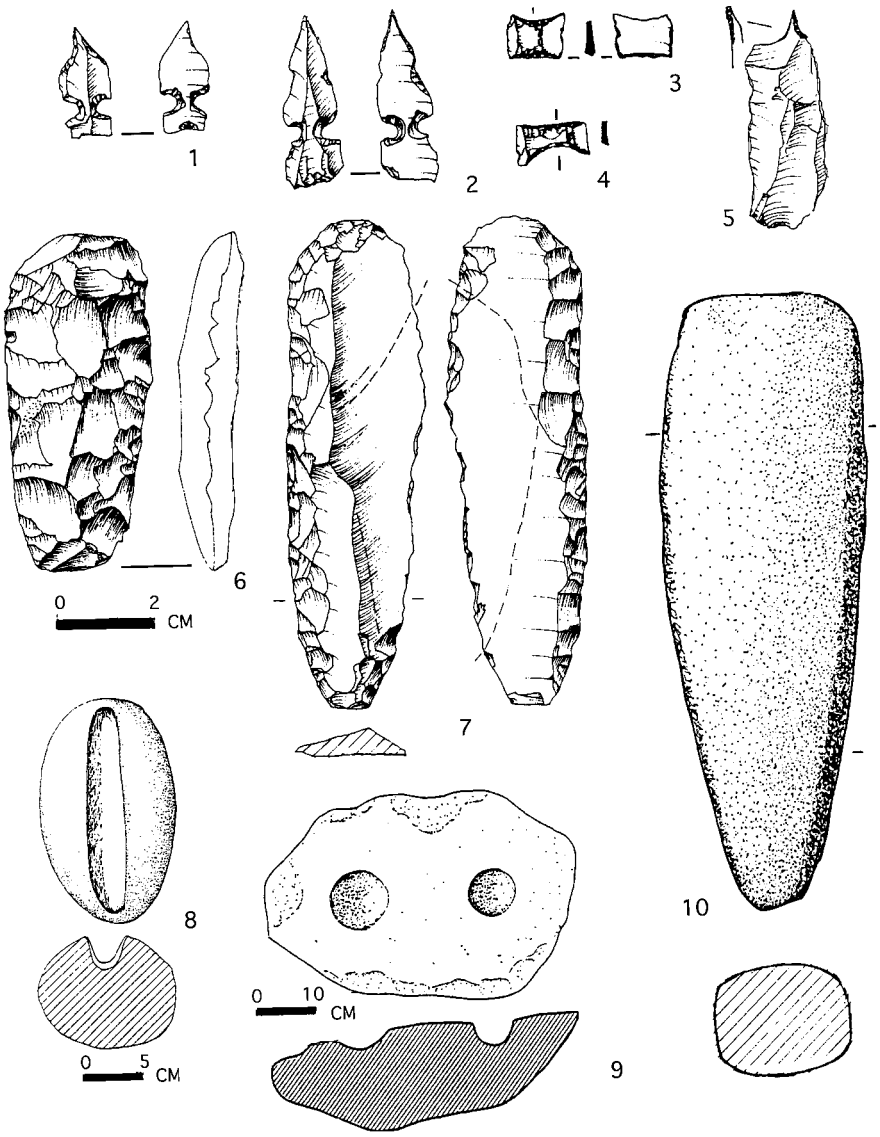

Figure 11. A typical assemblage from a Pre-Pottery Neolithic A site in the southern Levant: 1 and 2, Khiam points; 3 and 4, Hagdud truncations; 5, awl on blade; 6, a tranchet bifacial axe; 7, a sickle blade (type Beit Ta'amir); 8, grooved stone or a ''shaft straightener''; 9, limestone slab with cup holes; 10, a limestone celt (after Bar-Yosef and Gopher[129]).

Mortuary Practices and Art Objects

Most burials are single with no grave goods. Skull removal, a practice begun during the Late Natufian, was performed only on adults; child burials were left intact. The separated crania were sometimes found in domestic locales or special-purpose buildings. A current interpretation views these skull caches as having been formed through public ritual aimed at negotiating equality among the inhabitants of these villages.[137] The differentiation along age lines probably reflects changes in attitudes toward the dead within the Early Neolithic society, and perhaps is evidence for the veneration of ancestors.[120] In sum, it seems that a long-term social value was attributed to adults, as shown by the conservation of their skulls, but not to children.

Additional changes in society are expressed by the shaping of human figurines from either limestone or clay along gender lines (Fig. 13). Several depict a kneeling female, while others are of the "seated woman" type.[138] Common interpretation views this specification of gender, not evident in the Natufian, as indicating the emerging role of women in a cultivating society. It is assumed that this major shift brought about the cult of the "mother goddess" in later centuries.

Subsistence

Flotation procedures at sites in the Levantine Corridor have produced high frequencies of carbonized seeds of barley, wheat, legumes, and other plants.[18,97–100,139,140] Unfortunately, there is no agreement on the methods humans used to acquire the seeds, whether by intensive collection in the wild, cultivation, or gathering animal dung as fuel.[18,99,100,141] The debate focuses on the frequencies of certain morphological features that are considered to be signs of domesticated species and whether these are, in fact, the results of parching harvested wild cereals when still green. Regardless of whether they were cultivators or harvesters, the geographic shift in settlement pattern and the increasing site size during the Early Neolithic are sound indicators of a major socioeconomic departure from the Natufian way of life.

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Early Neolithic village inhabitants continued to gather wild fruits and seeds and to hunt. Gazelle, equids, and cattle were hunted in the middle Euphrates area (Fig. 8); gazelle, fox, a few fallow deer, wild boar, and wild cattle

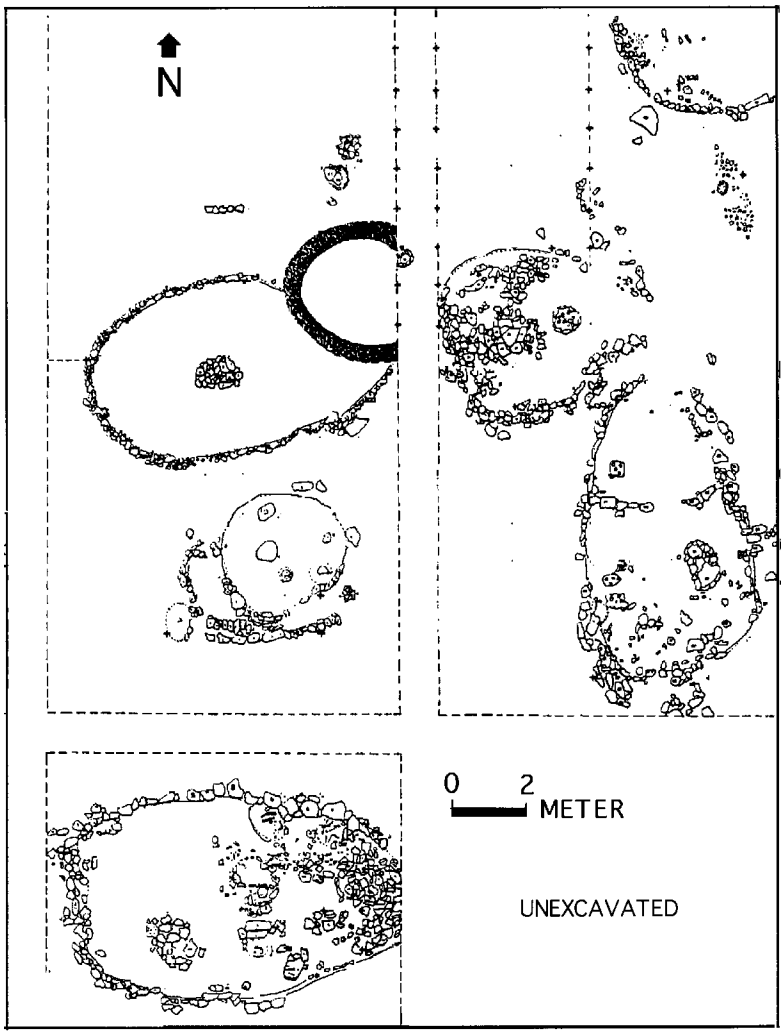

Figure 12. PPNA pit houses excavated in Netiv Hagdud. The darker circular building in the center was built of mud bricks and could have been a large silo.

were the main game animals in the Jordan Valley. Large numbers of birds, especially ducks, were trapped by occupants of all sites.[130] Lizards and tortoises were gathered as well. The overall picture is that of a "broad-spectrum" subsistence strategy similar to that of the Natufians.

Long-distance exchange is demonstrated by the central Anatolian obsidian found in Jericho and in smaller quantities in Netiv Hagdud, Nahal Oren, and Hatoula. No obsidian was found in Gilgal or Gesher. Marine shells were brought from the Mediterranean coast and fewer from the Red Sea. There is a clear shift in the types selected for exchange. *Glycymeris* and cowries become important, but Dentalium shells, where excavated deposits were sieved, are still common, as in Natufian sites.

DISCUSSION

Most readers are familiar with the different hypotheses that have been offered as explanations for the emergence of agriculture in the Near East. The following is a brief summary. One of the first proposals was made by Raphael Pumpelly, an American geologist who hypothesized that the warming climate of the Holocene forced people to settle near drying lakes. This idea led him to initiate excavations at the site of Anau in Turkmenistan, Central Asia.[3,141] The same idea was picked up by V. G. Childe, who proposed what today is called the "oasis hypothesis." Childe asserted that the Holocene postglacial warming resulted in increasing densities of humans and animals in river valleys, thereby motivating a new subsistence strategy based on animal domestication and cultivation.[141] Robert Braidwood and his associates shifted their focus from the river valleys to what today is the nuclear zone in which wild cereals and legumes grow,[18,142] often referred to as the "hilly flanks." They excavated sites in northern Iraq and southeastern Turkey. Braidwood proposed that within the evolving cultural contexts, technological progress led to village life and the ensuing domestication of plants and animals. The climatic factor was omitted from Braidwood's model as a result of field observations made by H. E. Wright. Wright, a palynologist and limnologist, recently conceded that these observations were erroneous and agreed that a greater role should be attributed to climatic fluctuations.[143] At the time, however, Braidwood accepted the notion that climatic fluctuations played only a minor role, and therefore suggested that food production did not begin at an earlier period because "culture was not ready."[144]

The role of increasing human populations at the end of the Pleistocene and the reaction of groups surviving in marginal areas to climatic fluctuations were prime stimuli in the writings of Binford,[145] Flannery,[146] Cohen,[147] Smith and Young,[148] Hassan,[149] and others. The idea of demographic pressure, which had originated in Childe's writings, was explicitly expressed within a cultural ecological model. Evidence to support the importance of this relative increase in human population densities was derived from new surveys and excavations accomplished in the 1950s and 1960s across the Near East.

Other scholars have attempted more general explanations. Thus, D. Rindos[150] viewed the emergence of agriculture and the domestication of plants as a long process of mutualism that began with incidental domestication and terminated with a fully developed agricultural system. However, if this process were truly a basic pattern of behavior for all foragers, then agriculture would have emerged independently in every region of the world. The evidence does not support this hypothesis. Another approach proposed by Hayden,[151] termed the "competitive feasting" model, emerged from a growing interest in social factors.

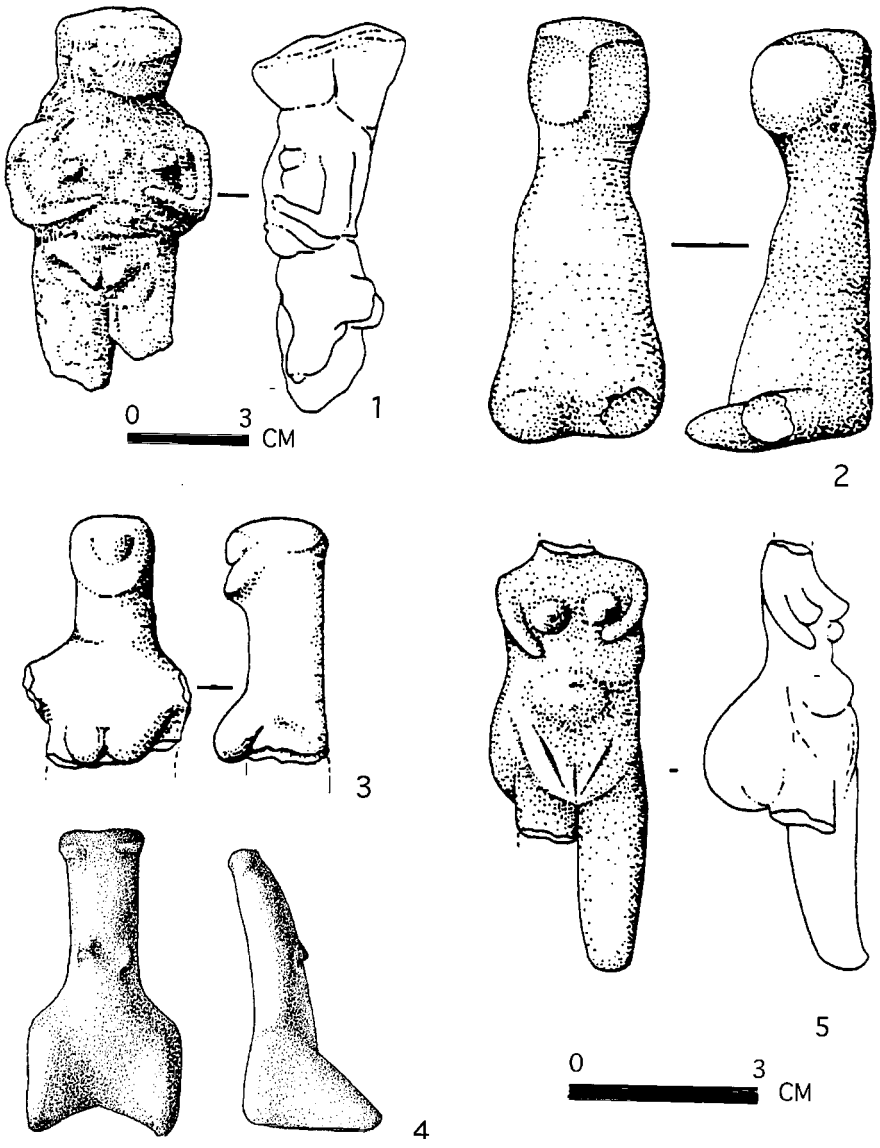

Figure 13. Pre-pottery Neolithic A female figurines from Mureybet (1–3,5) and Netiv Hagdud (4). Note that they are in two positions, sitting (2,4) and standing (1,3,5) (after Cauvin[158]; Bar-Yosef and Gopher[129]).

Unfortunately, the archeological record of the Levant indicates that the surplus of food and precious commodities needed for potlatch competition was not available before the development of agriculture but was, instead, an outcome of that development. Hayden's model would better fit the evidence for competition from the following Pre-Pottery Neolithic B period (ca. 9,300 to 7,800 B.P.) when large, well-established villages occupied the Fertile Crescent and beyond.

The explanatory model used in this paper and others[2–4,28,152] follows the "historical narrative explanation" proposed by Flannery.[153] It not only takes into account the unique geographic conditions of the Levant, but also combines the archeological history of foragers, their reconstructed social structure, and their subsistence strategies with environmental changes. The resulting sequence makes the emergence of cultivation, under these given conditions, the optimal strategy for semi-sedentary and sedentary hunter gatherers. The regional conditions during the Late Pleistocene included the availability, predictability, and accessibility of numerous edible annual seeds such as cereals and legumes (*r*-resources) and perennial plant resources, essentially fruits, and the presence of mostly stationary medium-sized ungulates and cervids that did not require the monitoring of large territories. The result was dense spatial distribution of combined resources that enabled foragers to survive in biologically viable populations in small territories.

The current trend to view climatic fluctuations as a mechanism for triggering cultural change is based on the growing understanding that environmental impacts are "screened" through a cultural filter. In each region at a given time, societies of hunter-gatherers have had their own cultural filters as much as they have had their own kinship systems, cosmologies, and economic and ideological adaptations to particular features of their landscape. Cultural filters are constructed through particular group histories. Thus, different human populations may react differently in the face of environmental crises. There is no need to seek one single model to explain the origins of agriculture.

Since the end of the Late Glacial Maximum (ca. 14,500 B.P.), people occupied every eco-zone in the Near East. The Levant was the most favorably inhabited belt. Desert oases continued to accommodate hunter-gatherer groups, but these populations were highly mobile and thinly distributed. In the coastal Levant, semi-sedentism or severely reduced mobility was already an established settlement pattern among foragers. Hence a short, cold, and abrupt crisis at about 13,000 B.P., which was immediately followed by an increase in precipitation and an expansion of woodland and parkland, had a major impact. It made sedentism within a certain "homeland" the most practical settlement pattern, resulting in the formation of the Early Natufian. The technological innovations introduced by the Natufians, such as sickles, picks, and improved tools for archery, were additions to an already existing Upper Paleolithic inventory of utensils that included simple bows, corded fibers, and food processing tools such as mortars and pestles. Demographic pressure was therefore the outcome when certain groups of foragers became sedentary while others remained mobile. This condition limited both groups in their access to resources when further climatic crises caused diminishing

yields in natural stands of cereals and fruits. The "packing of territories"[154] describes the Late Pleistocene archeological situation, which is now well known from numerous surveys and excavations of sites across the Levant.

Another major crisis was the "Younger Dryas," a period of cold, dry climatic conditions that lasted for centuries. Rapid reduction in the size of the lushest vegetation belts as well as reduction in the yields of natural stands of C3 plants such as cereals forced certain human groups to change their organizational strategies, including the ways they obtained carbohydrate resources. Experimental planting, shifts in the location of settlements, and the clearing of land patches resulted in establishment of the Early Neolithic (commonly labelled PPNA) villages, first in the western part, or the Levantine wing, of the Fertile Crescent. Other groups in the steppic belt reacted to these conditions by increasing their mobility.

The rapid return of wetter conditions around 10,000 B.P. triggered the expansion of numerous lakes and ponds, which then facilitated the cultivation of various annuals along their shores, especially in the Levantine Corridor. From that time onward, large villages existed, with estimated populations of 300 to 500 individuals. Each of these villages was inhabited by an entire biologically viable population, thereby reducing the need to maintain a mating network that stretched over long distances. Furthermore, within such large communities, the need for social cohesion motivated the maintenance of public ceremonies in addition to domestic rituals, the building of shrines, and the keeping of space for public activities.

Continued amelioration of climatic conditions during the PPNB (the next two-and-a-half radiocarbon millennia) enabled not only socio-economic success, but also the rather rapid expansion of agricultural communities and groups of farmers into neighboring regions. From that point on, the "multiplier effect"[155,156] of technological, social, and economic build-up played an important role in the Near East. The effects were numerous: the creation of food surpluses, additional population increases, the erection of temples in villages for public use, increasing demands for precious commodities, and possibly the eventual appearance of competitive feasting.

In conclusion, the "Neolithic Revolution" cannot be understood without research into its origins in the Natufian culture. The emergence of farming communities is seen as a response to the effects of the Younger Dryas on the Late Natufian culture in the Levantine Corridor. The beginning of intentional widespread cultivation was the only solution for a population for whom cereals had become a staple food. Domestication of a suite of founder crops came as the unintentional, unconscious result of this process. In retrospect, the stability of Early Natufian lifeways underwent rapid changes during the Late Natufian. These changes were expressed in the abandonment of numerous sites and the establishment of sites in the steppic zone. Natufian groups on the Mediterranean side of the hilly area were harvesting wild cereals in natural stands along the Jordan Valley on a seasonal basis. If yields of natural stands decreased during the Younger Dryas, the motivation for intentional cultivation could have increased. Establishing sedentary communities along the Jordan Valley and the Damascus basin enabled the first farmers to use flat alluvial lands as fields. This shift in settlement pattern suggests that the primary consideration for site location choice was related to cereal cultivation and permanant water sources, and not necessarily to the optimal foraging of vegetal and animal resources. The success of the Neolithic farming communities under the favorable climatic conditions of the early Holocene enabled them to expand along the Levantine Corridor into Anatolia and neighboring regions.

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