Prehistoric Cultural Ecology in Southern Jordan

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Research in the mountains of southern Jordan resulted in the discovery of 109 archaeological sites that are from the Lower Paleolithic to the Chalcolithic period [150 to 6 thousand years ago (ka)]. Beginning with the Middle Paleolithic (70 ka) two site types (long-term and ephemeral camps) are recognized. Long-term sites have larger areas, thicker deposits, higher artifact densities, and more abundant archaeological features than ephemeral sites. Their natural settings (elevation and exposure) and associated seasonal evidence (phytolith and cementum increment data) indicate that long-term sites were occupied during the winter, wet season and ephemeral sites during the warm, dry season. These differences in site use and seasonality likely reflect an adaptive strategy of transhumance that persisted to modern Bedouin times. At the end of the Pleistocene, the onset of warmer, drier conditions induced a shift of the long-term winter camps from relatively low (800 to 1000 meters above sea level) to high (1000 to 1250 meters above sea level) elevations and largely reversed the earlier transhumant pattern.

An understanding of the major transitions of cultural evolution, such as the emergence of modern behaviors and the beginnings of horticulture and pastoralism, requires a detailed reconstruction of the ecologies of prehistoric human populations (*1*). More than a decade of archaeological research in the mountains of southern Jordan has produced a body of data that provides the basis of such a reconstruction (*2*). It traces the settlement and procurement strategies of the occupants of the region during about 70,000 years.

Survey of the Wadi Hisma region on the southern edge of the Ma'an Plateau yielded 109 sites (in 32 km^2) that represent archaeological periods stretching from the Lower Paleolithic to the Chalcolithic (Fig. 1). During the late Pleistocene, long episodes of basin filling by coalesced alluvial fans and thick aeolian deposits acted to preserve archaeological sites. Commencing with the early Holocene, sustained erosion has exposed many of these sites, some of which contain thick cultural deposits, multiple occupations, and well-preserved economic and environmental evidence. The region has great relief and contains distinct, elevationally governed biotic zones that show considerable environmental sensitivity to climatic changes (*3*). This setting where a large number of sites represent a substantial, near-continuous temporal sweep and can be related to significant environmental changes furnishes an ideal field laboratory for examining prehistoric cultural ecology.

Biotic Zones

Marked differences in the relief and bedrock of the region create three well-defined physiographic units that, in turn, correspond to distinct biotic zones (Fig. 2). The uplands of the Ma'an Plateau at elevations from 1500 to 1700 meters above sea level (masl) receive 250 to 300 mm of precipitation annually. Here chert-rich, limestone bedrock has been eroded to low, rolling hills. These are veneered by thin soils that support a severely overgrazed and denuded Mediterranean woodland. The piedmont, resting at the foot of the plateau's escarpment between 1300 to 1000 masl, receives 100 to 200 mm of rainfall annually. Steep sandstone cliffs and canyons interspersed with basins dominate the landscape. Widespread silt deposits and stretches of drift sand support low shrubs and other steppic vegetation. The lowlands, located between 1000 to 700 masl on the floor of the Wadi Hisma, receive less than 100 mm of rainfall annually. This broad valley is covered in drift sand occasionally punctuated by steep sandstone inselbergs and playas. True desert vegetation furnishes a sparse plant cover.

With the exception of several springs in the uplands (and a few isolated springs in the lowlands), surface water is available for only 3 to 5 months of the year. Depending on the variability in annual rainfall, water can be found in potholes in the sandstone streambeds of the piedmont and lowlands from December to April. These are charged mainly by runoff from the uplands. Normally, water is more predictable in the piedmont and available for a longer period because of its proximity to the uplands and low rates of evaporation.

Study Areas

Between 1979 and 1988 four study areas (totaling 32 km^2) were systematically surveyed on foot for archaeological sites. The areas, defined by prominent terrain features, were selected along a generally north-south transect (38 km long) stretching from the edge of the plateau to the southern flank of the Wadi Hisma (Fig. 1). The areas, ranging in elevation from 790 to 1600 masl, furnished data from each of the physiographic units and biotic zones of the region.

Of the 109 sites discovered, all but four were limited to a single prehistoric period ranging from the Lower Paleolithic (Late Acheulean) to Chalcolithic. Many of these contained multiple, stratified occupations, however. Maps and systematic, controlled surface collections were made at 35 sites, with each of the archaeological periods being represented. Test excavations were undertaken at 32 sites, and all but the Lower Paleolithic were included. Excavations were conducted at six sites containing Middle Paleolithic, Upper Paleolithic, Epipaleolithic, and Chalcolithic occupations.

Cultural History

The investigation yielded 39 assemblages representing all of the major prehistoric periods stretching from the Lower Paleolithic through Chalcolithic (Fig. 3) (*4*). These assemblages, totaling 167,430 chipped stone artifacts, were classified as belonging to 11 complexes and eight industries. Phase designations were possible only for those assemblages of the Hamran and Natufian industries. Classification of assemblages into larger unit constructs was viewed as fundamental to (i) identifying prehistoric behavioral systems (that is, cultures) at some scale; (ii) linking such systems to environmental, economic, and demographic data; (iii) establishing the variability within such systems (for example, site types); and (iv) examining diachronic changes within such systems in an attempt to trace cultural evolution.

Lithic assemblages, common to all prehistoric sites in the Levant, represent by far the largest artifact category of those periods spanning the Lower Paleolithic through the Chalcolithic. For this reason, chipped stone artifacts form the basis of material culture classification and archaeological unit construction. In this study, as elsewhere (*5*), I have grouped assemblages within three scales: (i) complex, (ii) industry, and (iii) phase or facies. Assemblages grouped within a complex display a high level of general technological affinity and a low level of typological affinity as determined by their sharing of a polythetic set of

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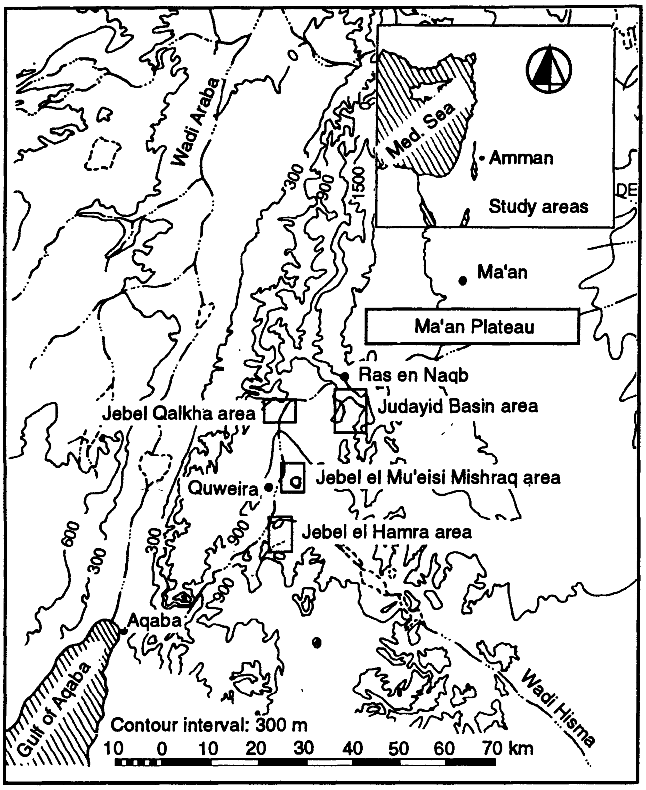

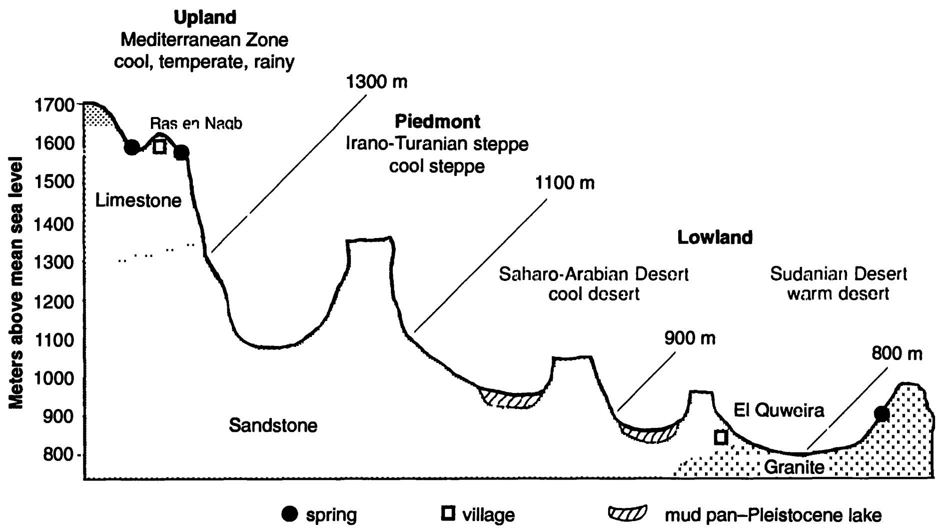

Fig. 1 (top). Regional map of southern Jordan showing the locations of the four study areas. **Fig. 2 (bottom).** Schematic north-south transect of area showing the relationships of elevation, bedrock geology, biotic zones, and climate (vertical exaggeration ×30).

attributes related to the production of blanks (blades and flakes) and the fabrication of tools (points, scrapers, and others). Those grouped within the intermediate scale of industry display a high level of affinity in sharing specific technological attributes and tools at the class and type levels. The lowest and most internally homogeneous scale is phase or facies. Assemblages grouped at this scale share several specific technological, typological, and stylistic attributes.

The chronology of the assemblages was based on cross-reference dating, intersite and intrasite stratigraphic positions, and direct chronometric assays (Fig. 3). Amino acid racemization and uranium series dates of 62 ± 14 ka to 69 ± 6 ka were obtained for the Middle Paleolithic (Late Levantine Mousterian) deposits of Tor Faraj and Tor Sabiha, whereas radiocarbon dates were obtained for Late Epipaleolithic (Natufian and Madamaghan) and Chalcolithic (Timnian) deposits (6).

Regional Adaptive Strategies

Examination of the environmental contexts of the assemblages provided information on the cultural ecologies of the occupants of the sites at regional and local scales. At a regional scale, the assemblages identified in the study are dominated by those with distributions centered in the steppe-desert zone, but those representative of the Mediterranean woodlands also occur, especially during late Last Glacial times (Table 1). As might be expected, during the driest intervals of the succession in early Last Glacial (Late Levantine Mousterian) and in mid-Holocene (Timnian) times, only assemblages with ties to the steppe-desert zone were found in the study area. During moister and colder intervals, especially within the Epipaleolithic, the presence of assemblages of the Hamran industries suggests that populations associated with the Mediterranean woodlands expanded into the region. Apparently, during these intervals populations that exploited different environmental zones came into close contact at least seasonally.

Within the Epipaleolithic, evidence for the presence of parallel traditions represented by the Qalkhan-Madamaghan and the Hamran-Natufian sequences extends over about 6000 years. Interfingering site distributions and synchronous radiometric dates suggest opportunities for contact and social interaction between neighboring populations, but artifactual clues confirm the exchange of ideas between living groups. Evidence for social interaction is found principally in lithic artifacts, especially in implements that would have served as armatures for arrows. A type of geometric microlith (trapeze or rectangle) appears to have been adopted from Middle Hamran groups by groups of the early Madamaghan between 13 to 14 ka. Later a distinct technological innovation, the microburin technique, was acquired from the Madamaghan by Late and Final Hamran groups. During Early Natufian times (12.5 ka) another specific type of geometric microlith, the Helwan lunate, having been developed within the Final Hamran, was adopted by late Madamaghan groups. Although these attributes apparently were exchanged between neighboring groups, a central core of technological and typological features of the assemblages remained unchanged and definitive of specific industries.

Evidence of Prehistoric Transhumance

Foragers and pastoralists typically adjust the sizes and the permanency of their camps to accommodate fluctuations in the abundance of critical resources. With the exception of the Early Natufian inhabitants of the region, who appear to have occupied permanent or semipermanent camps, this pattern persisted from Late Levantine Mousterian through Chalcolithic times. The adjustments in the sizes of residential groups and the degree of residential mobility are expressed in a dichotomy of camp types that corresponds to modes of coalescence and dispersal.

Within the study area, these dichotomous site types are defined archaeologically by patterned asymmetry in the occupational areas, thicknesses of cultural deposits, artifact densities, and presence of archaeological features (Table 2). Long-term campsites are significantly larger, have thicker cultural deposits, and yield higher artifact densities than ephemeral campsites. Features such as hearths, structures, bedrock mortars, petroglyphs, and less portable ground stone artifacts are found only in long-term camps. The most striking contrasts in site types are seen in those of the Chalcolithic where long-term camps display pit-house structures, stone corrals, storage pits, heavy grinding querns, and large storage jars.

Occupational areas of the two site types show strong asymmetry with nonoverlapping distributions. The areas of long-term camps exhibit a relatively wide range, extending from 216 to 3692 m^2, whereas those of ephemeral camps extend from 110 to 175 m^2. When the long-term sites are partitioned into those associated with mobile foragers, sedentary foragers, and pastoralists, the Timnian pastoral sites are by far the largest, with a mean area of 3692 m^2. These are followed by the Early Natufian sedentary foraging site of Wadi Judayid (>530 m^2) and the sites of mobile foragers stretching from Levantine Mousterian through Final Hamran times (427 m^2).

Sites of long-term camps have substantially thicker cultural deposits than the ephemeral camps (Table 2) and persistent evidence for multiple episodes of occupation. In contrast, ephemeral sites appear to have been revisited only rarely. Even though the long-term campsites appear to have been reoccupied regularly, sufficient time must have elapsed between these occupational episodes for sediments to accumulate. Stratified "living floors" (defined by fragile hearths, ash lenses, and artifact concentrations) can be identified within long-term camp deposits stretching from Levantine Mousterian through Chalcolithic times.

The density of lithic artifacts in long-term sites of all industries is consistently higher than in the ephemeral sites. Of the long-term sites, the highest density is in the Early Natufian deposit of Wadi Judayid, which is associated with a permanent or semipermanent occupation located very close to a chert source. The lowest densities of long-term occupations are at the Timnian sites. The low densities may not reflect a lack of intense use of these sites but a change in the importance of chipped stone tools within Chalcolithic material culture. If the Timnian and Natufian sites are excluded, there is little temporal variation in artifact densities for long-term occupations; densities range from 164 to 419 artifacts per 0.1 m^3.

The variation in the lithic artifact densities of the long-term and ephemeral campsites likely reflects the suspected differences in occupational intensities between the sites. Long-term campsites were evidently occupied for longer durations and by greater numbers than the ephemeral camps. Given

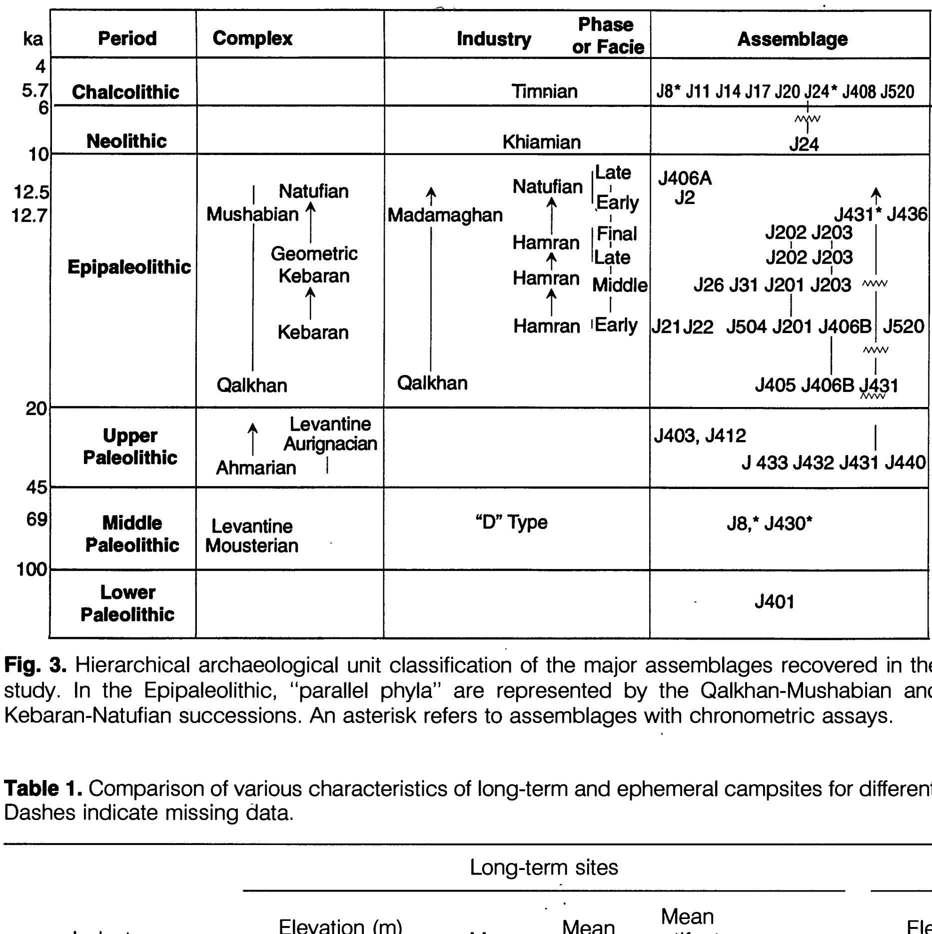

Fig. 3. Hierarchical archaeological unit classification of the major assemblages recovered in the study. In the Epipaleolithic, "parallel phyla" are represented by the Qalkhan-Mushabian and Kebaran-Natufian successions. An asterisk refers to assemblages with chronometric assays.

Table 1. Comparison of various characteristics of long-term and ephemeral campsites for different archaeological industries arranged chronologically. Dashes indicate missing data.

Industry	Long-term sites						Ephemeral sites					
	Elevation (m)		Mean area (m^2)	Mean depth deposit (m)	Mean artifact density (per 0.1 m^3)	Features*	Elevation (m)		Mean area (m^2)	Mean depth deposit (m)	Mean artifact density (per 0.1 m^3)	Features*
	Range	Mean					Range	Mean				
Timnian	1080–1200	1120	3692	0.9	115	H, S, GS	820– 950	805	125	0.10	29	BM
Late Natufian	—	1000	400	0.3	408	BM, GS			Not found			
Early Natufian	—	1100	530	0.6	1437	H, GS			Not found			
Late-Final Hamran	820	820	390	0.6	240	H, GS						
Middle Hamran	820–830	825	485	0.6	204	—	1080–1100	1095	175	0.25	18	H
Early Hamran	830–870	853	430	0.5	292	H, GS, P, BM	1020–1080	1068	110	0.05	20	—
Madamaghan	950–1000	975	257	1.2	232	H, GS, S			Not found			
Qalkhan	—	950	120	0.4	367	H	1020–1040	1025	NA	0.50	316	—
Levantine Aurignacian	970–980	975	807	+0.8	419	—			Not found			
Ahmarian	940–980	965	424	+0.9	248	H			Not found			
Levantine Mousterian	—	900	216	+2.5	164	H	—	1300	116	0.20	148	—

*GS, ground stone; H, hearth; S, structure; BM, bedrock mortar; and P, petroglyph.

that the long-term campsites are consistently larger than those thought to represent ephemeral campsites, their higher artifact densities not only suggest higher rates of artifact discard resulting from longer durations of residence but also greater numbers of inhabitants. If the discard rates and number of inhabitants were held constant, for example, the larger long-term campsites would be expected to have lower artifact densities than the smaller ephemeral campsites.

Another indicator of the different uses of the two site types is the greater abundance of features (hearths, structures, bedrock mortars, and petroglyphs) and bulky artifacts (ground stone artifacts) in the long-term campsites (Table 2).

The natural settings of the sites and evidence (cementum increment and phytolith data) for the season of their occupation indicate that the long-term campsites were inhabited during the winter, wet season, and the ephemeral campsites were established during the warm, dry season. An exception to this pattern is the Natufian permanent or semipermanent camp that was inhabited at least part of the wet and dry seasons as indicated by cementum increment analysis of gazelle teeth recovered from the deposit (*7*). In conjunction with a seasonal pattern of coalescence and dispersal, the prehistoric groups of the region selected specific elevational belts for seasonal exploitation, and these preferences varied through time.

During the Pleistocene, long-term, winter camps were established in the lower piedmont and lowlands of the Wadi Hisma at elevations between 800 and 1000 masl. In contrast, ephemeral, warm season camps were situated within the higher piedmont (and presumably the uplands) at elevations above 1000 to 1300 masl (Fig. 4). Beginning in the terminal Pleistocene and extending to Holocene and modern times, this pattern was largely reversed. Long-term winter camp sites of Natufian, Chalcolithic, and historic Bedouin groups were restricted to the higher piedmont between 1000 and 1300 masl, whereas the associated ephemeral camps cluster between 800 to 900 masl.

Table 2. Biogeographic affiliations of the archaeological industries identified in the study area.

Steppe-desert	Mediterranean woodlands
Timnian	
Mushabian (Madamaghan industry)	Natufian Geometric Kebaran (Middle, Late, and Final Hamran) Kebaran (Early Hamran)
Qalkhan	Levantine Aurignacian (?)
Early Ahmarian Levantine Mousterian "D" type	

Even under the predominantly moister Pleistocene conditions for the region (*8*), occupation of the lower elevation sites would have been restricted to the winter, wet season and early spring, because surface water would have been unavailable during the middle and latter portions of the dry season. The higher piedmont and uplands, on the other hand, would have made poor winter habitats because of cold temperatures and heavy snow. The use of natural shelters is consistent with the proposed seasonal schedule for occupation of the different elevational belts. Without exception, the long-term lower elevation sites thought to represent cold, wet-season camps are positioned within southwest-facing natural shelters. The nighttime drop in temperature is considerably moderated by heat radiated from the dark red sandstone forming the backs of the shallow shelters. All of the long-term sites are located within 0.5 km of a Pleistocene lake, represented today by a playa. Most of the ephemeral sites occur in the open, but when found in protected settings they often have eastern or northern exposures.

Direct evidence available for determining seasonality also points to winter residence at the long-term sites. Phytolith samples from Mousterian, Epipaleolithic (Madamaghan), and Chalcolithic (Timnian) deposits of long-term camps consistently indicate that they were occupied outside of the flowering season (spring and summer) (*9*). Moreover, cementum increment analysis of gazelle and caprine teeth from the Madamaghan site of Tor Hamar confirms a winter occupation of the shelter (*7*).

The adjustments in mobility and sizes of residential units that corresponded to the long-term and ephemeral sites appear to have been accompanied by shifts in provisioning strategies. To use Kuhn's (*10*) terminology, the residents of long-term, winter camps apparently provisioned their occupations as places with a radiating settlement-procurement structure. Among hunter-gatherers, this provisioning strategy and settlement structure are based on the anticipation that resources will be needed at a specific locus in the future. The importation of resources from beyond the limits (10-km radius) of the catchment (the area that is typically exploited by a group from a residential camp) of a site is characteristic of a radiating settlement-procurement pattern (*11*). For the long-term sites in the study area, the presence of bulky and nonportable artifacts, petroglyphs, and structures, along with evidence for the bulk acquisition of chert and granite for ground stone from distant sources, confirms such a pattern. Studies of the lithic artifact assemblages show that manufacturing activities included a full sequence encompassing raw material acquisition, core shaping, blank removal, and tool manufacture and rejuvenation.

In contrast, during their occupation of ephemeral, warm-season camps, groups appear largely to have provisioned their activities in an opportunistic manner or to have provisioned individuals with portable toolkits and resources. These provisioning strategies typically are associated with a circulating settlement-procurement structure in which most resources are obtained from within a 10-km radius defining the economic catchment of a residential camp. Beyond the scarcity or absence of nonportable artifacts, the chipped stone assemblages of ephemeral sites are dominated by artifacts of final production stages associated with the maintenance and rejuvenation of tools.

Implications of Climatic-Environmental Changes

The elevational belts selected for the locations of long-term winter camps appear to have shifted in concert with fluctuations in temperature (Fig. 5). Globally, two intervals of elevated temperature are recorded for the last 70,000 years (*12*). These were

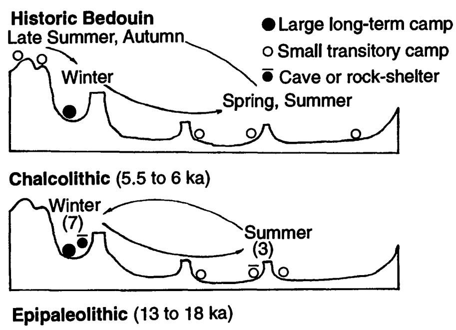

Fig. 4. Idealized patterns of transhumance from Middle Paleolithic to historic Bedouin. Note the change in pattern beginning with Chalcolithic. Numbers of sites are given in parentheses.

separated by a cold interval, from 30 to 13 ka, in which temperatures were depressed about 4° to 5°C below modern levels (*11*). With two minor exceptions, this global temperature reconstruction closely parallels that developed locally from palynological data (8). The pollen evidence indicates a brief cold interval at 12.5 to 13 ka and a short warm episode at 16.5 ka.

Long-term winter camps were positioned at their lowest elevations (800 to 900 masl) during this cold interval, as evidenced by the Early, Middle, and Late and Final Hamran occupations situated in rock-shelters overlooking dry lakes on the floor of the Hisma. Although pollen data suggest that moisture levels oscillated during this interval, there was evidently adequate runoff throughout the Hamran succession to maintain at least seasonal lakes. During the earlier warmer interval between 30 to 38 ka, Upper Paleolithic long-term camps were established at elevations from 950 to 1000 masl. With the marked rise in temperature that occurred during terminal Pleistocene and Holocene times, long-term winter camps were situated at progressively higher elevations to points more than 1200 masl. Accompanying this shift to higher settings for winter camps, the transhumant pattern of the Pleistocene was largely reversed. Rather than an exploitation of the piedmont and uplands during the warm, dry season, Holocene groups dispersed to the lowlands during the spring and early summer and then migrated to the uplands toward the end of the dry season.

Regardless of the specific transhumant pattern followed by the inhabitants of the region, the linkage between temperature and the elevational settings of long-term winter camps may be understood in light of groups attempting to position themselves near dependable water sources and at the same time remain within elevational belts that allowed for comfortable temperatures. During cold intervals comfortable temperatures would obviously have been found at lower elevations. But lower temperatures would also have reduced rates of evaporation and thus extended runoff from upland rains and snow to lower elevations. Historically, Bedouin groups inhabiting the region abandoned the uplands in the winter and established camps in the piedmont below 1400 masl (*13*). The mean minimum winter temperature of the uplands is 0° to 3°C, whereas that of the piedmont falls between 3° to 6°C (*14*). It seems then that the critical minimum temperature for determining the elevation of establishing winter camps in the region is that at or near freezing, at least for modern Bedouin groups.

When paleotemperatures are considered in the context of the universal temperature lapse rate (−0.66°C, 100 m), this freezing line typically would have been encountered just above the elevations of long-term winter camps (Fig. 5). Thus, as with Bedouin groups, the prehistoric inhabitants of the region likely positioned their winter camps at elevations that would ensure the availability of surface water from upland runoff and, at the same time, provide nighttime temperatures above freezing.

Another persistent feature of the adaptive strategies followed by the prehistoric inhabitants of the region, one inherent in transhumance, was the partitioning of resources by season and elevational belt on the basis of productivity and predictability. The winter, wet season and early spring corresponded to the peak in the availability of food and water. During the long dry season these resources progressively declined. During most of the Pleistocene, the high elevations of the piedmont and uplands would have been available for intensive exploitation only during the warm season, whereas the lowlands were potentially exploitable during most of the year. With the higher temperatures and generally drier conditions of the Holocene, this pattern was reversed. The lowlands were inhabitable only during and immediately after the wet season when game, pasturage, and water would have been available, whereas the high piedmont was potentially exploitable during most of the year.

Over a span of about 70,000 years, hunting-gathering and, later, pastoral populations of the region incorporated into their annual ranges resource zones that were seasonally marginal. Although the resources in these zones were less abundant and predictable than those in the zones selected for intensive exploitation during the winter, wet season, their seasonal use would have

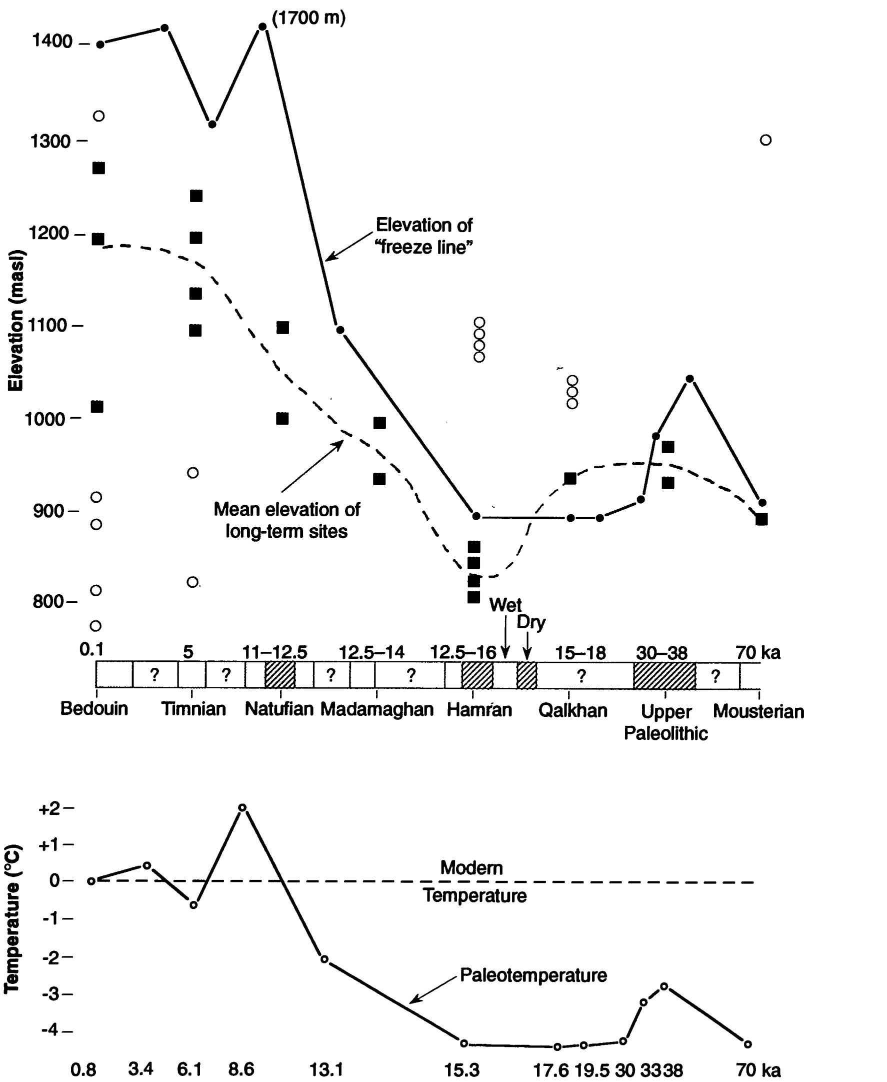

Fig. 5. The elevations of winter, long-term campsites of different archaeological industries in comparison with the "freeze-line" as reconstructed from paleotemperatures (*11*). The sites typically rest just beneath the elevations, where mean minimum winter temperatures would have been at freezing. ○, Ephemeral, warm, dry season sites; ■, long-term, cold, wet season sites.

relieved pressure on the optimum resource zones. This strategy of partitioning resources thus allowed for conservation of resources that were more intensively exploited during the time of population coalescence and reduced mobility. However, this practice demanded that groups make substantial seasonal adjustments in their settlement-procurement structure, residential mobility levels, residential populations, and provisioning strategies.

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Risking Everything? Risk Behavior, Behavior Change, and AIDS

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Inquiry into the determinants of risk-related sexual behavior is important for the development of interventions to reduce the incidence of new cases of human immunodeficiency virus infection. Recent social and behavioral research has revealed much about the individual and social factors influencing risk-taking. Findings from these studies have been important in the development of new educational and community-based interventions for communities at risk in the developed and developing worlds.

The long slow tragedy of acquired immunodeficiency syndrome (AIDS) continues to unfold. The most recent figures from the World Health Organization (WHO) estimate that, worldwide, at least 3 million people have developed AIDS and that, cumulatively, at least 15 million people have been infected by the human immunodeficiency virus (HIV) (*1*). By the year 2000, it is estimated that, cumulatively, 30 to 40 million people will have been infected since the start of the epidemic. The scale of this tragedy is immense, but because the epidemic's effects are insidious rather than instantaneous, localized rather than universal, the response has been uneven. Since the discovery of HIV in 1983, vast sums of money and the best scientific expertise have been directed toward a better understanding of the virus and its effects. Considerable advances have been made in these fields, and a number of candidate vaccines are now under development, although major obstacles remain to be overcome (*2*). Although there have only been limited advances in anti-retroviral treatment for those already infected, care for some of the more common opportunistic infections has greatly improved (*3*). The estimated distribution of total adult cases of HIV infection at the end of 1993 is shown in Fig. 1.

Although an effective vaccine or the definitive cure currently evades biomedicine, behavior change has been demonstrated to be a potentially effective means of slowing the spread of the virus and the human suffering it brings in its wake (*4*). Peter Lamptey, director of the AIDS Control and Prevention Project, and colleagues from the WHO Global Programme on AIDS pointed out at the IXth International Conference on AIDS in Berlin in June 1993 that the need for sustained behavior change is not only important now but will always be. Efforts to facilitate safer behavior should not cease if and when effective vaccines become available (*5*, p. 18).

The ideal HIV vaccine has to be safe, orally administered, single dose, stable, inexpensive, confer permanent life-time immunity and be effective against all HIV "strains". This is obviously an unrealistic expectation, at least in the next 10 to 20 years. Even if there were a major technological breakthrough and a cure or a vaccine tomorrow, the current behavioural and biomedical interventions would still be needed.

Behavioral science has already identified the main determinants of risk behavior and has contributed substantially to the design of programs that reduce personal risk, thereby limiting the spread of the virus. The appearance of the virus in populations as yet unaffected, however, and its continuing spread elsewhere require intensified efforts to ensure an expansion of existing education and communication programs. Because HIV and AIDS affect communities worldwide, with differing practices, cultural expectations, and beliefs, the social and behavioral research agenda is broad and urgent, as is the need to apply what has been learned in interventions for prevention. Yet, the U.S. National Commission on AIDS recently estimated that only about 12% of U.S. federal spending on AIDS went to behavioral research (*6*). The picture is little different in other developed nations, whereas, in general, the situation in the developing world is even less favorable (*7*).

In 1987, WHO declared HIV a global pandemic and initiated an accelerated global response that resulted in the creation of National AIDS Programmes in all developing countries. This initiative has provided financial, scientific, and technical support for National AIDS Programmes in their efforts to limit the spread of the virus and to ensure adequate care for those already infected. The basis of an infrastructure is therefore in place for the implementation of social and behavioral research findings in practical interventions.

Patterns of Spread

The incidence of AIDS varies widely among neighboring populations and countries, even those with apparently similar

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