THE NEOLITHIC OF THE LEVANT

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ABSTRACT

THE NEOLITHIC OF THE LEVANT
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The archaeological evidence for the Neolithic of the Levant, considered to have lasted from c. 8500 to 3750 B.C., is presented and an attempt made to explain its origins and development. The discussion is concerned with four principal themes: (1) the transition from a hunter-gatherer to a farming economy, (2) the social evolution that accompanied this economic development, (3) population growth immediately before and during the Neolithic and (4) the modifications in settlement patterns which followed these other changes. The environmental changes which occurred at the end of the Pleistocene and early in the Holocene are believed to be of fundamental importance. The degree of their influence on the four main themes is examined. The effects of man's own changing activities upon his environment are also considered.

The Neolithic of the Levant is divided into four stages, designated Neolithic 1 to 4, on the evidence of changes in economy, population, settlement patterns and cultural remains. Regional groups of sites, defined by their cultural material, may be discerned and their evolution followed from one stage to the next. The detailed archaeological evidence is examined principally for the light it throws upon the development of the four main themes of the thesis and the contemporary changes in environment.

It is argued that the amelioration of the environment in the late Pleistocene created a greater supply of wild foods for man which stimulated population growth. This was accompanied by increased sedentism and the development of agricultural techniques. In Neolithic 2 agriculture was intensified and the population grew further. After 6000 B.C. the population of the Levant lived in permanent settlements supported by agriculture but these were concentrated only in the more fertile and well-watered areas of the Levant. This new way of life permitted another increase in population in Neolithic 4 despite a deterioration in the environment.

ACKNOWLEDGEMENTS

This thesis was written between 1975 and 1977 but much of the information I have used was obtained in studies carried out as far back as 1969 when I first went to the Near East to begin research. Throughout I have benefited from the encouragement and advice of my supervisor, Dame Kathleen Kenyon. She introduced me to Near Eastern Archaeology by inviting me to participate in her excavations in Jerusalem in 1966. She has allowed me to study all the available Neolithic material from her excavations at Jericho and to use whatever information I needed from the records of the excavation. Her firm criticism has clarified my thinking and writing while her generous praise has given welcome support. I owe her much.

I studied under Professor J.D. Evans at the Institute of Archaeology of London University from 1967 to 1969. It was he who stimulated my interest in prehistory and the problems of the Neolithic. His humane approach to the study of prehistory has influenced my own work and I am grateful to him for his continued interest in the progress of my research.

The Queen's College, Oxford awarded me a Randall MacIver Studentship from 1969 to 1971 and the British School of Archaeology in Jerusalem made me their Annual Scholar from 1969 to 1970. These two studentships enabled me to spend a year and a half travelling through much of the Near East, visiting ancient sites and studying museum collections. During this period I formed a working knowledge of the available archaeological material which I have used in preparing this thesis. In 1973 I was awarded a Gerald Averay Wainwright Research Fellowship in Near Eastern Archaeology at Oxford. This Fellowship has supported me while I prepared the text of the thesis; it has also allowed me to continue work on my other research projects, in particular my excavation of Tell Abu Hureyra.

I wish to thank the Curators and staff of the Pitt Rivers Museum and Dr. D.A. Roe of the Donald Baden-Powell Quaternary Research Centre for affording me facilities and practical help during the preparation of this thesis.

In all my sojourns in the Levant the Directors and staff of the Departments of Antiquities in each country have readily granted me permission to carry out my research. The Curators of all the major museums have also allowed me full access to the collections of material in their charge. It will be evident that I could have accomplished little without this help. These authorities have also frequently given me much other practical assistance and generous hospitality for which I offer my grateful thanks. Very many other people from high officials to simple peasants and nomads have helped me in my travels so putting me in their debt in ways that cannot be repaid. It is a pleasure to recall and acknowledge these innumerable kindnesses here which have been given so freely in the true tradition of Levantine hospitality.

Many archaeologists and other scholars in several countries have allowed me to study material from their excavations or from collections in their care. Much of this information has been incorporated in the thesis. Others have helped me by analysing samples submitted to them. All have willingly answered my questions and discussed matters of common interest. I wish to thank them all and in particular the following: Prof. E. Anati for showing me his material from Tell Abu Zureiq; Prof. and Mrs. Braidwood for showing me their material from the Amuq tells, Tell Fakhariyah, Tabbat el Hammam and other sites as well as much helpful discussion; M. and Mme J. Cauvin for showing me their excavations at Mureybat and material from the site, and for several useful discussions; M. H. de Contenson for first introducing me to the archaeology of Syria, for allowing me to participate in his excavations at Tell Aswad in 1971, for access to material he has excavated from other sites and for many other kindnesses; Mrs. L. Copeland for numerous discussions on the prehistory of the Levant and much valuable help and advice given over many years; Dr. R. Dornemann for allowing me to study his material from El Kum; M. M. Dunand for permitting me to study material from Byblos, showing me his excavations and much kind hospitality; Prof. R. Dyson for allowing me to see material in the University Museum of the University of Pennsylvania; Père H. Fleisch S.J. for giving me free access to the collections in the Université Saint-Joseph, Beirut and for much valuable information; Dr. D.H. French for access to the collections of the British Institute of Archaeology in Ankara; Dr. J.B. Hennessy for showing me his material from Teleilat Ghassul and for much other help in Jerusalem; G. Hillman for analysing the plant remains from my excavation at Tell Abu Hureyra; Père F. Hours S.J. for information about his excavations at Jiita, help in the Université Saint-Joseph, Beirut and many valuable discussions; J. Kaplan for allowing me to study material from several of his excavations; L.H. Keeley for examining several tools from Tell Abu Hureyra for traces of microwear; Prof. C.C. Lamberg-Karlovsky for access to the collections of the Peabody Museum, Harvard University; A.J. Legge for information about his work at Nahal Oren and for examining the faunal remains from Tell Abu Hureyra; Prof. A.E. Marks for allowing me to study material from his excavations at Southern Methodist University, Dallas; Prof. M.J. Mellink for access to the material from Tarsus kept at Bryn Mawr College; Mrs. J. Crowfoot Payne for showing me the chipped stone tools from Jericho and for many helpful discussions; M. J. Perrot and his assistants for showing me material from his excavations; Dr. B. Rothenberg for allowing me to see material from sites he has discovered in Sinai; Dr. B. Schroeder for showing me material from his excavations at Nacharini and for information about his research; G. de G. Sieveking and C. Bonsall for access to material from Nahal Oren and other sites in the British Museum; the late Father J. Şira S.J. for showing me material from the first excavations at Teleilat Ghassul and surface collections from other sites kept in the Pontifical Biblical Institute, Jerusalem; the late Père R. de Vaux O.P. for allowing me to study material from his excavations at Tell el Far'ah at the Ecole Biblique Saint-Etienne, Jerusalem and for valuable discussions; S.E. Warren of Bradford University for all his help in our joint project of obsidian analyses, and Professor T. Cuyler Young and his assistants for showing me material in the Royal Ontario Museum, Toronto.

INTRODUCTION

Man has been a mobile hunter-gatherer for most of his existence. This pattern was first modified during the Neolithic when sedentary societies were formed whose members lived in permanent villages and depended upon agriculture for their livelihood. These momentous developments were the most significant changes in man's way of life since his evolution as a species. They were also an essential first step in the subsequent evolution of civilization. The origins and development of this new social and economic system in the Levant will be the subject of my thesis.

The Levant was one of the regions in the Near East where these changes in society and economy began. This happened well before the adoption of the new way of life by mobile societies in Europe and Africa. Thus we should study the Neolithic in this region if we are to understand how the new pattern of existence came about and what its immediate consequences were.

The Levant is a distinct geographical region defined by natural frontiers (Fig. 1). To the north the Taurus Mountains lie between it and the Anatolian plateau while to the east and south-east the Syrian desert separates it from Mesopotamia and Arabia. Sinai and the Gulf of Suez form the boundary between the Levant and Egypt. These geographical limits also served as cultural boundaries throughout the period that I shall consider. They reinforced the regional nature of Levantine culture and its development. Thus the Levant formed both a geographical and cultural unit throughout the Neolithic and, indeed, for some time before which makes it a particularly convenient region in which to study the emergence of the new way of life. It is also the region in the Near East which has been most intensively explored by archaeologists interested in Mesolithic and Neolithic communities so that we may consider the origins and development of the first agricultural societies in greater detail here than anywhere else.

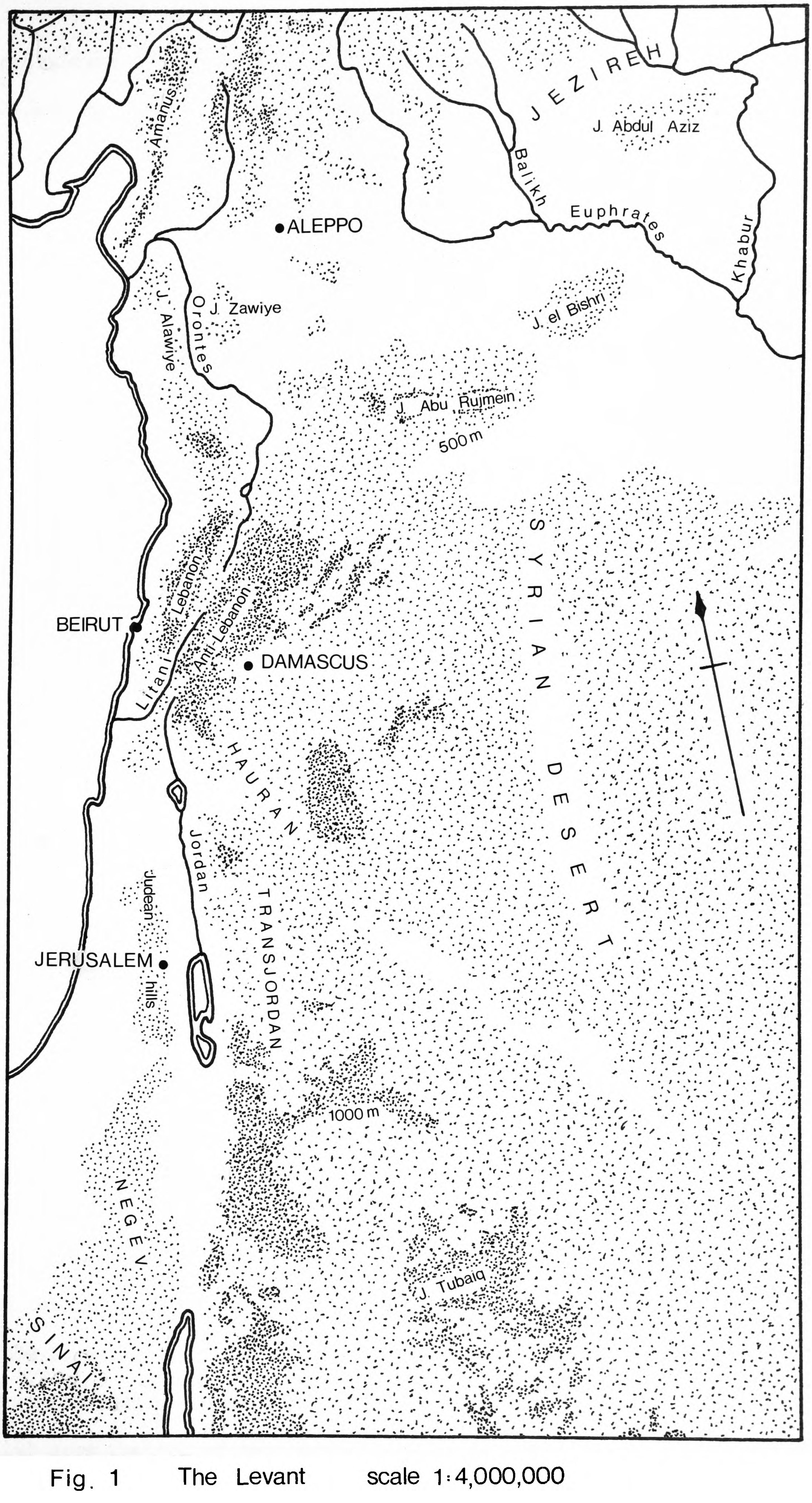

Fig. 1 The Levant scale 1:4,000,000

Agriculture formed the basis of the new way of life so the evolution of this economy will be the first main theme of my thesis. Agriculture involves the controlled exploitation of plants and animals, the planting and harvesting of crops and the reproduction and regular culling of flocks and herds. I shall consider what species of plants and animals were selected for agriculture by man in the Levant. I shall also attempt to describe the systems of farming employed and how these species were exploited within them.

The change from a hunter-gatherer to a farming economy brought about considerable alterations in the way human groups were organized. At the beginning they were widely dispersed across the landscape rarely remaining in one place for more than a few weeks at a time. Towards the end of the Neolithic by contrast most people were concentrated in villages where they spent all their lives. In the course of this fundamental change in social organization relations between members of each group were also greatly modified. These changes in social structure are to us perhaps the most important of all the consequences of the Neolithic since they concern the way in which members of our own species behave towards each other. Thus the changes that took place in social structure will be the second principal theme of my thesis.

We believe that the population grew during and after the period of transition from a hunter-gatherer to an agricultural way of life in the Levant. This increase would have been intimately connected with the change in economy and would have had an important influence on the modifications of the social structure. A consideration of the question of population growth will be third theme of my thesis.

Such fundamental changes in economy, social structure and human numbers would be reflected in the pattern of settlement. The distribution of sites across the landscape and their nature would depend upon all these factors. The internal arrangements of each site might also be expected to reflect the social organization of its inhabitants and the size of the group which lived on it. Changes in settlement patterns will be one of the most important items of archaeological evidence that I shall consider and in themselves will form the fourth major theme of my thesis.

The transition from mobile hunting and gathering which had characterised man's existence throughout the Palaeolithic to a Neolithic agricultural society living in permanent villages took place about the time of the change from Pleistocene to Holocene. During this period the temperature began to rise world-wide, the glaciers retreated and the sea level rose. This coincidence is important for it may indicate that the two phenomena were related, that the environmental changes created conditions which were favourable for the development of the Neolithic way of life. It will therefore be necessary to examine in detail the climate and environment of the Levant in the late Pleistocene and to see how these were modified during the early Holocene. This will be the subject of Chapter 1. In subsequent chapters I will examine the effects of the environmental changes on the factors which form the main themes of the thesis. Man himself was not simply affected by alterations in his environment but contributed to these changes by exerting his own influence on his surroundings. During the Neolithic, perhaps for the first time, he came to play a significant role in determining the nature of his environment. I shall discuss the evidence we have for the effects of man on his surroundings in appropriate sections of the thesis.

The origins of the Neolithic way of life can only be understood if we know how the people of the Levant lived in earlier periods. To this end I shall consider the Mesolithic of the Levant, the stage preceding the Neolithic, in Chapter 2 of the thesis. I shall examine in outline the settlement pattern, economy, population and social structure of Mesolithic communities in the Levant since these concern the major themes of the thesis.

The changes in economy, social structure, population and settlement that occurred during the Neolithic can only be determined by a thorough enquiry into all the archaeological evidence. It will be necessary to consider most of the known sites themselves and their distribution as well as the remains that have been found on them in excavation, survey or by chance. The organic remains found on some sites are the most important source of evidence for the economy but I shall also consider other material that has a bearing upon this main theme. The relative dates when each change occurred provide the framework within which all the other kinds of evidence must be ordered. These dates depend upon the chronology of the evolution of the Neolithic derived from absolute dating and the comparative stratigraphy of sites and typology of artifacts. I shall consider these topics in detail at appropriate places in each chapter.

The enquiry into the archaeological evidence will form the bulk of the thesis from Chapters 3 to 6. It will be seen that I conclude from this that the evolution of the Neolithic of the Levant falls into four stages. In each chapter I shall first present the archaeological evidence for the successive stages. I shall then consider changes in settlement patterns, economy, social structure and population in relation to this evidence. My conclusions on how the Neolithic began and subsequently developed will be presented in Chapter 7.

Much of the thesis will be necessarily devoted to establishing through a detailed description of the archaeological material what happened in the Neolithic. I wish to take the enquiry further than this by attempting to explain why the changes that I shall present, particularly in economy, social structure and population, took place. The scope of the discussion will be broad since it concerns one of the most important changes that has taken place in man's way of life as it occurred in a large region and over a considerable span of time. It will afford an opportunity to consider one of the problems of modern archaeological theory: is there one all-embracing model or explanation by which the changes I shall describe may be understood? Is there any single event or cause to which all that followed may be attributed? Were there several factors which determined the course of events?

On the other hand, did the Neolithic of the Levant come about as the result of some haphazard conjunction of circumstances? Or are there other explanations for this fundamental change which lie between the two extremes of these theoretical approaches?

Chapter 1

THE ENVIRONMENT OF THE LEVANT IN THE LATE PLEISTOCENE AND EARLY HOLOCENE

The environment of the Levant at the close of the Pleistocene and early in the Holocene was until recently poorly understood. It had long been thought that changes in the environment at the end of the Pleistocene contributed to the evolution of the Neolithic way of life but the influence of these changes could not be properly assessed. Recent studies in geomorphology, palynology and palaeozoology have produced new evidence on which to base an outline reconstruction of the environment in the late Quaternary. I will begin this chapter by discussing certain general factors which affected the environment of the whole Levant. I will then consider the evidence for the climate, landscape and vegetation of each region of the Levant and how they were modified, first in the late Pleistocene and after in the early Holocene.

In northern latitudes the late Pleistocene is marked by the Würm/Wisconsin glaciation. The Near East was not directly affected by the advance of the European ice sheets but its climate was significantly altered nonetheless. An indication of these climatic changes has been obtained from studies of the fauna and sediments in several deep-sea cores. Analyses of cores drilled in the Red Sea have determined that the climate was cooler and more humid there during the period of the last glaciation (Herman, 1968, 345). Two other deep-sea cores have been drilled in late Quaternary deposits in the eastern Mediterranean, one between Cyprus and Crete (no. 189) and the other west of Crete (V 10.67). Oxygen isotope analysis of these cores has shown that the temperature of the Mediterranean fell considerably during the period of the last glaciation (Emiliani, 1955, 90; Vergnaud-Grazzini, Herman-Rosenberg, 1969, 288) and studies of the fauna of core V 10.67 have confirmed this conclusion (Vergnaud-Grazzini, Herman-Rosenberg, 1969, 283). There is some doubt about how much the temperature actually decreased at this time but recent work suggests that the estimate of Vergnaud-Grazzini and Herman-Rosenberg of a fall of between 5° and $10^{\circ}C$ is the more reasonable (Farrand, 1971, 534).

This drop in temperature caused increased glacial activity in the mountainous regions of the Eastern Mediterranean. The present relict glaciers in the Taurus expanded considerably and it is estimated that the snowline lay about 1000m lower than today (Messerli, 1967, 139), that is at about 2650m. It is also believed that there were glaciers in the Mountains of Lebanon and on Mount Hermon (Kaiser, 1961, 131ff; Klaer, 1962, 97; Messerli, 1966, 46ff) but there is a divergence of opinion over how much the snowline was depressed in the Levant. Klaer claims that the permanent snowline today would lie between 3200 and 3400m (1962, 97) but Messerli estimates that it would be as high as 3700m (1966, 61), that is above the summits of the highest mountains in the Lebanon. Both derive their different estimates from studies of present snowfall. Klaer and Messerli have also examined the evidence for glaciation in the mountains and almost agree on the level of the permanent snowline during the Würm. Klaer thinks that it lay between 2750 and 2850m and so fell about 500m (1962, 117); Messerli believes that the snowline was at about 2700m (1966, 61), a much greater fall of about 1000m. Messerli's estimate of a depression of about 1000m would agree better with the evidence from the Taurus and so may be the more likely. If a fall in the air temperature was the sole cause of this lowering of the snowline then it would need to have dropped about 6° or $7^{\circ}C$ (Messerli, 1967, 207; Farrand, 1971, 550), an estimate which agrees broadly with the evidence of the deep-sea cores.

Studies of the sediments of some cave sites in the Levant have shown that these were deposited under the prevailing cooler climate of the last glaciation. This is most apparent at the inland sites of Jerf 'Ajla and Yabrud which were affected by continental conditions. Frost weathering could be detected throughout the Mousterian and Upper Palaeolithic sequence at Jerf 'Ajla (Goldberg, 1969, 750) although there were some fluctuations reflecting warmer climatic phases. It is also believed that the top five metres of deposit at Yabrud I, which includes the Mousterian layers, was laid down under cooler conditions (Farrand, 1965b, 41ff). Although winters can be cold in these areas today they are rarely cool and moist enough to cause significant frost weathering.

Farrand has detected cryoturbation in the Levallois-Mousterian and Upper Palaeolithic layers at Jebel Qafzeh (1971, 553; 1972, 233) near Nazareth. This site lies on the edge of the Galilee hills at an elevation of 220m (Bouchud, 1974, 87), sufficiently high apparently to have experienced frost weathering. The climate at coastal sites such as Tabun was also somewhat cooler during the last glaciation (Jelinek et al., 1973, 177) but not cold enough, apparently, to cause significant frost weathering (Farrand, 1971, 553). The evidence from the caves thus supports that from other sources, indicating that during the last glaciation the temperature in the Levant fell by several degrees.

The advance of the ice sheets absorbed water from the oceans and markedly lowered sea-levels. During the later Würm sea-levels throughout the world fell by perhaps 100 or 150m (Fairbridge, 1961, 152; Milliman, Emery, 1968, 1123; Butzer, 1972, 217) which considerably altered the configuration of the coastline of the Levant. Taking the more modest estimate of a fall of 100m, the shoreline in Palestine would have lain 15 km further west across a gradually sloping coastal plain. In Lebanon and southern Syria the coastal plain would have been about 5 km wider than now, sloping down to the sea and dissected by wadis. North of Lattakia it would have been only 2 km wider with a steep slope.

The displacement of the coastline has important implications for the pattern of later prehistoric settlement as we see it today. All Terminal Palaeolithic and Mesolithic sites and some early Neolithic ones now situated near the sea would have lain well inland at the time they were inhabited.

This includes the sites in the coastal dunes and around Mount Carmel in Palestine as well as many of the shelter sites in Lebanon. An open coastal plain would have lain to the west of these sites so their environments would have appeared much more favourable for settlement then than they do now. Almost certainly many more prehistoric sites were situated on the coastal plain which are now drowned. These would have included almost all the sites whose inhabitants might be expected to have supported themselves partly by fishing. Our present views about the economy and settlement pattern of sites on the seaward side of the coastal hills and mountains of the Levant will thus be distorted if we fail to allow for this evidence which we have lost.

Palaeotemperature studies of deep-sea cores from the Atlantic, Caribbean and Pacific indicate that the temperature gradually began to rise worldwide between 20,000 and 15,000 B.P. (Emiliani, Shackleton, 1974, figs. 3, 4). After 15,000 B.P. it rose sharply until it reached a maximum about 5000 B.P. The palaeotemperature curves derived from deep-sea cores mask almost all the minor fluctuations in temperature that occurred during this period but one temporary fall in temperature about 10,000 B.P. lasted long enough to be detected in the Caribbean cores (Emiliani, 1972, fig. 3). This has been equated with the Post-Allerӧd or Younger Dryas phase of cooler climate in northern Europe (Lamb, Woodroffe, 1970, 40).

As the temperature increased so the glaciers melted and the level of the oceans around the world began to rise; this process had certainly begun by 12,000 B.C. (Milliman, Emery, 1968, 1123) and perhaps earlier before 14,000 B.C. (Farrand, 1965a, 396; Shackleton, Opdyke, 1973, 46). Thereafter, although interrupted by several short stages of retreat (Curray, 1961, 1707ff; Fairbridge, 1961, 154ff) the level of the oceans rose rapidly until about 5000 B.C. and then more slowly until it reached its present level about 4000 (Fairbridge, 1961, fig. 14; Shackleton, Opdyke, 1973, 46) or 3000 B.C. (Butzer, 1972, 530). There is no general agreement on the actual levels of the sea worldwide at particular times during this period although one can gain some idea of the rapidity of the transgression by comparing estimates based on evidence from the continental shelves. Thus by 10,000 B.C. Fairbridge estimates that the sea had risen to about 40 or 50m below its present level (1961, fig. 14) although Milliman and Emery believe it still to have been much lower (1968, figs. 1, 2): at 7000 B.C. perhaps 15 (Fairbridge, 1961, fig. 15) or as much as 50m lower (Milliman, Emery, 1968, figs. 1, 2): at 5000 B.C. 10 to 30m below present levels.

The most recent curve of glacio-eustatic sea-level fluctuations during the Quaternary is that published by Shackleton and Opdyke (1973, fig. 7). This was derived from oxygen isotope analysis of foraminifera in a core, Vema 28-238, drilled in the sea bed of the Pacific. This new evidence also indicates that the level of the sea rose rapidly once the ice began to melt. The curve agrees better with that of Fairbridge than of Milliman and Emery; Shackleton and Opdyke estimate that at 10,000 B.C. the sea would have been about 30 to 40m below the present level.

These estimates may not correspond exactly with the Mediterranean rise in sea-level but as a recent study has shown that there was little tectonic movement along the Levant coastline during this period (Sanlaville, quoted in Copeland, 1975, 318) they probably give a rough indication of the rate of change. They suggest that the coastal plain was sufficiently open to facilitate communications along the Levant coast until about 7000 or even as late as 5000 B.C., that is during the later Neolithic. Thereafter, although the level of the sea rose further and there were additional minor fluctuations (Sanlaville, 1969, 290), this had no significant effect on the pattern of settlement. Movement along the coast became more difficult, particularly at the foot of the Mountains of Lebanon between Beirut and Tripoli.

Studies of shorelines, sediments and pollen samples have shown that there were several marked oscillations in climate during the period of the last glaciation and after. Unfortunately these oscillations are not well dated and it is difficult anyway to correlate the evidence from these different sources. Thus there is no general agreement on the pattern of climatic change in the Levant during the late Pleistocene and Holocene. Some authorities believe they can detect a detailed sequence of climatic fluctuations which matches the well-documented record of northern Europe (Horowitz, 1971, 274ff) while others think that the evidence is insufficiently detailed for such a precise evaluation (Farrand, 1971, 559; Butzer, 1975, 389, 404). Nevertheless, there is now enough evidence from a variety of sources to attempt a reconstruction of the environment at the close of the Pleistocene and in the early Holocene, even if the absolute chronology is still uncertain.

Late Pleistocene

During much of the period of the last glaciation the inland basins of Palestine and Transjordan were filled with "pluvial" lakes. The largest of these was the Lisan lake which flooded much of the Rift valley at present occupied by the Sea of Galilee, the River Jordan and the Dead Sea. This lake came into existence after about 70,000 B.P. and was maintained at its highest level from about 50,000 to 20,000 B.P. during the "Lisan" Stage (Neev, Emery, 1967, 26, fig. 16). It was then about 220 km long although no more than 17 km wide and its surface was at about 180m below mean sea level, some 200m above the present surface of the Dead Sea (Neev, Emery, 1967, 25).

It is believed that the Lisan lake was created during a period of increased precipitation, or at least at a time when there was more run-off of surface water and less evaporation in the Rift valley (Neev, Emery, 1967, 26). The ecological equilibrium in this region is easily disturbed so even small changes in climate can have a great effect on the environment. It has been calculated that a rainfall increase of as little as 200m in the Rift valley catchment would be sufficient to create the Lisan lake (Ben-Arieh, 1964, 46) without any change in other variables. We know from other evidence that the temperature fell by at least 5°C during the last glaciation which, as Butzer has pointed out (1975, 393) would have increased effective precipitation by reducing evaporation. It may be that there was little more actual rainfall but combined with the drop in temperature this was enough to fill the Lisan basin.

Although the lake was so large it was always too salty for fish and molluscs to live in it (Neev, Emery, 1967, 81) and thus useless to man as a source of food. Because of its length it would also have hindered rapid communication between the Judean uplands and Transjordan.

During the last glaciation another very large lake existed in the Jafr basin to the east of Maan (Huckriede, Wiesemann, 1968, 79) and smaller ones in the Azrak depression and perhaps elsewhere in Transjordan. The Jafr lake was between 1000 and 1800 sq km in area (Huckriede, Wiesemann, 1968, 78). It was a freshwater lake and its sediments were rich in molluscs. An upper layer of the lake deposits has been dated to 27,700 ± 870 B.P. Hv-1719 (Huckriede, Wiesemann, 1968, 81).

Further north the Damascus basin was also flooded during the Würm and there was a small lake in the Barada gorge (Kaiser et al., 1973, 279, 299). Large bodies of freshwater such as the Jafr and Damascus basin lakes would have created highly favourable environments for man. They contained an abundance of fish and molluscs while their marshy shores would have attracted wildfowl and game. Their surface area was sufficiently great for evaporation to create greater humidity in the region than now. This would have made more moisture available for plants through both increased precipitation and dew.

About 18,000 B.C. the Lisan lake shrank until its surface lay at about 37m below mean sea level (Neev, Emery, 1967, 26); this happened very quickly, perhaps within a millennium. The water level of the lake dropped so much during this "Dead Sea" Stage that the Lisan split into four relict lakes: the Sea of Galilee, a lake at Beth-Shan and two lakes in the Dead Sea basin. It is believed that this rapid transformation was partly caused by tectonic subsidence but either a decrease in precipitation or increase in evaporation or a combination of the two must also have taken place. The water level remained low for several millennia but then rose again, apparently because of an increase in available moisture. This phase of higher water level is dated by a single ^{14}C date of 7900 ± 150 B.C. (Neev, Emery, 1967, 28).

The Jafr lake gradually dried up sometime after 26,000 B.C. (Huckriede, Wiesemann, 1968, 80, 82), a process that is probably associated with the demise of the Lisan lake. There followed a very arid stage of uncertain length. This was succeeded by a phase of more effective precipitation during which mudflats were formed in the Jafr basin (Huckriede, Wiesemann, 1968, 82ff). The sequence in the Jafr basin matches that in the Rift valley so, although the mudflat phase is not accurately dated, it can probably be correlated with the phase of Dead Sea higher water level about 8000 B.C.

More arid conditions during the late glacial also caused the Damascus basin lake to diminish in area. This happened some time after 20,000 B.C. and the end of the regression phase itself has a single ^{14}C determination of 17,040 ± 520 B.C. Hv-4471 (Kaiser et al., 1973,279ff, 348ff). There was considerable aeolian erosion during this phase, as in the Jafr basin.

Recent work in Nubia indicates that the climatic pattern in Egypt was closely related to conditions in the southern Levant during the Würm. The climate there was semi-arid but cooler for much of this period with more available moisture than today (Butzer, 1975, 397, 404). The principal phase of increased moisture took place during the earlier Würm between 50,000 and 25,000 B.P. when substantial beds of gravels and silts were laid down by the increased discharge of the Nile and its tributaries (Butzer, 1975, 395ff). This phase was contemporary with the Lisan Stage in the Jordan basin. Thereafter an arid phase ensued, as in the southern Levant, which lasted until about 15,000 B.C. This was followed by two moister phases extending well into the Holocene. The first continued until about 10,000 B.C. and is associated with the deposition of the Darau member of the Jebel Silsila

Formation (Butzer, 1975, 396). The second lasted from about 9200 until 6000 B.C. during which period the Arminna member was formed. These phases coincided with the high level of the Dead Sea that occurred in the Levant at the time of the transition from Pleistocene to Holocene. The coincidence is not exact as on present evidence the two Egyptian phases spanned a longer period than the Levantine phase. After 6000 B.C. the Egyptian climate became arid and, apart from another moist interval in the 4th millennium, it has remained so until today.

The principal source of information about the vegetation during this period comes from palynological studies of cores drilled in lacustrine and riverine sediments. These studies are also an important additional source of information about climatic conditions, even if the data are open to conflicting interpretations.

A deep core, K-Jam, has been drilled in the bed of Lake Huleh into sediments which are believed to date from the present back to the Riss-Würm interglacial (Horowitz, 1971, 266). A pollen sequence has been prepared from this core which shows fluctuations in vegetation that reflect the same climatic changes as the "pluvial" lake sediments. Samples taken from a depth of between 50 and 35m had relatively high values of arboreal pollen (Horowitz, 1971, 267), principally tabor oak (Quercus ithaburensis), indicating that the Galilee hills to the west were clothed with deciduous oak forest. Gramineae and Cyperaceae were poorly represented because Lake Huleh was more extensive then but there was abundant open field vegetation around the lake. This phase apparently can be equated with the Lisan Stage when there was more available moisture than today.

The vegetation changed during the next phase from 35 to 25m in the core. The total percentage of arboreal pollen decreased, reflecting principally a sharp decrease in oak, but the values of olive (Olea europaea), pistachio (Pistacia sp.), Aleppo pine (Pinus halepensis) and cypress (Cupressus sp.) pollen slightly increased (Horowitz, 1971, 267). As these are all

Mediterranean species it appears that the former oak forest in the hills was replaced by open maquis vegetation. Both Gramineae and Artemisia pollen increased; these and other vegetational changes suggest that Lake Huleh diminished in size. Horowitz attributes these developments to the onset of a warmer, humid climate (1971, 267), a conclusion which his evidence appears to contradict. The replacement of oak forest by maquis and the shrinking of Lake Huleh suggest, rather, that there was less available moisture then. A sample from the 30m level has been dated by ^{14}C to 16,850 ± 195 B.C. Hv-1725 (Horowitz, 1971, 264) so this phase appears to be contemporary with the contraction of the "pluvial" lakes. We know from the evidence of the deep-sea cores that the temperature was near its glacial minimum at this date, another fact which conflicts with Horowitz's interpretation.

The phase above, from 25 to 18m in the core, was marked by a rise in arboreal pollen, mostly from oak: the percentage of Mediterranean tree pollen diminished (Horowitz, 1971, diagram p. 260). Pollen of open field species increased with the oak but pollen of marsh plants declined as the lake expanded. Horowitz believes that these changes were caused by cooler, moister conditions (1971, 267) but this is partly contradicted by other evidence which suggests that the postglacial rise in temperature had already begun. This phase in the pollen core corresponds to the rise in level of the Dead Sea in the lower Jordan valley.

The pollen evidence suggests that northern Sinai carried a denser vegetation during the Würm than today (Horowitz, 1975, 221) with scrub cover at least and even some trees in the Negev highlands. There were some variations in the pollen record, reflecting fluctuations in the climate during the Würm. One phase of somewhat richer vegetation in the Negev during the Natufian can be detected from pollen analysis of samples from the site of Rosh Zin (Henry, 1973a, 47). Much of the pollen was from Chenopodiaceae but there was a little arboreal pollen from evergreen oak (Quercus calliprinos) and olive, species that could not survive in the area today.

Pollen analysis of samples from stations on the seaward side of the Mountains of Lebanon has also shown that the vegetation there varied during the Würm under the influence of a changing climate (Leroi-Gourhan, 1973, 44). The Nahr Ibrahim samples indicate that at one stage during the earlier Würm the slopes of the mountains were covered with forest almost down to present sea-level. The forest was composed partly of deciduous species such as lime and hazel with cedar, pine and ivy also present. Conditions needed to be both cooler and moister then than now for these deciduous species to flourish and, as we have seen, there is supporting evidence for such a climatic change from other sources.

Very few late Würm pollen samples have been analysed from Lebanon but there are some indications that the vegetation thinned out in response to a decrease in available moisture (Leroi-Gourhan, 1973, 46). Then almost at the end of the Würm, perhaps about 12,000 or 11,000 B.C., tree pollen increased during a moister interlude. This phase may be correlated with a similar fluctuation in Palestine about this time.

Pollen analysis of a core from Sahl Aadra north-east of Damascus gives further support to this pattern of vegetation change in Palestine and Lebanon. The core was drilled through sediments at the edge of the Damascus basin "pluvial" lake and it spans the later Würm after perhaps 22,000 B.C. Zones 1 and 2 at the bottom of the core, dated by two determinations of $21{,}555 \pm {}^{3255}_{2060}$ B.C. Hv-4468 and 20,060 ± 350 B.C. Hv-4469, had high herbaceous and Gramineae pollen values with some Chenopodiaceae and a maximum of 14% arboreal pollen (Kaiser _et al._, 1973, fig. 5). The latter was principally composed of cedar and pine with a little oak, walnut and some olive. There were traces of silver lime (_Tilia tomentosa_), hornbeam (_Carpinus orientalis/ Ostrya_) and wing nut (_Pterocarya_) which are not found so far south today (Kaiser _et al._, 1973, 305ff) because they cannot tolerate such a warm, dry climate. The arboreal species would have occupied the hills around the

Damascus basin and the Anti-Lebanon Mountains to the west. The profile suggests that the climate during this phase was cooler than today with more available moisture.

After a high water phase in zone 3 the lake retreated in zone 4 as the climate grew more arid; arboreal pollen fell to less than 8% and herbaceous species, Gramineae and Chenopodiaceae dominated the profile (Kaiser et al., 1973, 306). Cedar and pine pollen decreased sharply although oak and walnut were still present in small numbers.

Another significant change in the vegetation pattern took place in zone 5 (Kaiser et al., 1973, 307ff, fig. 5). Gramineae dominated the profile at first but silver lime was present once more. Then the arboreal pollen, consisting mostly of cedar, increased to over 35%. Marsh plants were once more very abundant which suggests that the Damascus basin lake expanded during this phase. Conditions were now moister than before. The full development of this stage took place sometime after 17,000 B.C.

Central and northern Syria appear to have experienced a climate and vegetation different from the rest of the Levant during the Würm. There is no clear evidence that substantial bodies of water like the Lisan and Jafr lakes formed in the inland drainage basins north of Damascus (van Liere, 1960-61, 10) which at once suggests that there was little more available moisture in the region than now, despite the lower temperature. This view is supported by the pollen evidence from a core drilled in the Ghab section of the Orontes valley 15 km south of Jisr esh-Shaghur. The core spans much of the period of the last glaciation and the earlier Holocene. Throughout this time the Ghab contained a lake surrounded by marshes which survived well into the Holocene (Niklewski, van Zeist, 1970, 751). This lake was created by tectonic movement in the Orontes valley and its continuance was determined more by the local geology than by climatic conditions. The pollen which collected in the lake records the past vegetation of Jebel Alawiye (Ansariye) to the west and Jebel Zawiye to the east as well as the Ghab itself.

The samples from the earliest section of the core, zones S, T and U, indicate a spread of forest cover on both Jebel Alawiye and Jebel Zawiye which reached a peak in sub-zone T1 (Niklewski, van Zeist, 1970, 747). The climate would have been cooler than at present throughout this period and with much the same amount of available moisture as today in zones T and U, although drier in zone S. The core is dated by three ^{14}C determinations only; extrapolation from these indicates that this earliest section may date from before 45,000 B.P. (Niklewski, van Zeist, 1970, 751ff, table 2).

Thereafter towards the end of the glaciation from zone V through to Y the forest decreased, giving way to steppe. The loss of tree cover was most extreme in sub-zone Y5 when the only forest left was on the seaward side of Jebel Alawiye; Jebel Zawiye was steppic as it had been continuously since zone V (Niklewski, van Zeist, 1970, 750, fig. 4). There were variations in vegetation during this long period as the climate fluctuated but for most of the time it was drier and often cooler than now. Only towards the end of this long dry period does there seem to be a close correlation with the southern Levant where, in response to drier conditions after perhaps 18,000 B.C., the Lisan and Jafr lakes shrank.

The vegetation in the Ghab region changed markedly in zone Z (Niklewski, van Zeist, 1970, 750ff). In response to an increase in both temperature and available moisture the forest expanded over the whole of Jebel Alawiye and clothed Jebel Zawiye with light tree cover. It is suggested that the moisture increased briefly beyond present day levels allowing the vegetation to reach a slightly richer climax than today in sub-zone Z2. The vegetation changes recorded in zone Z can probably be related to changes in vegetation and lake levels that took place in Lebanon and Palestine at the end of the Würm. It is not possible to date zone Z exactly but Niklewski and van Zeist suggest on the evidence of the latest of the Ghab ^{14}C dates that it may have begun about 9400 B.C. although they admit a possible margin of error of several thousand years (1970, 752); on their evidence it is more likely that zone Z began earlier rather than later. This would permit a closer correlation with changes elsewhere in the Levant, even though these are admittedly almost equally uncertainly dated.

Seeds preserved in the Mesolithic deposits at Tell Abu Hureyra throw light on the environment further east at this time (Hillman, 1975, 70ff). The vegetation was steppic but quite rich in species compared with the present. It is possible that some trees such as hackberry and turpentine were also growing in the area; if so the rainfall must have been slightly higher then. Such an environment would be quite similar to that of today if man had not disturbed the vegetation. An intermediate zone of open forest would have lain between the forested coastal mountains and the park-like steppe around Abu Hureyra.

The pollen record of the Ghab core is almost the only detailed evidence we have for vegetation and climatic change in northern Syria during the later Würm but the pattern it reveals is supported by other pollen cores from Greece and the Iranian Zagros. Wijmstra has made a detailed study of the upper section of a deep core drilled at Tenaghi Philippon in Macedonia. Zones V, P and X of this core were characterised by high counts of Artemisia and Chenopodiaceae and low values for arboreal pollen (Wijmstra, 1969, 525). These zones cover much of the period of the last glaciation from about 50,000 B.P. to 14,600 B.P. (Wijmstra, 1969, 523, 527, fig. 2). Wijmstra suggests that the climate was both cooler and drier then than now (1969, 526) which accords with the evidence of the Ghab core from Syria. The proportion of arboreal pollen increased through zone Y reaching modern levels about 8000 B.C.

The Tenaghi Philippon data are supported by another pollen core from Ioannina in Epirus. Although this was drilled at a higher elevation than the Tenaghi Philippon core it nevertheless shows the same vegetational and climatic trends. Zones IIC and III were characterised by high values of herbaceous pollen and low arboreal pollen caused by cool, dry conditions (Bottema, 1967, 28). These zones cover the period from approximately 40,000 to before 10,000 B.P. At the beginning of zone IV Artemisia pollen decreased and oak pollen increased as the forest expanded into a previously steppic area, a phase which corresponds to zone Y at Tenaghi Philippon.

Several cores have been drilled in late Quaternary deposits in the floors of valleys in the Zagros Mountains. From pollen analysis of these cores it is possible to reconstruct the pattern of vegetation in the region from the late Pleistocene into the Holocene. In zone A1 of the 63-J core from Lake Zeribar there were very high proportions of Chenopodiaceae and Artemisia but almost no arboreal pollen (van Zeist, 1967, fig. 3). This zone is dated to between 20,000 and 12,000 B.C. and it is suggested that the climate then was cooler and drier than today. Analysis of two other cores from Lalabad springs and Lake Nilofar in the Kermanshah valley shows that similar conditions prevailed further to the south-east (van Zeist, 1967, 309). Chenopodiaceae and Artemisia values remained high in zones A2 and B of the Zeribar core but plantain (Plantago) pollen now formed 10% of the diagram and arboreal pollen, mostly oak, became significant for the first time. Van Zeist suggests that this indicates the spread of savanna vegetation, caused by an increase in both temperature and precipitation (1967, 310). A gradual expansion of trees continued until about 4000 B.C.; the percentage of arboreal pollen then rose rapidly as an oak forest developed in response to an increase in available moisture. This pattern of vegetation change is supported by the results from another core drilled at a lower elevation at Lake Mirabad in the Saidmarreh valley. The change from a late Pleistocene vegetation formed under arid conditions to a savanna and then later an oak forest as temperature and available moisture increased matches both the Ghab core and those from northern Greece.

Summary

It will be helpful now to summarise the evidence discussed above in order to present an outline of the environment of the Levant in the late Pleistocene. We have established that during the last glaciation the level of the sea on the Levant coast dropped considerably. The temperature fell between 5° and 10°C, the most likely estimate being about 6° or 7°C. This led to a lowering of the snowline and below that the treeline and altitudinal vegetation belts. The fall in temperature increased the effectiveness of precipitation which in its turn led to marked alterations in vegetation and lake levels; it does not appear, however, that there was much if any absolute increase in rainfall at this time. This, together with the unequivocal evidence for an arid phase in the Levant towards the end of the Würm glaciation, contradicts the view expressed by some authorities (Horowitz, 1975,207; Begin et al., 1974, 28) that there was a distinct "pluvial" phase in the Near East corresponding to the Würm/Wisconsin glaciation in northern latitudes.

For much of the last glaciation there were large lakes in the inland basins in the central and southern Levant because there was more available moisture in these regions than today. Moister conditions also prevailed in Egypt during this period. Apart from a lake in the Ghab section of the Rift valley there do not seem to have been any large open bodies of water in Syria so there was not as much available moisture there as in the rest of the Levant. Early in the Würm glaciation the vegetation was denser than it would be today without human interference. Tree cover extended throughout the upland zone behind the Levant coast. The slopes of the Lebanon Mountains and the lower Anti-Lebanon were clothed with mixed deciduous and coniferous forest. There was oak forest in Galilee and probably Judea while trees were found as far south as Sinai. Even the Jebels Alawiye and Zawiye carried more forest than would be possible today.

In northern Syria the forest thinned out in response to increased aridity and was largely replaced by steppe well before the middle of the

Würm; open forest and steppe were also characteristic of Macedonia for much of the last glaciation. The tree cover remained fairly dense in Lebanon and Palestine, however, until much later.

A marked change in the climate and environment of the Levant took place quite late in the Würm. The Lisan, Jafr and Damascus basin lakes all shrank. The inception of this phase is approximately dated by ^{14}C determinations of lake sediments. These dates would suggest that the regression phase of these lakes began at approximately the same time about 20,000 to 18,000 B.C.

The vegetation also changed about this time. The trees thinned out in the uplands and mountains and the steppe greatly expanded. In Galilee the oak forest was replaced by maquis. Although the Lebanon Mountains continued to be forested the tree cover was much reduced; in the Anti-Lebanon and around Damascus very few trees were to be found at all. The replacement of forest by steppe which had begun some time before in northern Syria went still further until only part of the Jebel Alawiye carried any tree cover. The whole Syrian plateau would have been intensely steppic and this zone would have extended as far south as Transjordan. Similar steppic conditions characterised the Zagros at this time while steppe and open forest still constituted the vegetation in northern Greece.

Although there is disagreement among palynologists about the causes of these vegetation changes, there seems little doubt that a reduction in the available moisture was responsible for the drop in lake level, the expansion of steppe and the reduction in tree cover. This stage coincided with the second severe cold phase of the Würm in northern Europe (Butzer, 1972, 274) and the temperature in the Levant would have been at its lowest during this period. The climate was, therefore, arid and relatively cool.

Towards the end of the last glaciation there was another change in environmental conditions throughout the Levant. The inland basin lakes expanded again though they did not reach their earlier Würm high levels. The steppe retreated and there was an expansion of forest cover. Oak forest partly replaced maquis in northern Palestine while scattered evergreen oak and olives grew in the Negev. The forests became much denser in the Lebanon Mountains and woodland with both cedar and deciduous species spread quite widely in the Anti-Lebanon. In northern Syria the forest expanded greatly over both the coastal mountains and the Jebel Zawiye. It was a mixed forest of oak, pistachio, olive and hornbeam with some cedar (Niklewski, van Zeist, 1970, 746).

During this period the vegetation of the Levant reached a particularly rich climax (Fig. 2). As today there were three vegetation zones from the well-watered coast to the arid interior. In the coastal mountains and on the edge of the plateau to the east was a Mediterranean forest zone. Today species such as pine (Pinus brutia and Pinus halepensis), pistachio (Pistacia lentiscus), both deciduous and evergreen oak, oriental plane (Platanus orientalis) and juniper are characteristic of this zone (Zohary, 1962, 44) but then it included several species typical of cooler conditions. This zone extended much further east and south than now. Beyond the Mediterranean forest lay the steppe zone (Irano-Turanian) with a rainfall of between 300 and 150mm (Zohary, 1970). Today this zone is composed principally of herbs and dwarf shrubs such as Ephedra, Noëa, Haloxylon and Artemisia herba-alba but also pistachio (Pistacia atlantica) and jujube (Zohary, 1962, 47); the plant remains from the Mesolithic settlement at Tell Abu Hureyra suggest that this zone was richer in species then. An intermediate belt of open woodland would have lain between the Mediterranean and steppe zones like today (Zohary, 1970; Pabot, 1957, 68) but this belt may have been broader then. The third zone was the true desert (Saharo-Sindian or Saharo-Arabian), receiving less than 150mm rainfall a year and characterised by a very poor vegetation (Zohary, 1970). This zone was much less extensive than today, probably occupying part of the Arabian interior and so only impinging on the south-eastern corner of the Levant.

Once again a change in the amount of moisture available seems to have

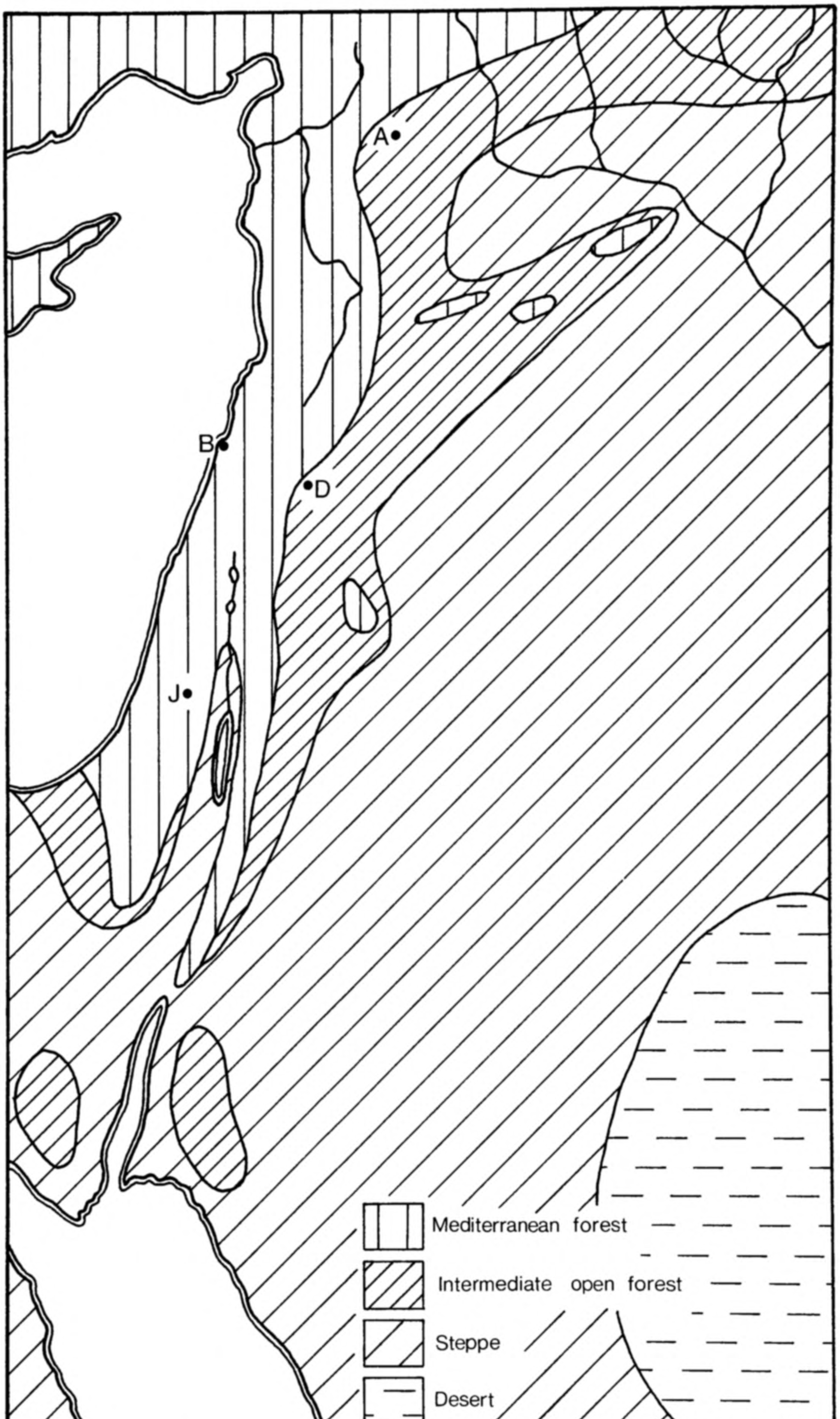

Fig. 2 A reconstruction of vegetation zones c. 9,000 B.C.

scale 1:5,000,000

been the principal cause of both the rise in lake levels and the spread of forest. This was entirely due to an increase in precipitation because we know from the deep-sea cores that the temperature worldwide had already begun to rise. This temperature rise, or at least the effects of it, seems to have taken place a little later in the Eastern Mediterranean and Red Sea as the cores from there do not indicate any significant warming much before 12,000 or 13,000 B.P. (Vergnaud-Grazzini, Herman-Rosenberg, 1969, fig. 2; Herman, 1968, 326). The presence of species such as silver lime in the hills around Damascus indicates that it was still relatively cool during this phase.

The date for the beginning of this moister phase is uncertain because the relevant ^{14}C dates from pollen spectra and sediments in the Levant occur either well before or sometime after its inception. A good estimate can, however, be made from data in neighbouring regions. The transition from zone X to zone Y in the pollen spectrum from Tenaghi Philippon is dated at 12,650 ± 200 B.C. GrN-4183 (Wijmstra, 1969, 523), a date that fits well with ^{14}C determinations from several cores drilled in the area. A similar transition at Lake Zeribar is dated about 12,000 B.C. In the Levant itself we know that the change took place after a date of 16,850 ± 195 B.C. Hv-1725 for the regression phase in the Huleh basin and a date of 17,040 ± 520 B.C. for the same regression in the Damascus basin. The phase also began sometime before 9400 B.C. in the Ghab, a date estimated from a ^{14}C determination of 8,130 ± 55 B.C. GrN-5810 for the transition from sub-zone Z1 to Z2 in the pollen spectrum (Niklewski, van Zeist, 1970, 743, 751ff). The rise in level of the Dead Sea is dated 7900 ± 150 B.C. and must have begun sometime before that. A fair estimate for the beginning of this phase in the Levant might be about 12,000 B.C. bearing in mind the dates from Tenaghi Philippon and Lake Zeribar but this may be in error by as much as two millennia.

Although the date for the beginning of this phase is so uncertain the phase itself is clearly contemporary with the Late Glacial in northern Europe (Butzer, 1972, 274). This was a complex period of alternate milder and colder phases. It is not surprising, therefore, if it is difficult to interpret the geomorphological and pollen data for this phase in the Levant. The actual changes which these data record need not have happened at exactly the same time so one should not necessarily expect to be able to give a single date for the inception of this phase.

Early Holocene

The date for the end of the Pleistocene and beginning of the Holocene in northern Europe has been determined as about 8000 B.C., one recent estimate being 8300 B.C. (Butzer, 1972, 530). This date is believed to mark a substantial reduction of the glaciers and the draining of the Baltic Lake. These criteria have little relevance for the Levant yet this date does appear to coincide with certain environmental changes there that characterise the true Holocene. 8000 B.C. may, therefore, also be taken as a convenient point at which to divide the Pleistocene and Holocene in the Levant.

After a marked fall in the 9th millennium B.C. the temperature rose again at the beginning of the Holocene and continued to increase until perhaps as late as 3000 B.C., certainly throughout the Neolithic. This rise seems to have been less irregular in the earlier Holocene than during the Late Glacial but there may still have been minor fluctuations that affected the environment of the Levant.

The Dead Sea remained at a higher level than before for several millennia during the early Holocene. The ratio of run-off to evaporation was high during this period and an extensive bed of clay was laid down in the Dead Sea basin (Neev, Emery, 1967, 28). During a subsequent drier phase a layer of rock salt was superimposed on this clay bed. The deposition of this rock salt is estimated to have taken place between 4500 and 3500 B.C. Another phase of increased available moisture followed when a further bed of clay was laid down; this bed is dated by a single ^{14}C determination of 2460 ± 320 B.C. (Neev, Emery, 1967, 28). The Beth-Shan lake existed throughout this period but was finally drained sometime after 3000 B.C.

No significant alterations in lake level during the Holocene have been detected in the Jafr depression (Huckriede, Wiesemann, 1968, 85) but changes were taking place in the Damascus basin. Here alternating drier and moister phases are believed to have influenced the environment during the Holocene (Kaiser et al., 1973, 351ff) although these phases are not well dated. During the middle Holocene a deep layer of calcareous sediments was deposited by heavy winter rains at Tekieh in the Barada gorge and run-off was sufficiently great to wash more sediment into the Damascus basin (van Liere, 1960-61, 54). Nevertheless, despite this evidence of erosive activity, the late Würm lake in the Damascus basin gradually shrank and divided into two to form the present Hijjane and Ataibe lakes. This was caused by an increase in evaporation following the Holocene rise in temperature and an eventual decrease in effective run-off.

The rise in sea-level towards the end of the Pleistocene sharply reduced the gradient of the rivers on the seaward side of the Jebel Alawiye. The valleys of the Nahr el Kebir and the other smaller rivers began to fill with debris (van Liere, 1960-61, 24). The erosive power of the run-off in this region has not been very strong during the Holocene so this deposit has continued to accumulate and little sediment reaches the sea.

The evidence for changes in vegetation in the Levant during the Holocene is less satisfactory than for the Pleistocene. Very few pollen cores have been drilled and studied while those which are available are difficult to interpret. This is true even in the northern Jordan valley where no less than five cores have been bored in Holocene sediments, three in the Huleh basin (K-Jam, U.P.6, U.P.15) and two in the bed of the Sea of Galilee (D-1016/2, D-1021/1). Unfortunately the cores were sampled at rather wide intervals and relatively few pollen grains were recovered (Horowitz, 1971, 259). ^{14}C determinations have been made on samples from only three of the five cores, K-Jam, U.P.15 and D-1016/2. The K-Jam date (Hv-1725) falls in the Pleistocene but the other dates cluster in the second half of the Holocene. Because of this uneven distribution one must treat with caution Horowitz's calculations of average sedimentation rates in the cores, particularly when he applies the supposed rate in the dated core U.P.15 to U.P.6 although the lithology in the two is completely different (Horowitz, 1971, 269). One's misgivings are reinforced on observing that some of the dates applied to different stages in the cores have been incorrectly calculated from the supposed sedimentation rates (Horowitz, 1971, 268). Even when one allows for these discrepancies one finds that, on Horowitz's own division of the stages, the results from the cores are in part contradictory.

In spite of these difficulties it is necessary to attempt to analyse the data presented in this study because it provides almost the only independent evidence about the Holocene vegetation in this region; the other source of data, evidence from archaeological sites, may be expected to be influenced by man's activities. K-Jam is a much deeper core than the others and it is only the section from 18 to 9m which is believed to record the vegetation in the first half of the Holocene (Horowitz, 1971, 267). At 18m the percentage of arboreal pollen, principally oak, is relatively high but then this gradually declines. At the same time pollen of marsh plants and grasses increases, reflecting a gradual contraction of Lake Huleh.

A more detailed picture of Holocene vegetation changes may be obtained from core D-1016/2. This core is thought to have been drilled entirely in Holocene sediments (Horowitz, 1971, 270ff) and samples for pollen analysis have been taken at shorter intervals of time than in the K-Jam core. A sample at the bottom of the core from a depth of 30m below the surface of the lake, which is believed to date from the beginning of the Holocene, has a low value of 10% for arboreal pollen composed mostly of oak with a little Aleppo pine. Open field species are much more common, accounting for over 55% of the pollen (Horowitz, 1971, diagram p. 266). Horowitz believes that these figures are supported by the pollen spectra of the other, undated core from the Sea of

Galilee, D-1021/1 (1971, table 16). These results directly contradict the evidence from the K-Jam cores which suggested that Galilee was well-forested at the beginning of the Holocene.

Subsequently the values for arboreal pollen increase in core D-1016/2, reaching a peak between 27 and 23m, a little before the middle of the Holocene. The proportions of oak pollen in the spectra have actually declined but walnut and jujube make up the difference. Open field pollen still forms an important percentage of the total. Again it would appear difficult to reconcile this curve for arboreal pollen with that from the K-Jam core.

The two other cores from the Huleh basin, U.P.6 and U.P.15, are believed to extend back only as far as the earlier Holocene (Horowitz, 1971, 268ff). The percentages of arboreal pollen are quite high at the bottom of these cores, possibly correlating with the relatively high values we have noted for the earlier Holocene in core D-1016/2. The pollen is mostly from oak trees with a little pistachio and olive but no jujube; the high values for the latter species in the D-1016/2 core may be anomalous.

Can the often apparently conflicting evidence from these cores be brought together to present a coherent picture of vegetation change? Part of the difficulty may be that the record from the K-Jam core is a long one and insensitive to short-term variations. The evidence from this core suggests a steady decline in forest vegetation as the Holocene progresses, a general trend apparent from the arboreal pollen curves in the two other Huleh cores, though not fully supported by the evidence from the cores from the Sea of Galilee. The low arboreal pollen values for the beginning of the Holocene in core D-1016/2 may refer to a short-term fluctuation in that area which has not been noticed in the more generalised studies of the K-Jam core.

One may now present with due caution a synthesis of the vegetation record from these cores. At the close of the Pleistocene when the Huleh lake was quite extensive the hills of Galilee and the Golan were clothed with forest composed principally of oak. At the beginning of the Holocene there may have been a brief decline in forest cover, at least in the environs of the Sea of Galilee, but thereafter the hills were forested until the mid-Holocene. This long period of fairly extensive tree cover in northern Palestine coincides with the phase of greater run-off that maintained the Dead Sea at a high level. Later in the Holocene most of the cores show a decline in tree pollen and, in the Huleh basin, an extension of marsh vegetation which Horowitz believes can be attributed to generally drier conditions (1971, 268). It would seem more likely by this time that man was partly responsible for these vegetation changes through forest clearance.

If this interpretation is correct for Galilee and the Golan then one may tentatively infer from it something of the pattern of vegetation further south. It is likely that the Judean hills and the mountains of Transjordan were forested at least as far south as the latitude of the Dead Sea and probably further. Timber from a number of species from the forested zone such as ash, plane, almond, pear, olive, fig, Christ's Thorn and carob was used by the Neolithic inhabitants of Jericho (Western, 1971, fig. 1). This suggests that the Mediterranean forest lay nearer the site than it does today (Western, 1971, 40).

Northern Sinai would have been affected by the moister conditions that existed in Egypt and so probably had a richer vegetation in the earlier Holocene than now. This was almost certainly the same vegetation of steppe and scattered trees that existed in the area at the end of the Pleistocene. Only when more arid conditions returned after 6000 B.C. would the vegetation have deteriorated, a gradual process that has continued until the present day. Even now a few relict specimens of trees are to be found in favoured habitats in both Sinai and Transjordan (Zohary, 1962, 54) though the vegetation zones of which they were characteristic have retreated.

There is very little evidence from which to determine the vegetation in Lebanon and southern Syria during the Holocene. Presumably the Mountains of Lebanon remained heavily forested for several thousand years. A single pollen spectrum from Tekieh suggests that the Anti-Lebanon still carried some trees and herbaceous ground cover as late as the mid-Holocene (Kaiser et al., 1973, fig. 6). Further east steppe vegetation characterised by Chenopodiaceae and Compositae began to encroach upon the Damascus basin and the Golan (Leroi-Gourhan, 1973, 46) quite early in the Holocene but it is likely that man's activities hastened this transformation.

The principal source of information for the vegetation of northern Syria during the earlier Holocene is the Ghab pollen core. Sub-zone Z3 in the pollen diagram is ascribed to this period (Niklewski, van Zeist, 1970, 750). Jebels Alawiye and Zawiye remained clothed with light mixed forest throughout this period. The forest was principally composed of evergreen oak, olive, pine (Pinus brutia), pistachio and hornbeam with some cedar of Lebanon. There was less oak pollen in this sub-zone than in Z2 and a higher percentage of herbaceous pollen. This may indicate that the tree cover was less dense than in Z2 and that rainfall decreased slightly (Niklewski, van Zeist, 1970, 750) in the early Holocene. Almost the same type of light forest would be the natural vegetation cover in this area today were it not for man's interference. Later in the Holocene species such as pistachio, olive, juniper and hornbeam decreased while cedar disappeared completely because of man's activities (Niklewski, van Zeist, 1970, 751).

The vegetation around Abu Hureyra during the earlier Holocene was steppic but still richer in species than today (Hillman, 1975, 70). This would indicate that the total rainfall was probably about the same as now although it may have been more regular. The drastic degradation of the steppe that occurred during the Holocene around Abu Hureyra and throughout northern and central Syria was brought about more by man's activities than by climatic change.

It will be useful now to compare the data we have already considered with recent proposed reconstructions of postglacial atmospheric circulation in the northern hemisphere. During the 9th millennium atmospheric circulation is believed to have been relatively weak over Europe and it is thought that the belt of westerly winds lay further south than today (Lamb, 1971, 140ff). Rain-bearing winds from the Atlantic and Mediterranean would have reached the Levant more frequently (Lamb, Woodroffe, 1970, figs. 10b, 10c) and so winter rainfall would have been greater than today; it is also possible that the rainy season lasted longer than now.

By about 6500 B.C. the European ice sheet had almost disappeared but the North American one still existed. This stimulated a more vigorous wind system and also caused the westerlies over the Atlantic to follow a more north-easterly course. A strong anticyclone lay in the eastern Atlantic and over western Europe (Lamb, 1971, 160, figs. 8, 9), preventing some of the moist air from the Atlantic reaching the Levant. In consequence rainfall became more seasonal and possibly decreased in amount; the continued post-glacial rise in temperature would have also tended to lower precipitation.

About 4000 B.C. the North American ice sheet had melted so the wind system resumed a more zonal configuration but now the track of the westerlies lay further north (Lamb, 1971, 160, fig. 10; Lamb <u>et al</u>., 1966, fig. 11g). The Levantine summer became longer and drier while fewer rain-bearing depressions penetrated from the west in winter. Consequently this was a relatively arid period. Subsequently the atmospheric circulation fluctuated again (Lamb, 1971, 160ff) and this led to an amelioration of climatic conditions in the Levant during the following millennia.

<u>Summary</u>

We can now summarise the evidence for climatic change in the Levant during the earlier Holocene and see what effect it had on the environment. After a brief cooler phase at the close of the Pleistocene the temperature resumed its rise. The rainy season was both more regular and lasted longer than today. Total rainfall remained relatively high although there is some evidence from the pollen cores that it decreased slightly in northern Syria and possibly further south. These relatively cool, moist climatic conditions kept the Dead Sea at a high level and led to significant erosion in the

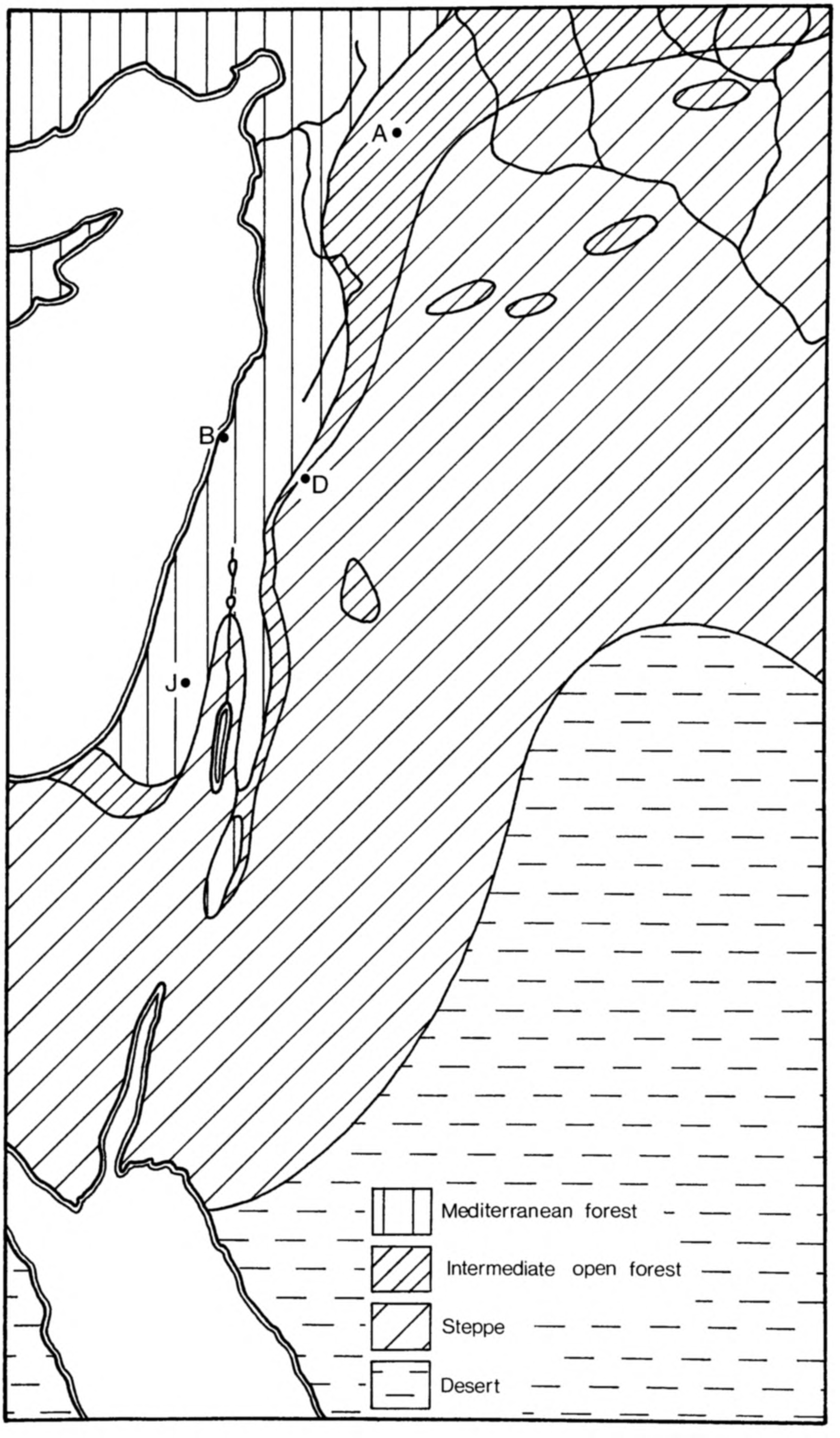

Fig. 3 A reconstruction of vegetation zones c. 6,000 B.C.

scale 1:5,000,000

Damascus basin. In Egypt conditions were also moister than today, causing the Arminna member to be formed in Nubia.

Because the climate was cooler and moister the Mediterranean forest zone covered a larger area than it would now without human interference. Palestine and Transjordan were clothed in a mixed forest which extended further south than today. This changed to open forest in northern Sinai while much of the rest of the peninsula had steppe vegetation with scattered trees.

Further north the Mountains of Lebanon were heavily forested while the Anti-Lebanon carried light woodland. The mixed forest extended throughout the Jebels Alawiye and Zawiye, curving eastward about the latitude of Aleppo. Beyond the Mediterranean forest zone lay the intermediate open forest belt which stretched from as far south as the Dead Sea along the plateau of Transjordan into northern Syria. To the east this belt merged with the steppe zone which occupied much of the interior and part of Sinai. The desert zone still covered a very small part of the Levant, in contrast with today (Zohary, 1962, 45).

During the 7th millennium the climate changed; rainfall became more seasonal and probably diminished. This caused a gradual contraction of the Mediterranean mixed forest and intermediate open forest zones (Fig. 3). The steppe expanded into areas that previously carried open forest while the desert, too, reached further north and west. The Ghab and other pollen cores indicate that these changes were accelerated by man's activities.

Another change in climate took place during the 5th millennium when rainfall in the Levant decreased further; it had already fallen to almost nothing in Egypt. By now the temperature had risen to near its postglacial maximum. This deterioration in climate seems to have been quite marked for it caused the level of the Dead Sea to drop sharply. The effect on the vegetation would have been to cause a further contraction of the forest zones (Fig. 4). The desert albeit with some relict trees, would have now extended throughout Sinai, eastern Transjordan and southern and eastern Syria. It is

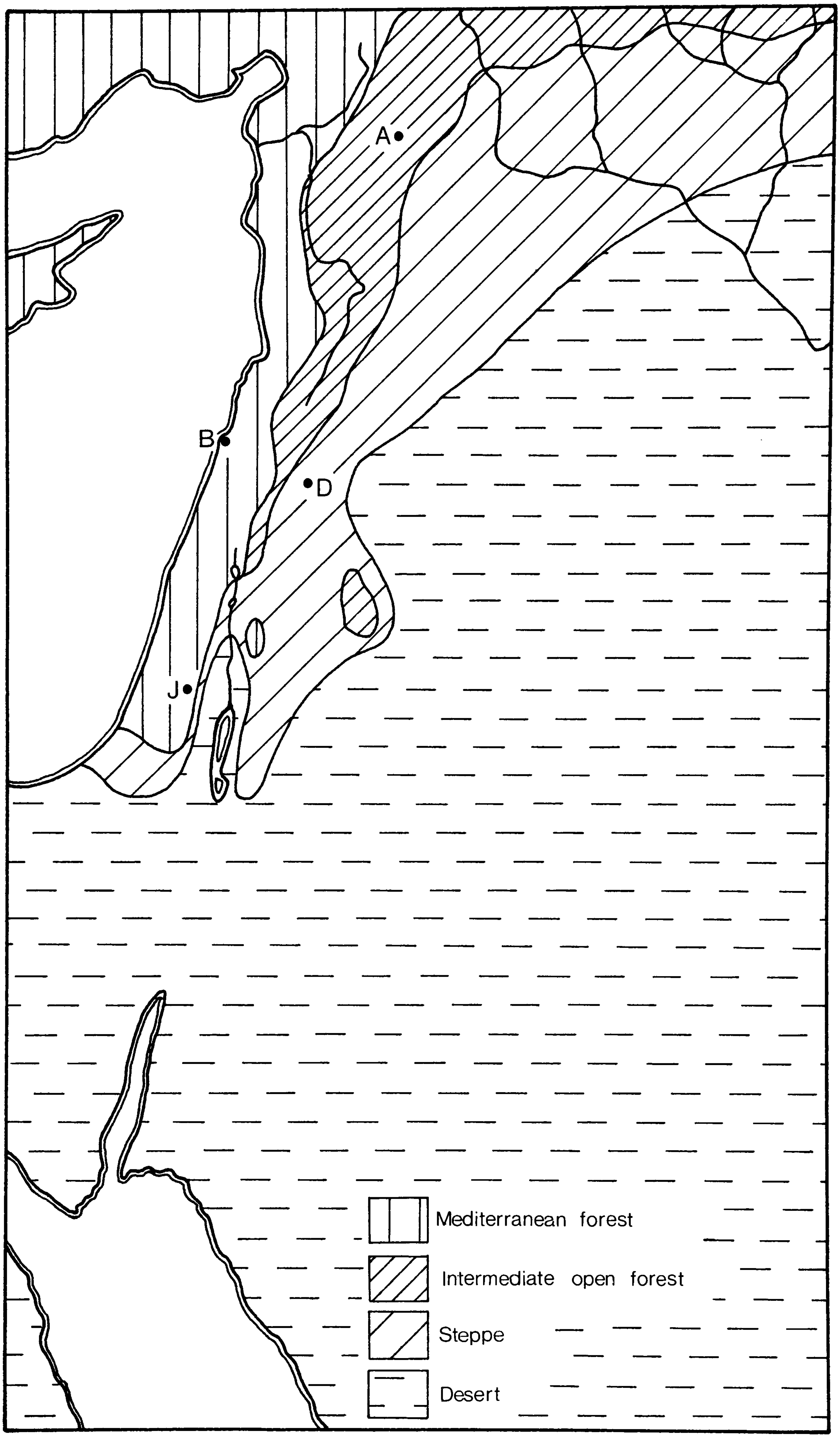

Fig. 4 A reconstruction of vegetation zones c. 4,000 B.C.

scale 1:5,000,000

difficult to determine precisely the boundaries of the natural vegetation zones because man's activities had already distorted the picture. The climate improved somewhat late in the 4th millennium but by now the damage done to the vegetation by man and increased aridity, particularly in the zones of open forest and park steppe, was irreversible.

While the climatic changes that took place in the Levant in the early Holocene were not as great as during the Würm they were sufficient to alter both landforms and the extent of the major vegetation zones. At the moment it is possible only to describe these environmental changes in outline but the evidence of the pollen cores and the sediments of the Damascus basin suggest that events were more complex than the scheme presented here. The actual fluctuations in rainfall and temperature may have been relatively small compared with the postglacial in northern Europe but they had a marked effect on the environment because so much of the southern Levant and the inland plateau is a semi-arid zone sensitive to slight climatic changes. The evidence of the Zagros pollen cores emphasises that the present climate and natural vegetation zones in the Near East were not established until the Holocene was well advanced.

The changes in natural environment that took place during the earlier Holocene would have significantly influenced human settlement and economy. For the first time man's own activities had a marked effect on the landscape, particularly its vegetation and soil cover. The environmental changes that took place, therefore, were caused by a complex interaction of climatic change and human behaviour.

Chapter 2

THE MESOLITHIC OF THE LEVANT

The Mesolithic of the Levant was a distinct cultural stage which came betweeb the Aurignacian and the Neolithic. Its most diagnostic archaeological feature was a chipped stone industry characterised by microlithic tools. This microlithic component has been found on Mesolithic stations all over the Levant but on no Aurignacian or Neolithic site. It is thus the most distinctive trait by which to define the Mesolithic stage.

Mesolithic sites were first discovered in Palestine and the cultural sequence has since been established more securely there than anywhere else. The earliest group of these sites determined on the evidence of stratigraphy and comparative typology was called Kebaran after the site where this phase was first defined in excavation by Turville-Petre (1932, 271). The second phase was called Natufian since its type-site, Shukbah, was situated in the Wadi en-Natuf on the western edge of the Judean hills (Garrod, 1942, 1). The information obtained from these excavations was considerably augmented in later years in further work by Garrod herself at the Mugharet el Wad (Garrod, Bate, 1937, 9ff), by Neuville at several sites in the Judean desert (1951, 86ff), Stekelis and his collaborators at En Gev (Bar-Yosef, 1970a, 106) and Perrot at Ain Mallaha (Eynan)(1968, col. 367). Much other information about Mesolithic sites in Palestine has also been found in recent surveys and excavations.

I must now explain why I have called this stage "Mesolithic" since this term is not widely used at present in Near Eastern archaeology. The Kebaran and Natufian were described as Mesolithic from their discovery until sometime after the Second World War (Turville-Petre, 1932, 276; Garrod, 1957a, 211). Objections to this term have recently been raised by a number of archaeologists. Braidwood, for example, has said that there was no Mesolithic in western Asia in the sense that the term is used in northern Europe (Braidwood, Howe, 1960, 4, 81). Perrot (1966a, 483) and Bar-Yosef (1970a, 1) have also rejected the term; they prefer to call this stage "Epipalaeolithic" to emphasise that the microlithic industries developed from the Aurignacian. At a conference in London in 1969 a number of archaeologists accepted this reasoning and agreed to use this name in future.

I believe that the exclusive use of "Epipalaeolithic" has a number of disadvantages. While I would agree that there was continuity from the Aurignacian to the Kebaran, this term implies that there was an absolute break between the Natufian representing the end of the Palaeolithic and the Neolithic. It is clear now, however, that human occupation of the Levant continued straight through from the Natufian to the earlier Neolithic. "Epipalaeolithic" also implies that the Kebaran and Natufian had more in common in their artifacts and way of life with the immediately preceding Aurignacian than with the Neolithic. It will be seen from what follows that I would strongly challenge this assumption. This was an important intermediate stage in the human settlement of the Levant distinct from both the Palaeolithic before and the Neolithic after. Further, it coincided with the final cold phase of the Pleistocene and its immediate aftermath so that the environmental setting was different from the preceding and succeeding stages, the contrast between the Kebaran and Aurignacian landscapes being particularly marked. This stage needs to be described by a term that suitably expresses its distinctive qualities. I prefer to return to earlier usage and to use "Mesolithic" to describe these phases, the Kebaran and Natufian in Palestine and contemporary sites elsewhere in the Levant.

The Mesolithic has been more thoroughly investigated in Palestine than in any other region of the Levant. A few Mesolithic sites had long been known in Lebanon and Syria but their number has grown markedly in recent years. Several of these sites have now been excavated so that the sequence in these regions has also been determined, at least in outline. For many years the Nebekian and Falitian levels excavated by Rust at Yabrud III were thought to be the most northerly Kebaran-like occurrence but related material has now been found at Douara Cave near Palmyra (Akazawa, 1974, 4) and possibly at Nahr el Homr east of Aleppo beside the Euphrates (Roodenberg, forthcoming). The evolution of this phase in Lebanon has become much clearer following the recent work at Ksar Akil (Tixier, 1974, 184) and Jiita II (Hours, 1973, 199).

Sites with material related to the Natufian have also been known over a wide area for some time. Helwan near Cairo (Massoulard, 1949, 29) and Yabrud III (Rust, 1950, 119) were investigated long ago but recently several more sites have been discovered and excavated in Lebanon and Syria. No less than four, Tell Abu Hureyra (Moore, 1975, 56), Mureybat (Cauvin, 1972, 107), Dibsi Faraj East (Wilkinson, Moore, forthcoming) and Nahr el Homr (Roodenberg, forthcoming) have now been examined in the Euphrates valley in the programme of archaeological exploration which has taken place during the construction of the new Euphrates dam. Work by Hours and his collaborators at Jiita II (Chavaillon, Hours, 1970, 215ff) and by Schroeder at Saaideh (1970, 200) and Nacharini has begun to clarify the development of this stage in Lebanon.

Now that sites with material resembling at least in part the assemblages of artifacts from Kebaran and Natufian sites in Palestine have been found over such a wide area of the Levant and even further afield the traditional terms used to describe them are no longer adequate. The descriptions "Kebaran" and "Natufian" have been used to describe every site far beyond the confines of Palestine with material which bears only the most general resemblance to that on the type-sites. They have by such usage become so strained that they have lost some of their original meaning and precision. I propose in this thesis to use the terms "Kebaran" and "Natufian" only for sites in Palestine which may be properly described under these headings. Sites found elsewhere in the Levant which have similarities with these I shall classify as Mesolithic 1 if they may be compared with the Kebaran and Mesolithic 2 if they have some of the characteristic traits of the Natufian. Both Mesolithic 1 and Mesolithic 2 will also subsume the Kebaran and Natufian in Palestine itself.

Mesolithic 1

Mesolithic 1 throughout the Levant followed the Aurignacian or Levantine Upper Palaeolithic. The Aurignacian was divided into three phases by Neuville (1951, 260, table 1) called Upper Palaeolithic III, IV and V, the last being transitional between the Aurignacian and the Mesolithic. Garrod believed that the Aurignacian of the Levant did not sufficiently resemble the Aurignacian of Europe to justify using the name so she introduced the terms Lower and Upper Antelian (Garrod, 1957b, 440) to describe stages III and IV of Neuville. She also invented another term, Athlitian, to describe the material from Mugharet el Wad which roughly corresponded with Neuville's transitional phase V (Garrod, Bate, 1937, 41). Copeland has recently introduced new terms to describe the material from Lebanon and Syria using Ksar Akil as the type-site (1975, 342). She uses Levantine Aurignacian phase C for Ksar Akil Levels 8 to 6 which corresponds very approximately to Neuville's stage V. This phase is marked by very varied assemblages at most sites on which is occurs, emphasising its transitional nature.

It seems fairly certain that Mesolithic 1 developed directly from the Aurignacian. There are indications that a gradual change took place in the stone industries. Microliths and retouched bladelets are found for the first time in the Aurignacian deposits of El Khiam E (Perrot, 1951, 141), Kebara D (Garrod, 1954, 177) and Ksar Akil (Copeland, 1975, 343). Two sites at least, Ksar Akil and Yabrud III, seem to have fairly complete sequences that span the transition from Aurignacian to Mesolithic 1. Perrot has also claimed a degree of continuity from level E to D at El Khiam (1951, 149) while at Kebara itself no break was detected in the stratigraphy between D and C (Garrod, 1954, 186) although the Athlitian was missing here. On the other hand there was a break in the sequence between the Aurignacian and the Kebaran at Nahal Oren (Bar-Yosef, 1970a, 37ff) while at Mugharet el Wad there was no Kebaran occupation at all after the Aurignacian of layer C. Such breaks may partly be a reflection of the way of life of the inhabitants of these sites. It is probable that such groups used sites intermittently over several years and then left them unoccupied for long periods.

The stone industries from Athlitian sites are so diverse typologically that Bar-Yosef has questioned even the existence of this phase (1970a, 26). Others believe that a number of sites can be included in this stage despite the differences between them (Hours et al., 1973, 273). Such sites would be Mugharet el Wad C, El Khiam E, the Nahal Oren terrace and Ksar Akil 6. Changes of some kind were taking place at this time which manifested themselves in the stone industries first of Athlitian sites and then of Mesolithic 1. The latter with its large proportion of microliths is very different from the Aurignacian.

Several factors brought about these changes. One of the most crucial was the abrupt deterioration in climate and environment that set in about 20,000 or 18,000 B.C. when the last cold phase of the Pleistocene began. We have seen that the Levant became relatively arid and the forest vegetation retreated to be replaced by steppe. The inception of this cool, dry phase just preceded the beginning of Mesolithic 1 on present evidence. The hunter-gatherers of the Aurignacian would have had to modify substantially their way of life, particularly their settlement pattern, to take account of changing conditions. This shift to a new adaptation may be responsible for the confused nature of Athlitian deposits. The crystallization of this new pattern resulted in Mesolithic 1; not only was the settlement pattern modified but a new stone industry of distinctive character was developed.

The inhabitants of the small Mesolithic 1 sites found in the Levant left behind little more than their chipped stone tools. Any definition of the Kebaran thus rests upon a description of the characteristic features of this chipped stone industry (Bar-Yosef, 1970a, 168ff; Hours et al., 1973, 452). The industry was essentially one of small tools made on bladelets struck off single-platform cores. Much of the waste also consisted of bladelets.

There were rarely more than a few blades on any site, in contrast with the Aurignacian. The most numerous and typical tools were non-geometric microliths particularly microgravettes, backed bladelets and backed truncated bladelets. The only other tools found with any frequency were end-scrapers and burins. A few bone tools and some of ground stone have been found on Mesolithic 1 sites but little else.

Before considering the distribution and nature of Mesolithic 1 sites I will present the little information we have about the chronology of this stage. Mesolithic sites are far less numerous than those of the Neolithic and only a few have been dug recently. Of these not all have yielded material suitable for carbon 14 dating so that there is a dearth of chronological data. Those dates which are available suffice only to fix Mesolithic 1 approximately in time and to establish its duration. Following standard practice all ^{14}C dates I shall quote in this thesis will be calculated on the Libby half-life. In presenting the determinations in this form I recognise that they will sometimes differ by as much as several centuries from the absolute age of the samples which they date. At present it is not possible to estimate except in the most general way the absolute age of dated samples since the whole Mesolithic and much of the Neolithic lie beyond the range of the calibration curves published so far. I discuss this question more fully in the Appendix but it should be pointed out here that uncorrected dates still provide a sound sequence of relative chronology. Carbon 14 is the only method of near absolute dating that has been used for archaeological sites and contemporary environmental phenomena during the Mesolithic and Neolithic in the Levant so that chronological data from these two sources may be directly compared to build up as complete a picture as possible of the evolution of human society in the Levant during these stages.

In order to determine when Mesolithic 1 began it is necessary to consider dates from sites occupied late in the Aurignacian and also the few Kebaran sites in Palestine from which ^{14}C determinations are available.

There is one date of 26,890 ± 380 B.C. GrN-2195 (Radiocarbon 5, 1963, 173) from level 8 at Ksar Akil. This is supported by new, as yet unpublished, dates for slightly later material from the site (Tixier, quoted in Copeland, 1975, 343) but these dates are believed to be rather early for such a late stage in the Aurignacian. The other dates are all from Ein Aqev, an Aurignacian site in the Negev. The samples for these determinations were collected in stratigraphical order. From bottom to top they are: 18,080 ± 1200 B.C. SMU-5, 15,440 ± 560 B.C. SMU-8, 15,940 ± 600 B.C. SMU-6 (Radiocarbon 16, 1974, 378, 379), 15,560 ± 290 B.C. I-5495 and 14,950 ± 250 B.C. I-5494 (Radiocarbon 15, 1973, 295). Again these determinations are almost consistent internally.

The Ein Aqev dates pose a problem because most of them overlap with the earliest dates now available from Kebaran sites. At En Avdat only 3.5 km from Ein Aqev there is a site (D5) classed as Geometric Kebaran A which has given the following dates: 16,890 ± 680 B.C. SMU-7 (Radiocarbon 16, 1974, 379), 13,870 ± 1730 B.C. Tx-1121 (Radiocarbon 14, 1972, 484) and 11,220 ± 230 B.C. I-5497 (Radiocarbon 15, 1973, 296). This is not a very satisfactory series: SMU-7 is considered suspect by the excavator of the site because it seems so much earlier than the other dates and Tx-1121 has such a large standard error that it could really be much earlier or later. It remains possible, however, that En Avdat does have some occupation deposits dating from early in Mesolithic 1.

Two sites in northern Palestine, Nahal Oren and Rakafet, have Kebaran levels that are dated very early. From Rakafet there is a single determination of 16,960 ± 330 B.C. I-6865 (Noy et al., 1973, 96). This is supported by one date from Nahal Oren of 16,300 ± 320 B.C. UCLA-1776C from layer IX (Noy et al., 1973, 77) near the beginning of the Kebaran sequence on the site. There are also later dates in the sequence of 14,930 ± 340 B.C. UCLA-1776B and 13,850 ± 300 B.C. UCLA-1776A (Noy et al., 1973, 77). This series of dates is consistent and the standard errors are small. The layers dated by I-6865 and UCLA-1776C are not, however, thought to be at the very beginning of the

Kebaran sequence in this region (Noy et al., 1973, 96).

The Nahal Oren dates in particular suggest that Mesolithic 1 began before 17,000 B.C. and possibly as early as 18,000 B.C. in Palestine and perhaps Lebanon. The Ksar Akil dates would not preclude the possibility that it began earlier still. This estimate would include the En Avdat dates but does not resolve the problem of those from Ein Aqev. It is possible, of course, that Mesolithic 1 began somewhat later in the Negev. It should be borne in mind, however, that the flint industries of the Aurignacian and Mesolithic 1 in the Negev do not resemble very closely those from further north in the Levant. When the assemblages from En Avdat (Marks et al., 1971, 20) and Ein Aqev (Marks, 1973, 4) are compared they do not appear to be very different. It may be that both represent a range of activities carried on by similar groups over a long period of time.

The change from Mesolithic 1 to Mesolithic 2 can be dated more closely, though still not very exactly. This is because the dates available from Mesolithic 1 sites are mostly derived from early phases in the sequence so one has to rely on dates from early Mesolithic 2 sites to arrive at an estimation. The latest date for a Mesolithic 1 site anywhere in the Levant is 12,150 ± 500 B.C. Mc-411 (Radiocarbon 15, 1973, 337) from Ksar Akil. The earliest date from a Mesolithic 2 site is 11,140 ± 200 B.C. I-5496 (Radiocarbon 15, 1973, 295) from Rosh Horesha in the Negev. This determination may be inaccurate as it does not agree with two others taken from similarly stratified samples at the same site; those determinations are 8,930 ± 280 B.C. SMU-10 and 8,540 ± 430 B.C. SMU-9 (Radiocarbon 16, 1974, 379). There are several determinations from three other sites that fall in the 10th millennium. These are 9,200 ± 400 B.C. for Kebara B, two dates from Mugharet el Wad B2 of 9,970 ± 660 B.C. and 9,525 ± 650 B.C. (Henry, 1973a, 291) and a date from Jericho of 9,216 ± 107 B.C. P-376 (Radiocarbon 5, 1963, 84), although two other samples from the Natufian deposits here have given later dates of 7,850 ± 240 B.C. F-72 and 7,900 ± 240 B.C. F-69 (Kenyon, 1959, 8). None of these dates is entirely satisfactory: the Kebara and Mugharet el Wad determinations were all made recently on bones from skeletons excavated many years ago (Henry, 1973a, 99) and the Jericho samples were processed when carbon 14 dating was still quite new. Nevertheless, this series of dates forms a consistent pattern which suggests that the transition from Mesolithic 1 to Mesolithic 2, in Palestine at least, took place about 10,000 B.C. or possibly a little before. This estimate can only be approximate for the moment since the evidence is so uncertain; it ignores the possibility that a version of the Kebaran continued on beside the earliest Natufian (Bar-Yosef, 1970a, 173).

Settlement patterns

Mesolithic 1 sites have been found over much of the Levant but their greatest density is in Palestine and Lebanon (Fig. 5). Their known distribution is the result of survey and excavation, much of it quite recent, which may not necessarily accurately reflect the original pattern of occupation. This has been demonstrated in Syria where no Mesolithic 1 sites were known north of Yabrud until a few years ago when more were found following intensive survey of the Palmyra region and the Euphrates valley.

Sites have now been located in the Jebel Meghara in northern Sinai (Moshabi XIV) as well as in the Har Harif and in Nahal Lavan (Nahal Lavan II, VI, 105) in the Negev. Others have been found along the present coast of Palestine (Kiryath Aryeh, Kefar Darom), in the Judean hills (El Khiam), on Mt. Carmel (Kebara, Nahal Oren) and in Galilee (Hayonim, En Gev). At least three sites have been discovered in what is now the steppe zone of Transjordan east of the Rift valley (Wadi Dhobai K, Wadi Madamagh, Wadi Rum). In Lebanon almost all the known sites are on the western slopes of the Lebanon Mountains (Abri Bergy, Jiita II, Ksar Akil). Douara Cave near Palmyra and Nahr el Homr on the Euphrates are proof that Mesolithic 1 communities inhabited central and northern Syria where there must be many other contemporary sites awaiting discovery.

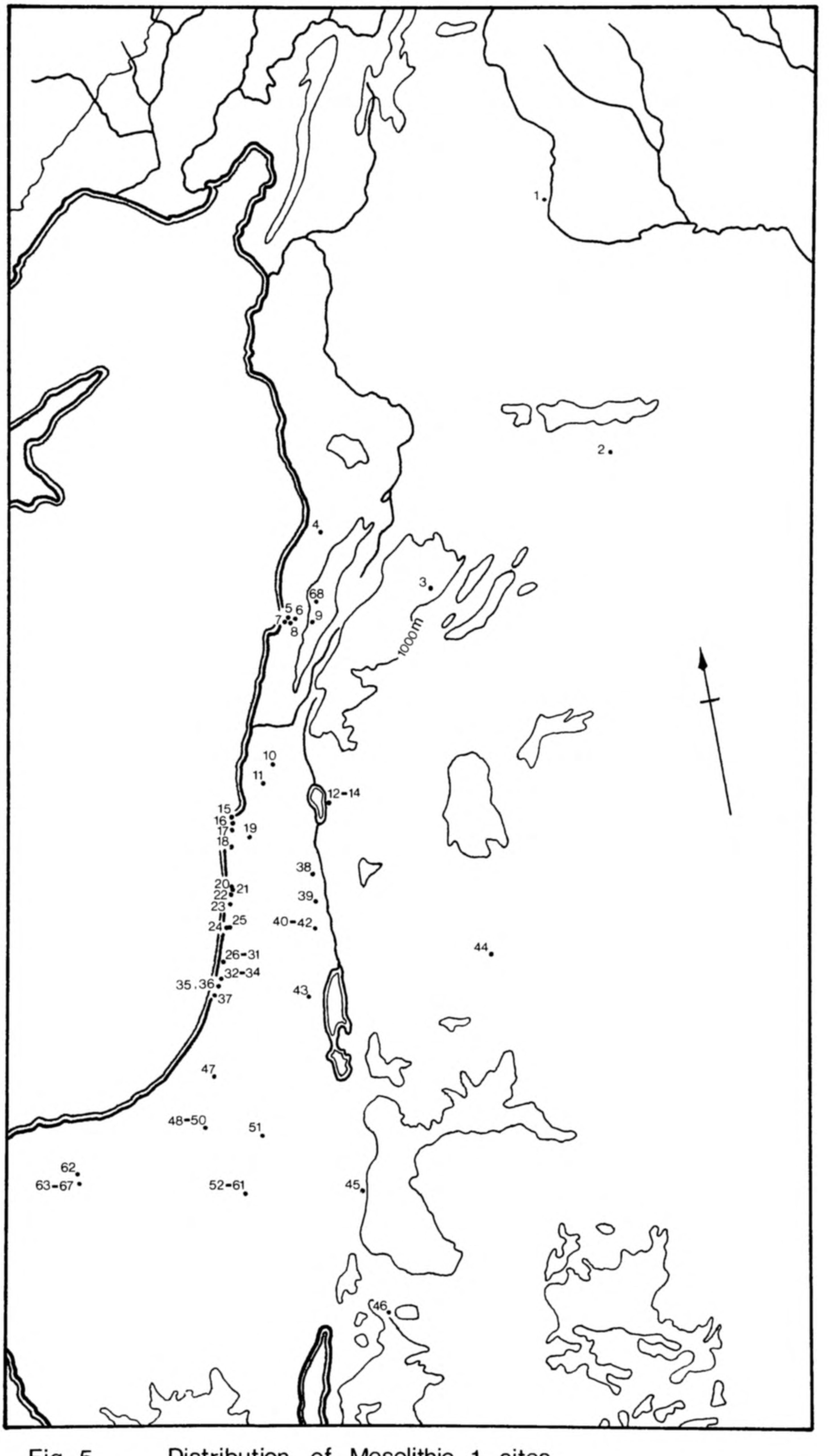

Fig. 5 Distribution of Mesolithic 1 sites

scale 1:4,000,000

FIGURE 5

Distribution of Mesolithic 1 sites

1 Nahr el Homr (Roodenberg, forthcoming)
2 Douara cave (Akazawa, 1974)
3 Yabrud III (Rust, 1950, 107)
4 Ash Ash (Copeland, Wescombe, 1966, 24)
5 Jiita II (Hours, 1973)
6 Dhour Choueir (Hours _et al_, 1973, 454)
7 Ksar Akil (Tixier, 1974)
8 Abri Bergy (Copeland, Wescombe, 1965, 62)
9 Ain Hazir (Hours _et al_, 1973, 454)
10 Mugharet el Abed (Copeland, Wescombe, 1966, 47)
11 Hayonim (Bar-Yosef, 1970a, 42)
12 En Gev I (Bar-Yosef, 1970a, 106ff)
13 En Gev II (Bar-Yosef, 1970a, 106ff)
14 En Gev III (Bar-Yosef, 1970a, 106ff)
15 Haifa 1 (Olami, 1973, 8)
16 Iraq el Barud (Bar-Yosef, 1970a, 32)
17 Nahal Oren (Noy _et al_, 1973)
18 Kebara (Turville-Petre, 1932)
19 Rakafet (Noy _et al_, 1973, 96)
20 Hofith-68 (Bar-Yosef, 1970a, 63)
21 Kefar Vitkin III (Bar-Yosef, 1970a, 60)
22 Umm Khalid (Bar-Yosef, 1970a, 66)
23 Poleg 18MII (Bar-Yosef, 1970a, 69)
24 Kiryath Aryeh II (Bar-Yosef, 1970a, 76)
25 Kiryath Aryeh I (Bar-Yosef, 1970a, 77)
26 Soreq 33MI (Bar-Yosef, 1970a, 84)
27 Soreq 33M (Bar-Yosef, 1970a, 85)
28 Soreq 33G (Bar-Yosef, 1970a, 85)
29 Soreq 33 M_1 (Bar-Yosef, 1970a, 86)
30 Soreq 33 M_2 (Bar-Yosef, 1970a, 88)
31 Giveath Haesev (Bar-Yosef, 1970a, 89)

32 Kefar Darom 26 (Bar-Yosef, 1970b, 61)
33 Kefar Darom 27 (Bar-Yosef, 1970b, 61)
34 Kefar Darom 28 (Bar-Yosef, 1970b, 61)
35 Kefar Darom 3 (Bar-Yosef, 1970b, 61)
36 Kefar Darom 8 (Bar-Yosef, 1970b, 61)
37 Kefar Darom 13 (Bar-Yosef, 1970b, 61)
38 Wadi el Malih (Bar-Yosef et al, 1974, 423)
39 Wadi Far'ah (Bar-Yosef et al, 1974, 423)
40 Wadi Fazael III (Bar-Yosef et al, 1974, 421)
41 Wadi Fazael VII (Bar-Yosef et al, 1974, 420)
42 Wadi Fazael VIII (Bar-Yosef et al, 1974, 421)
43 El Khiam (Perrot, 1951, 154)
44 Wadi Dhobai K (Waechter, Seton Williams, 1938, 174)
45 Wadi Madamagh (Kirkbride, 1958a)
46 Wadi Rum (Copeland, Hours, 1971)
47 Point 104 (Perrot, 1968, col. 365)
48 Nahal Lavan II (Phillips, Bar-Yosef, 1974a, 477)
49 Nahal Lavan VI (Phillips, Bar-Yosef, 1974a, 477)
50 Nahal Lavan 105 (Phillips, Bar-Yosef, 1974a, 478)
51 En Avdat D5 (Marks et al, 1971, 20)
52 Har Harif G1 (Marks et al, 1972, 78)
53 Har Harif G3 (Marks et al, 1972, 78)
54 Har Harif G9 (Marks et al, 1972, 78)
55 Har Harif G10 (Marks et al, 1972, 78)
56 Har Harif K4 (Marks et al, 1972, 78)
57 Har Harif K5 (Marks et al, 1972, 78)
58 Har Harif K6 (Marks et al, 1972, 78)
59 Har Harif K7 (Marks et al, 1972, 78)
60 Har Harif K8 (Marks et al, 1972, 78)
61 Har Harif K9 (Marks et al, 1972, 78)
62 Lagama I (Phillips et al, n.d., 7)
63 Moshabi XIV (Phillips, Bar-Yosef, 1974b, 483)
64 Moshabi XVII (Phillips, Bar-Yosef, 1974b, 483)
65 Moshabi unnumbered (Phillips, Bar-Yosef, 1974b, 483)
66 Moshabi unnumbered (Phillips, Bar-Yosef, 1974b, 483)
67 Moshabi XIX (Phillips, Bar-Yosef, 1974b, 483)
68 Neba'a el Mghara (Copeland, Wescombe, 1965, 113)

Relatively few Mesolithic 1 sites have been found in the Judean hills or in the Mountains of Lebanon even though these areas have been carefully surveyed. This suggests that the people of Mesolithic 1 avoided the wooded highlands. The Kebaran occupation at El Khiam and the related Nebekian/ Falitian at Yabrud III show that they did penetrate the upland rain-shadow zone which carried thin woodland at most during this period. Transjordan and possibly Sinai and the Negev were all steppic yet Mesolithic 1 sites have been found in these regions so the steppe itself must have afforded resources which these people could exploit. They do not, however, appear to have deeply penetrated the steppic zone to the east. It may be that the very dry, cool conditions of the interior inhibited further expansion in this direction. All known Mesolithic 1 sites were probably north and west of the contemporary 200mm isohyet which may have been the effective boundary of occupation. It will be interesting to see if this observation still holds true once the interior of the Syrian desert has been more thoroughly surveyed.

The people of Mesolithic 1 used both rock shelters and open stations as habitation sites. The shelter sites, among them Ksar Akil, Jiita II, Hayonim, Kebara and Wadi Madamagh, were frequently situated in wadis on the fringes of the hill country. Not all the available rock shelters were occupied: Mugharet el Wad, Shukbah and Erq el Ahmar for instance remained empty throughout Mesolithic 1. This may indicate that shelters were now less attractive as habitation sites than they had been during the Aurignacian.

Most Mesolithic 1 sites were open stations. Again, some like the Nahal Oren terrace and the Wadi el Malih and Wadi Fazael sites were situated in wadis while En Gev and others were found near springs. There were many more open stations along the present coast and in the Negev around the Har Harif and Jebel Meghara. Until recently the relative abundance of open sites in Mesolithic 1 compared with the Aurignacian lent weight to the suggestion that these were more preferred than in the past. This may still be true of the upland zones where shelters and caves were to be found. This observation does not apply to northern Sinai and the Negev where the recent survey work of Marks, Phillips and their collaborators has shown that these areas were inhabited in both the Aurignacian and Mesolithic 1. All the sites of both stages found here have been open stations principally, no doubt, because shelters were a rare feature of the landscape in these regions.

Economy and society

The great environmental diversity of the Levant meant that a wide range of fauna, flora and raw materials could be exploited by man but these resources would have varied considerably from zone to zone. This diversity of resources is reflected in the different artifact inventories from supposedly approximately contemporary deposits on Mesolithic 1 sites. The artifacts reflect above all the activities practised by the inhabitants and it is reasonable to expect that these activities would have varied according to the resources available although other factors such as human preference would also have played a part.

The animal bones form the largest and most important category of direct evidence for the economy of Mesolithic 1 and the varied collections from individual sites give some idea of the wide range of resources that was used. The catchment areas of the sites would have contained a variety of species in different proportions and this environmental factor can be detected in the excavated faunal remains.

Preliminary information from En Gev I indicates that gazelle comprised 43% of the bones of the main food animals, deer (fallow, red and roe together) 36% and ovicaprines 15.5%. There were also some cattle bones (4.5%) and a little pig (1%) (Bar-Yosef, 1970a, 120ff; 1975, 372 after Davis) while a number of other species, including birds, were represented in small quantities. Many of these species were also found in En Gev II and III.

The fauna from the Kebaran layers at Nahal Oren was quite similar and the species were represented in much the same order but here the preponderance of gazelle (77.4%) was even more striking. Fallow deer were second in importance (15.2%) but the other species were much less significant: cattle 3.3%, pig 2.6%, red and roe deer 1.1% and goat hardly at all (0.1%) (Noy et al., 1973, table 4).

At Kebara itself gazelle dominated the fauna in layer C (Saxon, 1974, fig. 3) while fallow deer were much less important than in the Aurignacian. Other species were killed only in very small quantities. The pattern was similar at Hayonim even though the faunal sample was small. Gazelle was again the most numerous species (Bar-Yosef, Tchernov, 1966, 129ff) with fallow deer second. Cattle, red deer and caprines were present in small quantities as well as numerous other species of rodents and carnivores. Hares were very common and it appears that terrestrial molluscs were also eaten.

When the fauna from these sites is compared it is clear that gazelle were eaten in much greater numbers in Palestine than any other species. Deer, especially fallow deer, were second in importance and hares seem to have been a regular supplement. A wide range of other species was hunted or collected for food but these were of minor importance in the total diet. The consumption of gazelle rapidly increased in proportion to that of fallow deer after the Aurignacian (Noy et al., 1973, fig. 9). This trend continued throughout Mesolithic 1 as the evidence from Nahal Oren makes clear; fallow deer declined from about 30 or 40% in layer IX early in the Kebaran to 14.9% in layer VII at the end while gazelle increased reaching 82.6% in layer VI transitional between the Kebaran and Natufian (Noy et al., 1973, table 3). Such a pattern of exploitation depended partly on environmental factors. The forest in central and northern Palestine thinned out in response to more arid conditions during the last cool phase of the Pleistocene. This probably led to a natural decline in the deer population and a rise in that of gazelle. As gazelle became more plentiful so man hunted more of them rather than other species which were much less numerous. Legge has suggested that the people of Mesolithic 1 may have practised "gazelle husbandry" (1972, 123; Noy et al., 1973, 91). Certainly it appears that this species was pursued more intensively and that care was taken to kill a high proportion of immature animals but this may have amounted to no more than selective hunting. It is probable, however, that a close dependence on gazelle was established at this time and that this relationship was intensified later.

This concentration on gazelle was not a universal pattern of exploitation in Mesolithic 1. At Ksar Akil, for example, the percentage of fallow deer killed was very high (53%), a higher proportion even than in the Aurignacian (Hooijer, 1961, table 25). Goat was second in importance (30%) and roe deer third (15%). Some cattle were taken (1%) but even fewer gazelle than in the preceding stage (1%). The emphasis on fallow deer throughout the Ksar Akil sequence is as striking as that of gazelle on sites in northern Palestine after the Aurignacian. It must, equally, represent selective, intensive hunting of the species near the site that was most numerous and easiest to kill.

Goats (the bezoar Capra hircus aegagrus and beden Capra ibex nubiana) were the main animals hunted at Wadi Madamagh (Perkins, 1966, 67), their bones accounting for 82.7% of the animal bones at the site, although other food animals such as aurochs (Bos primigenius), gazelle, pig (Sus scrofa), an equid and hare were also taken. Again one species was much preferred to all the others and it was probably the one that was especially numerous around the site. Selective hunting was practised on most sites in Mesolithic 1, the species chosen being those that were readily available in the vicinity and which provided ample meat and other products.

Marine shells have been found at a number of inland Mesolithic 1 sites such as D5 near En Avdat (Marks et al., 1971, 20), Wadi Madamagh (Kirkbride, 1958a, 56) and En Gev I and II (Bar-Yosef, 1970a, 121, 125) and also nearer the sea at Hayonim (Bar-Yosef, Tchernov, 1966, 137). Many of these were decorative objects brought up from the Mediterranean but some were edible species. It seems likely that fish and molluscs would have been eaten, if only in small quantities, where they were available. One instance of this is En Gev where fish bones were found at En Gev IV only, a site transitional between Mesolithic 1 and 2, but not at En Gev I, II or III (Bar-Yosef, 1970a, 109). The latter sites were all in use when the Pleistocene Lisan lake still existed. It had much of the character of the Dead Sea today and fish could not have lived in it. At the close of the Pleistocene the Lisan lake shrank and eventually the Sea of Galilee was formed from it as a freshwater lake (Bar-Yosef, 1970a, 108). Fish gradually established themselves and by the time En Gev IV was founded on its shore man was able to catch them for food. It is possible that some Mesolithic communities depended to a much greater extent upon marine resources but their sites will have disappeared as the sea level rose at the end of the Pleistocene. During Mesolithic 1 the sea lay about 15 km west of the present coast of Palestine.

There is some archaeological evidence that plants were eaten in Mesolithic 1. 64 seeds were recovered from the Kebaran levels at Nahal Oren which included fig and grape pips as well as vetch and grass seeds (Noy _et al_., 1973, table 6). There is also rather enigmatic evidence that cereals were collected as one barley and three emmer (_Triticum dicoccum_) grains were found in the deposits. One cannot unreservedly accept the presence of cultivated emmer grains in such an early deposit despite the apparently unequivocal archaeological evidence that they were _in situ_ (Noy _et al_., 1973, 93) until supporting evidence is forthcoming from other sites. Not too much should be made either of such a small sample but it would not be surprising if cereals were being collected at this early date as part of the vegetable diet. Further, it is not impossible that emmer, which is present in some early Neolithic contexts, was being collected in the wild in such a way that a "domesticated" form had already developed.

We do not know what proportion of the diet of the people of Mesolithic 1 consisted of vegetable foods but the probability is that they were at least as important as the meat obtained from hunting. Recent studies have shown that among most contemporary hunter-gatherers vegetable foods form a major part of the diet. Australian aborigines select food from almost all edible plant and animal species in their habitats but they eat more vegetable foods than anything else (Gould, 1969, 258; Yengoyan, 1968, 186ff). Woodburn has calculated (1968, 51) that 80% of the Hadza diet by weight is composed of vegetable foods and 20% of meat and honey although the calorific value of the plant foods is proportionately rather less. The !Kung bushmen also eat similar quantities of vegetable foods (Lee, 1968, 33ff, 40). It is only in certain extreme environments where vegetable foods are rare such as the north-west coast of North America (Suttles, 1968, 61, note 5) or the Arctic that man relies on hunting and fishing for subsistence (Lee, 1968, 42). The wide range of plant and animal foods available to man in the Levant is typical of many other regions in lower latitudes where hunter-gatherers now and in the recent past have subsisted on a largely vegetable diet though eating a great variety of other foods from time to time. It seems highly probable that this was also the case in Mesolithic 1; vegetable foods were almost certainly collected and eaten in quantity and may have formed the basis of the diet.

The artifacts and technology of Mesolithic 1 communities differed significantly from those of the Aurignacian. The most obvious development was in the chipped stone industries although the innovation of microlithic tools remains difficult to interpret in the Levant where there is no accompanying evidence of a major change in the basis of subsistence. One of the new tools was the sickle blade (Bar-Yosef, 1970a, 156), that is a blade with gloss on the cutting edge. This was quite a rare tool on Mesolithic 1 sites, as were blades and blade tools in general. The gloss on the edge indicates that the tool was used for cutting plants with siliceous stalks, reeds, cereals or the like. This innovation signifies that specialised stone tools were being developed to process plants, though there is no indication yet that anything resembling conscious agricultural techniques was being practised. One other new group of tools was stone pestles, mortars and grinders. These were found first at En Gev then recently at a number of other Mesolithic 1 sites (Bar-Yosef, 1975, 368). Stone grinders have been found at the Aurignacian site of Ein Aqev in the Negev (Marks, 1973, 4) but it appears that these tools were first made in quantity during Mesolithic 1. We do not know if they were used in some new industrial process or for crushing plant foods but the development of such tools is significant not only as a technological innovation but because they were the first bulky, heavy items made by man in the Levant. They would have been an impediment to mobile groups and, as such, were harbingers of a later more sedentary existence.

We know the area of some Mesolithic 1 sites and from this it is possible to estimate approximately the number of people which inhabited them. When this information is combined with the data we have for their economy it enables us to reconstruct in outline the social structure of these human groups. Some sites were very small indeed; Nahal Lavan VI was 15 sq m and Nahal Lavan II 40 sq m (Phillips, Bar-Yosef, 1974a, 477) while Hofith-68 (75 sq m) and Kefar Darom 28 (70 sq m) were only a little bigger (Bar-Yosef, 1970a, 63, 92). Most of the other sites for which we have information were between 120 and 300 sq m in area. Wadi Madamagh was originally about 120 sq m (Kirkbride, 1958a, 55ff) and the Mesolithic 1 occupation at Jiita II about 130 sq m[1]. The maximum extent of site D5 at En Avdat in the Negev was also 130 sq m (Marks <u>et al</u>., 1971, 20). Moshabi XIX was only a little larger (160 sq m) (Phillips, Bar-Yosef, 1974b, 483) but Moshabi I was almost twice as big (300 sq m) (Phillips <u>et al</u>., n.d., 8). The estimated area of Kebara itself was the same as Moshabi I (Garrod, 1954, 156ff, pl. XXIII). The total area of occupation at Kefar Darom 8, 500 sq m (Bar-Yosef, 1970a, 102), is apparently greater but as it is thought that this site was used over a long period the total area occupied at any time was probably less and so within the range of the other sites. One site, Ksar Akil, may have been bigger than the others I have mentioned since the total area of the shelter and terrace in front was well in excess of 500 sq m^2. The area occupied in Mesolithic 1 may have been 500 sq m or more but we do not have enough information about the excavations at Ksar Akil to be sure.

While the size of camps used by hunter-gatherers today varies widely, they frequently come within the same range as Mesolithic 1 sites. It is known that camps of Australian aborigines are often from 200 to 300 sq m in area while Bushmen camps may be a little larger, ranging from 230 to 790 sq m (Isaac, 1968, 258). These are open sites in which groups of the same size might be expected to occupy a slightly larger area than in a cave. These groups or bands have 20 to 30 members and groups of this size are commonly found among hunter-gatherers today. Using data from the Birhor, !Kung Bushmen and some Australian aborigines Birdsell has suggested (1968, 235) that the average band has 25 members. Steward has found (1968, 331) that this is also true for the Athapaskans, Hadza and Western Shoshoni. Given that Mesolithic 1 sites are approximately the same size as those used by groups of hunter-gatherers today it seems likely that the basic unit of social organization, a band of about 25 people, was also about the same.

It is possible to suggest in a little more detail how these bands may have been organized. Some years ago in a discussion of social organization among primitive peoples Service stated that most hunter-gatherers today were grouped in patrilocal bands (1962, 65). He also believed that this type of social structure was characteristic of prehistoric hunter-gatherers (1962, 107ff). Recent research has demonstrated that this particular band structure is much less common than was previously supposed (Lee, De Vore, 1968, 7ff) and, indeed, Service has considerably modified his earlier views (1971, 157). It is now clear that Primary (Steward, 1968, 331) or Composite (Lee, De Vore, 1968, 8) bands are more typical of hunter-gatherer societies today. Bands of this type may fluctuate considerably in size but usually consist of about 25 individuals. The members will be related to each other but there is great variety in the kinship structure.

This form of social organization has considerable adaptive advantages. Composite bands are small so they do not rapidly exhaust the food supply in the vicinity of their camps, They are also extremely flexible: they can move easily from one camp to another in order to exploit fresh resources and can also split up or amalgamate to adapt to seasonal variations in food supply. This type of adaptation is well-suited to a region such as the Levant with very varied geographical conditions and seasonal differences of climate, vegetation and fauna. Such a model of social organization fits the archaeological evidence for Mesolithic 1 quite well. While it is no doubt oversimplified and will need modification when more evidence is available, I believe it indicates in outline how society was organized in Mesolithic 1.

Although most Mesolithic 1 sites fall within the same size range as camps of composite bands of hunter-gatherers today a few, as we have seen, were smaller than the average, that is less than 100 sq m in area. Such sites were too small to have accommodated a complete composite band. They may have been the camps of single families or small hunting parties which had separated from a band. Some sites from 100 to 200 sq m were intermediate in size between these transitory stations and the larger camps; they may have been used by two or three families or groups smaller in size than the full composite bands. All Mesolithic 1 sites and thus the groups which inhabited them were in general quite small particularly when compared with some Mesolithic 2 camps and earlier Neolithic settlements.

Some information about the internal arrangements of Mesolithic 1 sites has been recovered in excavations at En Gev which enables us to deduce in a little more detail the organization of Mesolithic 1 communities. Excavations here revealed four sites in close proximity, three of them Kebaran (En Gev I, II, III) and one transitional between the Kebaran and Natufian (En Gev IV). En Gev I was 150 sq m in area but the density of stone tools found suggests that only 50 sq m was intensively occupied

(Bar-Yosef, 1970a, 182). En Gev II was very small but may have been inhabited about the same time as En Gev I (Bar-Yosef, 1970a, 182), so these two sites came within the size range of the intermediate sites discussed above. En Gev I consisted almost entirely of a large round hut 5 to 7m in diameter floored with pebbles (Bar-Yosef, 1970a, figs. 89, 90) with associated hearths and occupation debris. En Gev III probably represented a similar hut (Bar-Yosef, 1970a, fig. 102) while En Gev IV was also apparently a habitation structure (Bar-Yosef, 1970a, 126). These large, single structures suggest that each site may have been occupied by an extended family rather than a band composed of several families. The total number of people in the group was probably less than the average of 25 or so suggested for composite bands, perhaps no more than 10 or 15.

A little more evidence for a similar type of small camp has now been found at Moshabi XIV in the Jebel Meghara (Phillips, Bar-Yosef, 1974b, 483). A pit dwelling has been discovered here associated with post-holes and hearths. This camp would appear to resemble those at En Gev and may have been inhabited by a group of similar size.

Most Mesolithic 1 sites have very thin occupation deposits indicating that they were occupied briefly perhaps on a seasonal basis. The presence of amphibian species but not reptiles in the fauna from Hayonim may be taken as evidence that the cave was too wet in the winter for human occupation (Bar-Yosef, Tchernov, 1966, 138); it was probably only inhabited during the summer. The absence of certain rodents closely associated with man is a further indication that human occupation was intermittent during Mesolithic 1. The hut at En Gev I had six floor levels separated by sterile sand (Bar-Yosef, 1970a, 110), clear evidence that the structure was repeatedly occupied for short periods of time. En Gev III seems to have had a similar series of floor levels (Bar-Yosef, 1970a, 124, fig. 102), emphasising that this was a regular practice over several years.

Composite bands or smaller groups may have lived on each site for a short time, varying between a few days and several weeks, until the easily available food in the neighbourhood began to diminish. They would then have moved on to a new site. On modern analogy their movements would probably have taken place within a defined area or territory and may have been restricted by the presence of other groups who were exploiting neighbouring territories. This pattern of movement would have been related to the marked seasonal variation in resources typical of the region. The length of time spent at each site would have varied during the year depending on the resources available in the vicinity. A band might have returned to certain favoured sites regularly for a few years but then have moved away into a new territory.

Although Mesolithic 1 sites were usually insubstantial, clusters of them have often been found together, as around Nahal Poleg (Burian, Friedmann, 1964-64, 10ff), Kefar Darom, En Gev itself and in Wadi Malih. These areas were sufficiently attractive for the people of Mesolithic 1 to visit them frequently. The same was probably also true of some of the shelter sites with more substantial occupation deposits such as Ksar Akil and Jiita II, themselves close together, and Yabrud III. Higgs has suggested that transhumance may have been practised between Nahal Oren and Rakafet (Noy et al., 1973, 95ff). This would have been a specialised form of seasonal movement between a lowland and an upland site quite near each other which offered complementary resources. Such a pattern of movement may have been typical of some other areas of the Levant where contemporary sites have been found only a short distance apart in different environmental zones. This practice may have begun much earlier during the Palaeolithic as has been postulated for Epirus in Greece (Higgs et al., 1967, 18ff).

The constant movement that was one of the dominant features of this way of life would have imposed a severe constraint on the rate of population growth. The mothers would be unable to look after more than one, or at the most two, infants at a time and so could only support children born at least three years apart. Without some form of birth control children would often be born more frequently than this so some other limitation would be necessary. The solution adopted among many hunter-gatherers today is infanticide (Birdsell, 1968, 236ff) while among communities in extreme environments even more severe demographic controls are exercised (Balikci, 1968, 81). Where infanticide is not practised a high infant mortality rate severely restricts population growth (Rose, 1968, 203ff). By means of these and other constraints the Mesolithic 1 population would have remained stable or grown only very slowly indeed. On modern analogy it would have remained for much of the time well below the maximum carrying capacity of the region.

Mesolithic 2

Archaeological evidence from sites in Palestine and on the Lebanese coast suggests that Mesolithic 2 developed directly from Mesolithic 1. At Kebara, Nahal Oren, Hayonim and Jiita II the Mesolithic 2 layers were stratified immediately above those of Mesolithic 1 without any serious break in the sequence. There were also enough similarities in the cultural equipment of the two stages from these and other sites to indicate that Mesolithic 2 developed directly from Mesolithic 1, at least in these regions. Both the microliths and the heavy component of the flint industries of both stages had many types in common; only the lunate, one of the type-fossils of Mesolithic 2, was really new. Certain technological traits such as the microburin technique were shared by many Mesolithic 1 and Mesolithic 2 sites while the same types of heavy stone tools, pestles, mortars and querns were present in each stage.

It would also appear that the huts at En Gev I and III were the ancestors of the characteristic circular Mesolithic 2 buildings. The sequence of sites at En Gev illustrates the transition from Mesolithic 1 to Mesolithic 2 as it took place in one favoured settlement location. Sites I and II here have been classified as "Kebaran" and therefore quite early in the Mesolithic 1 sequence, site III as "Geometric Kebaran A" which is thought to have been a little later, and site IV as "Geometric Kebaran A2" or "B" (Bar-Yosef, 1975, 368ff); this last phase may be regarded as transitional or even a variant of Mesolithic 2.

It is only in the central Levant that we have strong evidence for an uninterrupted transition from Mesolithic 1 to Mesolithic 2 although there is some additional evidence from other sites as far south as the Negev to Yabrud III in the north. Elsewhere in central and northern Syria and in the semi-arid areas to the east not enough is known yet about contemporary sites for one to be certain that their development was similar.

The Natufian in Palestine may be defined by a number of cultural attributes. The most important of these is a microlithic chipped stone industry of which the lunate is the most characteristic type; this stone industry may include many coarse flake tools on some sites. Heavy ground stone tools such as mortars, pestles and rubbers are another typical feature. Some other traits are also characteristic, among them a rich bone industry, certain bone and shell beads and art objects which include both human and animal figurines. Circular stone buildings sometimes associated with stone paving have also been found on some sites and may be regarded as another attribute.

Most or all of these traits have been found on the large sites such as Erq el Ahmar (Neuville, 1951, 86), Mugharet el Wad (Garrod, Bate, 1937, 29ff) and Ain Mallaha (Perrot, 1968, col. 367) in central and northern Palestine. It is in this region which may be regarded as the Natufian heartland that the Natufian was most developed. Many smaller sites in this area were also Natufian in aspect although for functional or other reasons they may have lacked some of the characteristic artifacts. Most of the typical Natufian traits have also been found on the larger sites in the Negev. Both Rosh Zin and Rosh Horesha had circular buildings and a typical Natufian flint industry (Marks, 1975a, 353). A number of ground stone rubbers and querns were also found at Rosh Zin (Henry, 1973b, 130) as well as other diagnostic traits. The material from these sites is so similar to that on sites further north that it is reasonable to include Rosh Zin and Rosh Horesha within the Natufian as defined above.

Mesolithic 2 sites in Lebanon and south Syria, Jiita II (Chavaillon, Hours, 1970, 230), Jiita III (Copeland, Wescombe, 1965, 92) and the Beirut Sands stations (Copeland, Wescombe, 1965, 129, 134) on the coast; Amiq II (Hours et al., 1973, 466) and Jebel Saaideh (Schroeder, 1970, 200) in the Beka'a; Nacharini, Yabrud III (Rust, 1950, 119), Mugharet el Abde (Nasrallah, 1951, 92ff), Qornet Rharra (de Contenson, 1966a, 199) and Saidnaya (van Liere, de Contenson, 1963, 179) in the Anti-Lebanon; and Taibe (M.-C. Cauvin, 1974a, 469) in the Hauran had relatively few characteristic Natufian traits. All of them lacked buildings which may be because they were mostly shelter sites. Only two of them, Saaideh (Schroeder, 1970, 200) and Jiita II (Chavaillon, Hours, 1970, 230) had ground stone tools while few other types of artifacts have been found on them at all. The one feature linking them with the Palestinian Natufian was an abundant microlithic flint industry characterised by lunates. This connection is strong enough to place them on the same horizon as the Natufian in Palestine but the cultural links do not seem to have been very close. It is for this reason that I believe these sites are better regarded as a regional variant, Natufian-like rather than true Natufian. These two groups of sites may be conveniently described together as Mesolithic 2.

Mesolithic 2 sites with a flint industry related to the Natufian have been found in a great arc around the eastern Mediterranean from Helwan near Cairo in the south to Beldibi and Belbaşi (Bostanci, 1959, 146ff; 1962, 254ff) on the Turkish coast near Antalya. These sites were located in regions far beyond the Natufian heartland and, apart from the flints, their artifacts had little in common with the full Natufian inventory. The same may be said of the sites in the Euphrates valley. Both Abu Hureyra and

and Mureybat had an abundant microlithic flint industry characterised by lunates, a range of simple bone tools and ground stone pestles, mortars, rubbers and querns. These artifacts broadly resembled Natufian types but there was none of the elaboration of a full Natufian assemblage and some of the significant traits were missing. The structures at both sites were different from anything found in Palestine. In the small exposure at Mureybat[3] in phase IA there were large fire-pits and at Abu Hureyra there were a number of interlocking pits cut into the natural subsoil with post-holes around them; the latter appear to have been dwelling or working hollows which were probably roofed with timber, branches and reeds.

All these sites were on the same cultural level as the Natufian but they cannot really be regarded as truly Natufian or even Natufian-like unless further evidence is forthcoming to indicate that they were more closely related than at present they appear to have been. I do not believe that they should be called Natufian either with (Hours et al., 1973, 458) or without (Cauvin, 1972, 107) further differentiation. I prefer to group them all under the more general name, Mesolithic 2.

I do not intend to present a detailed review of the material remains of Mesolithic 2 in this chapter but simply to discuss the Mesolithic 2 population, their economy and pattern of settlement in order to establish how these contributed to the emergence of the Neolithic way of life. A word must be said, however, about the detailed schemes which have been proposed in the past for subdividing this stage since they can no longer be used as a guide for ordering all the material which has now been discovered. The evolution of Mesolithic 2 has been studied in detail only in Palestine where the Natufian was first defined by Garrod in 1932 (1932, 257ff). Two years later Neuville published a fourfold division of the Natufian based on the results of recent excavations (1934, 251ff). He believed that the Natufian could be divided into successive chronological stages, I to IV, on the basis of comparative stratigraphy, changes in the chipped stone industry and the presence or absence of certain attributes. In her report published in 1937 Garrod divided her deposits at the Mugharet el Wad into two stages, Lower and Upper Natufian (Garrod, Bate, 1937, 9) which she believed corresponded to Neuville's stages I and II. At that date she accepted Neuville's scheme but later she modified her views and proposed a threefold division of the Natufian (1957a, 213). For many years archaeologists continued to try to fit new discoveries into one or other of these chronological schemes though never with complete success. In a recent study of the Natufian chipped stone industry and its technology Henry has indicated that he believes the schemes of Neuville and Garrod may still have some validity (1973a, 173) but the fact remains that most Natufian sites cannot at present be accommodated in any detailed chronological sequence.

One of the most striking aspects of Mesolithic 2 material remains is their great variability fron one site to another. This is true of both the structures and the artifacts. Neuville and Garrod sought to explain this from the point of view of archaeologists well-versed in the sequential successions of industries which were then thought to characterise the Palaeolithic. They believed that the varied Natufian assemblages they had found in Palestine must represent different industries which could be arranged in the order of their chronological development. Stone industries during the Palaeolithic had a long life so a series of four stages such as Neuville proposed would have required a long period of development. We now know that Mesolithic 2 lasted a relatively short time, certainly much less than Mesolithic 1, and that there was no time for a succession of industries to have been developed on the model of, for example, the Upper Palaeolithic sequence in the Levant. As new sites were discovered and excavated the variations between them became more and more apparent until there could be no doubt that there never was a single succession of assemblages throughout Mesolithic 2.

This variability may be explained in several ways. It remains possible that some of the differences may reflect changes through time but for the moment we cannot pinpoint these. No site was definitely inhabited throughout Mesolithic 2 and few were occupied for even a substantial part of it. Thus we lack good stratigraphical evidence for whatever changes may have taken place during Mesolithic 2. Very few Mesolithic 2 sites have been dated by carbon 14 so that there is not even a good internal chronology to help us place sites in chronological order. For the moment we can only regard them as having been occupied contemporaneously in archaeological terms.

The most likely explanation for the great variability in assemblages from different sites is that different activities were being practised from one site to another. Mesolithic 2 sites were scattered through several environmental zones and this ecological diversity is also reflected in the diverse remains from different sites. We shall see that after a long period of apparent relative economic and social stability during Mesolithic 1 several significant modifications to man's way of life took place in Mesolithic 2 which were associated with changes in the environment and in the level of population. These developments were reflected in the variations in artifact assemblages between one site and another.

I will now briefly consider such evidence as we have for the chronology of Mesolithic 2 in order to establish how long it lasted. We have already seen that Mesolithic 2 followed Mesolithic 1 about 10,000 B.C. on present evidence. I have mentioned several dates from Kebara, Mugharet el Wad and Jericho which confirm that Mesolithic 2 lasted throughout the 10th millennium and into the 9th. The end of Mesolithic 2 is difficult to determine precisely because the pattern of ^{14}C determinations we have for sites occupied late in Mesolithic 2 or early in the Neolithic is not consistent. The latest dates for Mesolithic 2 deposits anywhere in the Levant are the old determinations F-69 and F-72 from Jericho and a date of 7845 ± 600 B.C.

(Henry, 1973a, 291) obtained recently from bone excavated from Mugharet el Wad B1. All the other relevant dates would indicate that Mesolithic 2 ended much earlier so these three should be discounted.

The only dates for an early Neolithic site in the central Levant come from Jericho. Two determinations were made by the British Museum on samples from quite early in the Pre-Pottery Neolithic A (PPNA) levels which gave results of 8350 ± 500 B.C. BM-250 (Radiocarbon 11, 1969, 290) and 8300 ± 200 B.C. BM-105 (Radiocarbon 5, 1963, 107). Results obtained by the Philadelphia laboratory from samples of similar age were several centuries later. The phases dated by these determinations were preceded by earlier PPNA levels and the whole Proto-Neolithic stage. I would estimate from this information that the transition from Mesolithic 2 to Neolithic at Jericho may have taken place about 8500 B.C. The change seems to have occurred in the Negev at about the same time. We have seen that the latest date from a Mesolithic site there is 8540 ± 430 B.C. SMU-9. The oldest dated site in the Negev with early Neolithic affinities is Abu Salem from which three determinations have been obtained of 8020 ± 150 B.C. I-5498, 8280 ± 150 B.C. I-5499 and 8280 ± 150 B.C. I-5500 (Marks, 1975a, 361). Thus the transition could be dated about 8500 B.C. here or perhaps a century or two later.

The only other region of the Levant from which we have dating evidence for late Mesolithic 2 and the beginning of the Neolithic is north Syria. Several determinations have been obtained from Mureybat which give us an approximate idea of when the change took place here. The oldest phase at Mureybat was IA which has been ascribed to Mesolithic 2. Four determinations for this phase have recently been published though full details of these are not yet available. They are 8400 B.C. Mc-675, 8280 B.C. Mc-731, 8280 B.C. Mc-732 and 8220 B.C. Mc-635 (Leroi-Gourhan, 1974, 444). Unfortunately these new dates conflict with those obtained by other laboratories for phase IB, the earliest Neolithic deposit, and phase II which succeeded it. The greatest discrepancy is with a determination of 8640 ± 140 B.C. Lv-607 for the latter part of phase I (Gilot, Cauvin, 1973, 37) now ascribed to IB (Leroi-Gourhan, 1974, 444). Other Louvain determinations for phase II have given results of 8640 ± 170 B.C. Lv-605 and 8510 ± 200 B.C. Lv-606 (Gilot, Cauvin, 1973, 37). Three dates were obtained by the Philadelphia laboratory for levels now ascribed to phase II which were excavated by van Loon in the earlier campaigns at the site. These were 8265 ± 117 B.C. P-1217, 8142 ± 118 B.C. P-1216 and 8056 ± 96 B.C. P-1215 (Radiocarbon 11, 1969, 151). These determinations cannot all be resolved satisfactorily. If the Louvain and Philadelphia dates only are considered then phase IA may have ended about 8700 B.C. At the other extreme a comparison between the Monaco and Philadelphia dates would yield a figure of approximately 8300 B.C. Taking all the dates together one might tentatively suggest that the transition from IA to IB happened about 8500 B.C. or a little after but this must remain a provisional estimate until the discrepancies between these determinations have been resolved. If my estimate of 8500 B.C. is approximately correct then the transition from Mesolithic 2 to the Neolithic would have happened at about the same time in Palestine and northern Syria.

Although neither the Palestinian nor the north Syrian chronological evidence can be related directly to the sequence in Lebanon and southern Syria it is probable that the transition there took place about the same time. It It would thus appear from the evidence now available that the Neolithic began well before 8000 B.C. throughout the Levant from northern Syria to Sinai.

Settlement patterns

Mesolithic 2 sites were situated in almost every environmental zone of the southern and central Levant from the present coastline eastwards to the edge of the steppic plateau (Fig. 6). Sites have now been discovered in the Jebel Meghara in northern Sinai (Moshabi IV) and in the Negev (Nahal Lavan 110, Matred 190). Some were on the coastal plains of Palestine (Kfar Vitkin III, Poleg 18M) and Lebanon (Beirut Sands - Borj Barajne) while others have been found in the valleys of the hills behind from Judea as far north

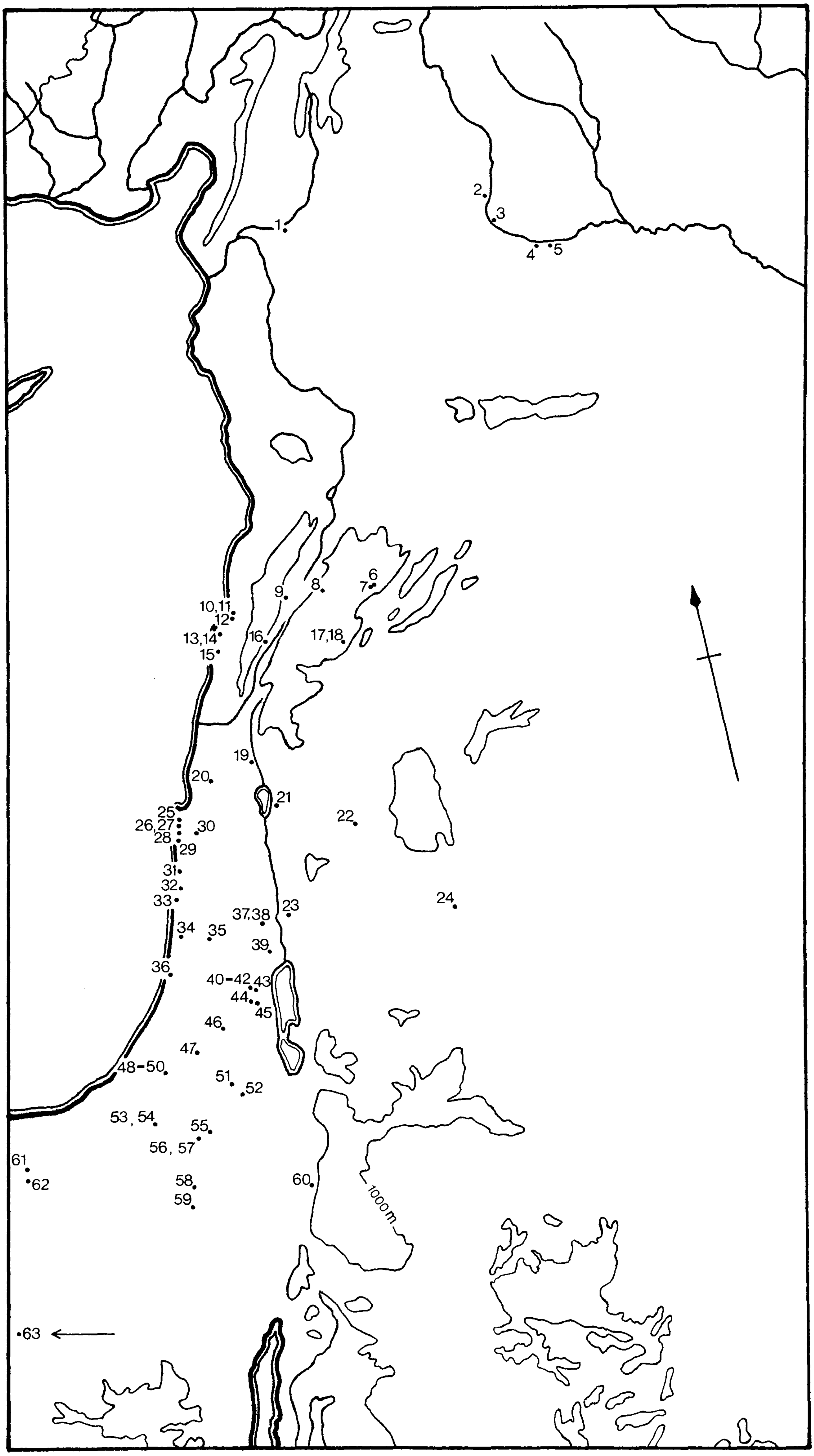

Fig. 6 Distribution of Mesolithic 2 sites

scale 1:4,000,000

FIGURE 6

Distribution of Mesolithic 2 sites

1 Tell Dhahab (Braidwood, Braidwood, 1960, 476)
2 Nahr el Homr (Roodenberg, forthcoming)
3 Mureybat (Cauvin, 1972, 107)
4 Dibsi Faraj East (Wilkinson, Moore, forthcoming)
5 Tell Abu Hureyra (Moore, 1975, 56)
6 Yabrud III (Rust, 1950, 119)
7 Mugharet el Abde (Nasrallah, 1951, 92ff)
8 Nacharini
9 Saaideh (Schroeder, 1970, 200)
10 Jiita II (Chavaillon, Hours, 1970, 230)
11 Jiita III (Copeland, Wescombe, 1965, 92)
12 Antelias (Copeland, Wescombe, 1966, 162)
13 Beirut Sands - Borj Barajne (Copeland, Wescombe, 1965, 129)
14 Beirut Sands - 8II (Copeland, Wescombe, 1965, 134)
15 Jiye I (Copeland, Wescombe, 1965, 96)
16 Amiq II (Hours _et al_, 1973, 466)
17 Saidnaya (van Liere, 1961, 34)
18 Qornet Rharra (de Contenson, 1966a, 199)
19 Ain Mallaha (Perrot, 1966a)
20 Hayonim (Bar-Yosef, Goren, 1973)
21 En Gev IV (Bar-Yosef, 1970a, 126)
22 Taibe (M.-C. Cauvin, 1974a)
23 Ala Safat (Waechter, 1948)
24 Azraq
25 Iraq el Barud (Bar-Yosef, 1970a, 32)
26 Nahal Oren (Noy _et al_, 1973)
27 Abu Usba (Stekelis, Haas, 1952)
28 Mugharet el Wad (Garrod, Bate, 1937, 9)
29 Kebara (Turville-Petre, 1932)
30 Rakafet (Noy _et al_, 1973, 96)
31 Caesarea Sands (Bar-Yosef, 1970a, 59)

32 Kefar Vitkin III (Bar-Yosef, 1970a, 60)
33 Poleg 18M (Bar-Yosef, 1970a, 72)
34 Gath Rimon (Bar-Yosef, 1970a, 81)
35 Shukbah (Garrod, 1942)
36 Kefar Darom 28 (Bar-Yosef, 1970a, 94)
37 Wadi Fazael IV (Bar-Yosef et al, 1974, 423)
38 Wadi Fazael VI (Bar-Yosef et al, 1974, 420)
39 Jericho (Kenyon, 1970, 41)
40 Erq el Ahmar (Neuville, 1951, 86)
41 Umm Qalaa (Bar-Yosef, 1970a, 175)
42 Ain Sakhri (Neuville, 1951, 133)
43 El Khiam (Perrot, 1951, 155)
44 Umm ez-Zuweitina (Neuville, 1951, 121)
45 Tor Abu Sif (Neuville, 1951, 126)
46 P 508 (Bar-Yosef, 1970a, 145)
47 Beer Faher (Alon, Noy, 1974)
48 Halutza 5 (Noy, 1970)
49 Halutza 82 (Burian, Friedmann, 1973)
50 Halutza 83 (Burian, Friedmann, 1973)
51 Tulmeh (Bar-Yosef, 1970a, 145)
52 Kurnub (Noy, Schick, 1973)
53 Nahal Lavan IV (Phillips, Bar-Yosef, 1974a, 478)
54 Nahal Lavan 110 (Bar-Yosef et al, 1974)
55 Rosh Zin (Henry, 1973b)
56 Matred 141 (Yizraeli, 1967)
57 Matred 190 (Yizraeli, 1967)
58 Rosh Horesha (Marks et al, 1972, 80)
59 Arif en-Naqa (Bar-Yosef, 1970a, 149)
60 Beidha (Kirkbride, 1966, 47)
61 Lagama IX (Phillips et al, n.d., 9)
62 Moshabi IV (Phillips, Bar-Yosef, 1974a, 478)
63 Helwan (Massoulard, 1949)

as the Mountains of Lebanon (Erq el Ahmar, Shukbah, Nahal Oren, Hayonim, Jiita II). The Rift valley was also inhabited from the Dead Sea (Jericho) through the upper Jordan valley (Ain Mallaha) to the Beka's (Amiq II, Jebel Saaideh). The highlands of Transjordan (Beidha, Ala Safat) and the Hauran (Taibe) were occupied while there was another group of sites in the Anti-Lebanon (Qornet Rharra, Nacharini, Yabrud III). Mesolithic 2 sites have also been recently discovered by Garrard and Stanley Price as far east as the Azraq basin. Further north traces of Mesolithic 2 habitation have been found in the Amuq (Tell Dhahab) while several sites are now known along the Middle Euphrates (Tell Abu Hureyra, Dibsi Faraj East, Mureybat).

This pattern of distribution was almost exactly the same as in Mesolithic 1 although the environment in each of these regions was now markedly different (Fig. 2). The only areas that seem to have been avoided were the spine of the Judean hills and the higher altitudes of the Mountains of Lebanon. This may have been because these areas were now densely wooded. Several sites were concentrated at high elevations in the Anti-Lebanon but here the forests would always have been thinner because this range lay in the rain-shadow of the Lebanon mountains. The other sites east of the Rift valley in the Hauran and broken country on the edge of the Transjordan plateau were all in areas that carried extensive woodland then. Further east and south-east the steppe stretched away to northern Arabia but as yet very few sites have been found in this area. It is possible that the steppe was little used by the people of Mesolithic 2 who preferred more wooded country but the existence of a flourishing settlement at Abu Hureyra in an area that was demonstrably steppic should inhibit us from drawing premature conclusions. The sites along the Euphrates and in the Azraq Basin have only become known through recent fieldwork and it may be that future surveys will find traces of Mesolithic 2 occupation much further out in the steppe zone than this.

Mesolithic 2 sites were situated in rock-shelters and in the open. In some shelters the Mesolithic 2 occupation followed a Mesolithic 1 phase as at Kebara itself; in others such as Erq el Ahmar a shelter last used in the Aurignacian was re-occupied while at Umm ez-Zuweitina and a few more the earliest recorded occupation was in Mesolithic 2. One new feature of shelter sites used by the people of Mesolithic 2 was that the area of concentrated occupation was frequently on the terrace in front rather then in the shelter itself. This was so at Mugharet el Wad, Nahal Oren, Qornet Rharra and probably Hayonim. Most of the open sites had only Mesolithic 2 occupation on them and were therefore single-period sites as were almost all Mesolithic 1 open stations. A few such as Jericho and Beidha were covered by later settlements.

Most of the larger Mesolithic 2 sites were situated in the foothills of the upland zones near permanent sources of water. Some of these like Hayonim, Nahal Oren, Mugharet el Wad and Shukbah were in wadis and others such as Saaideh, Jericho and Rosh Zin were in more open positions. One site at least, Ain Mallaha, was situated beside a lake but also on the fringe of the Galilee hills. There seem to have been significantly more shelter sites in Mesolithic 2 than in Mesolithic 1 which may reflect the apparent concentration of Mesolithic 2 sites around the upland zone.

Economy and society

Much new evidence for the economy of Mesolithic 2 sites is now available which, when added to what was known from earlier excavations, allows us to suggest in outline how the inhabitants of these sites lived. Their exploitation of animals is the aspect which is best documented from the numerous collections of animal bones that have been studied. The Natufians in much of Palestine killed many more gazelle for food than any other animal. The percentage of gazelle bones to all others at Nahal Oren was as high as 83.3% (Noy et al., 1973, 90) and of about the same order at Mugharet el Wad (Garrod, Bate, 1937, 141, fig. 1). Several other species found on these sites would have been eaten, among them fallow deer, goat, cattle and pig. The proportion of gazelle bones was also high at Kebara, the third large Natufian site on the seaward side of Mt. Carmel, and at Shukbah (Bate, 1932, 277; 1942, 19). The most recent study of the Kebaran fauna does suggest, however, that gazelle formed a smaller proportion of the diet than in Mesolithic 1 and that cattle, pig and hartebeest were now killed in some numbers (Saxon, 1974, fig. 3). Moister climatic conditions and the spread of marshes near the coast may have led to an increase in the herds of these animals in the vicinity of Kebara.

Gazelle bones were also plentiful at Hayonim (Bar-Yosef, Tchernov, 1966, 129) and at Ain Mallaha where they made up 44.6% of all the animal bones found (Ducos, 1968, 73). This was significantly less than on the Carmel sites and is partly explained by the different environments of these two settlements. The upper Jordan valley would have been well-wooded and marshy in Natufian times, rather different from the drier hilly hinterland of Mt. Carmel with a flat coastal strip in front and this is reflected in the full faunal assemblage from Ain Mallaha. Deer were much more plentiful here, the three main species comprising 33.4% of the animal bones. Pigs, which would have been abundant around Lake Huleh, were quite common (14.2%) while cattle and caprines were present in small quantities only.

Gazelle seems to have been an important source of meat on the Negev sites of Rosh Zin and Rosh Horesha (Henry, 1973a, 128, 130). Here again the faunal remains from these sites reflect their environments for Capra ibex also seems to have been plentiful as one would expect in this drier, broken country. Deer were found at Rosh Zin, which may have lived in the Nahal Zin below the site, and equid at Rosh Horesha, possibly reflecting its more open position.

The faunal evidence from the Judean desert sites emphasises that hunting patterns were significantly influenced by the environment, Neither at Erq el Ahmar (Vaufrey, 1951, 210) nor at the other Natufian sites does it appear that gazelle were particularly common, presumably because they were not to be found in large numbers in those broken, wooded, uplands. A number of other species better adapted to such conditions were found at Erq el Ahmar including ibex, roe deer, cattle and an equid.

Gazelle were also uncommon in the Mesolithic 2 levels at Beidha where the fauna was dominated by goats (Capra hircus aegagrus and Capra ibex nubiana) which comprised 76.7% of the bones found. These species would have been particularly plentiful in the cliffs and hills around the site. As on other sites a number of other species such as aurochs and an equid were hunted from time to time.

The archaeological evidence suggests that the Natufian pattern of animal exploitation in Palestine was strongly influenced by what species were readily available near the sites. We see that at most sites one species was much preferred to all the others and this was the animal that was available in large numbers near the site. In several instances this was the gazelle but at Beidha it was the wild goat; a number of species were readily available at Ain Mallaha so, although more gazelle were taken here than other species, the proportion was not so marked.

Several zoologists have examined the better-documented faunal collections to determine at what age these species were killed in order to throw more light on methods of exploitation. From this it has emerged that 54.7% of the gazelle at Nahal Oren (Noy et al., 1973, table 5) and 75% of the goats at Beidha (Perkins, 1966, 67) were immature. Although the Beidha percentage was determined on a rather small sample, it is especially interesting when compared with the figures from Wadi Madamagh where only 23.1% of the goats were immature. These results would seem to indicate that at some sites care was exercised to kill off a high proportion of young animals, thus following a pattern of exploitation similar to that of domesticated herds (Bokonyi, 1969, 222). This pattern was not a universal one for at Ain Mallaha only a few immature gazelle were killed (Ducos, 1968, 73ff).

This evidence suggests that the people of Mesolithic 2, like their ancestors in Mesolithic 1, practised selective hunting. There was a slightly greater emphasis on a particular species, usually gazelle, than in Mesolithic 1 which indicates that by now this form of exploitation was more concentrated or intensified. The high proportion of juveniles killed at a few sites, while it may suggest a mode of exploitation akin to domesticated herds, cannot really be regarded as the same. It was probably a particular form of selective hunting rather than the herding hinted at by Legge (1972, 123). Moreover, although the evidence is still very uneven, it does not seem to have been a very common practice.

While intensive, selective hunting seems to have been practised on many Mesolithic 2 sites, this was not universally so, even in Palestine, as the evidence from Ain Mallaha demonstrates. No statistical information is available for the fauna of the Judean desert sites but Vaufrey's comments do not indicate that the Natufian inhabitants there exhibited any marked preference for a particular species. Even at Nahal Oren, although gazelle seem to have formed the bulk of the meat diet, the weight of beef consumed was considerably more than the percentage of cattle bones present (9.2%, Noy et al., 1973, table 4) would imply and this was also the case at Kebara (Saxon, 1974, 32). It is important to remember that the people of Mesolithic 2 were prepared to kill and eat a wide range of other game, both large and small, which would have significantly supplemented their diet. Hares, for instance, seem to have been eaten in quantity at Hayonim (Bar-Yosef, Tchernov, 1966, 126) and their bones were found at Mugharet el Wad (Garrod, Bate, 1937, 152), Beidha (Perkins, 1966, 66) and other Mesolithic 2 sites. Both terrestrial and marine molluscs were eaten at Hayonim (Bar-Yosef, Tchernov, 1966, 135, 137) and Mugharet el Wad (Garrod, Bate, 1937, 224), shellfish, turtles and fish from Lake Huleh at Ain Mallaha (Perrot, 1966a, 481). Fish were also consumed at Hayonim (Bar-Yosef, Tchernov, 1966, 133) and, on the evidence of the fish-hooks, probably at Kebara (Turville-Petre, 1932, 272). This readiness to eat a wide range of species is typical, not only of the people of Mesolithic 2, but of Mesolithic 1 and earlier hunter-gatherers. Although there were differences in emphasis between the hunting practices of the Mesolithic 2 population and their predecessors, these were not as great as is sometimes supposed. For example, it has been assumed that the people of Mesolithic 2 were the first to eat fish and other aquatic foods and that these formed a major part of their diet (Binford, 1968, 334). In fact the evidence, slight though it is, would suggest that these foods were used at some sites only as a supplement to the diet and that this had been a feature of the economy of Levantine sites at least since the Aurignacian.

There is no evidence available yet for exploitation of animals from Mesolithic 2 sites in Lebanon and only preliminary information from the Euphrates valley settlements. We know that gazelle, onager, cattle, sheep/goat, hares, fish and shellfish were exploited at Abu Hureyra and Mureybat and, although detailed figures are not available, that the gazelle and onagers were killed in some quantity. This suggests that selective hunting was also being practised at these two sites and that the species preferred were those herbivores which were especially numerous in the neighbourhood. This mode of hunting would seem to have resembled Natufian practices in Palestine, so far as one can see at the moment.

Both direct and indirect evidence has been found for the consumption of plant foods in Mesolithic 2. The remains of the plants themselves recovered from archaeological deposits provide direct evidence while artifacts, structural features, human remains and the setting of sites are all sources of indirect evidence. Plant remains are much the easiest evidence to interpret but they have been recovered fron only one site so far in the Natufian heartland, Nahal Oren; even then no more than 25 seeds were found (Noy et al., 1973, table 6).

The identified seeds at Nahal Oren were from vetches, grasses and vines, all of which could have been used for food. Conditions for seed survival at Nahal Oren seem to have been unfavourable as so few were recovered. Since cereal grains were found in the Kebaran and Neolithic levels at the site they may have been eaten in the Natufian, although none were retrieved from those layers.

Very many more seeds and charcoal have been found in the Mesolithic levels at Abu Hureyra and some plant remains at Mureybat. One can describe the exploitation of plants in the Middle Euphrates in more detail from this evidence but one cannot apply many of the conclusions to Mesolithic 2 sites elsewhere in the Levant. Not all the samples of plant remains from the Mesolithic levels at Abu Hureyra have been examined yet but already the plant economy of the site can be discerned in outline (detailed account in Hillman, 1975, 70ff). Cereal grains, particularly of wild-type einkorn, were quite common in all the samples studied so far. Grains of both wild-type and domesticated barley and rye were also present, all in well-stratified deposits. Grains of domesticated barley have not been found in such an early context before so we cannot discount the possibility that they may have filtered down through rodent burrows into the Mesolithic levels from the Neolithic settlement above. The rye probably grew with the other cereals.

The presence of all these cereals at Abu Hureyra would suggest that they were being eaten in some quantity there. This was probably also the case at Mureybat where wild-type einkorn has also been found in the Mesolithic 2 layers.[3] Were these cereals growing in the vicinity of these sites during Mesolithic 2 and, if so, were they collected from the wild or deliberately planted and harvested? The answers to these questions depend upon the botanical status of these plants and the prevailing climate at the time the sites were occupied.

More grains of wild-type einkorn have been identified than of the other cereals at Abu Hureyra so the origin of these seeds may be considered in some detail. Hillman believes that there were three possible ways in which the einkorn could have been obtained. If the einkorn was growing near the site then it could have been harvested from these wild stands. Wild einkorn cannot grow there today because the area is too arid. The climate would have been both cooler and moister in Mesolithic 2 so conditions would have been more favourable for the wild plant to have grown there then. The second possibility is that the einkorn was gathered from natural stands growing in a more favourable environment among the foothills of the Anti-Taurus as much as 200 km to the north. This suggestion was first made by van Zeist to explain the presence of wild-type einkorn in late 9th and early 8th millennia B.C. deposits at Mureybat (1970, 172). The Mesolithic settlement at Abu Hureyra was quite substantial and was occupied for a relatively long period. It would be difficult to understand how its inhabitants could have supported themselves if a significant amount of their food had to be imported since the means for transporting large quantities of grain over such a distance did not then exist. For these reasons this seems to be the least likely explanation. The third possibility is that wild-type einkorn was already being cultivated around Abu Hureyra but had not yet undergone the selection process which led to the development of a morphologically "domesticated" form. The environment was probably sufficiently favourable for einkorn to have grown wild or to have been cultivated so either would have been possible from what we know about the status of the plant and the contemporary climate. Hillman has now found further evidence which indicates which explanation should be preferred. Among the cereal grains were many other seeds of plants which flourish in disturbed ground. This suggests that the soil in the vicinity of Abu Hureyra was already being broken for cultivation and that, therefore, the einkorn was already being deliberately planted and harvested as a crop. The evidence is not yet conclusive but we may reasonably hope that this explanation will be corroborated when all the plant remains have been studied.

Other food plants have been identified among the plant remains. The most abundant was a common vetch, probably Vicia sativa, but bitter vetch, Vicia ervilia, and wild-type lentils were also present. The common vetch in particular would have been an important constituent of the diet. Fruits and nuts from a number of other species were also collected and eaten, among them caper, hackberry and turpentine. Not only were considerable amounts of cereals and vetches consumed but also a variety of other vegetable foods in season.

Although plant remains are much the most satisfactory evidence for the use of vegetable foods they have been found on very few Mesolithic 2 sites so far. Certain categories of indirect evidence, on the other hand, are common to most of these sites. Sickle blades and grinding tools have been found on most Natufian sites in Palestine and on many Mesolithic 2 sites in Lebanon and Syria. These artifacts are frequently thought to have been used for harvesting and preparing plant foods (Henry, 1973a, 190). While this may have been the case, it has not yet been conclusively demonstrated. As I have already explained both classes of tools could have been used for purposes other than food processing. Almost all the grinding tools found at Abu Hureyra were stained with red ochre as if they had been used for grinding the pigment. Many of the grinding tools from Mugharet el Wad (Garrod, Bate, 1937, 41), Ain Mallaha (Lechevallier, Valla, 1974, 193) and other Mesolithic 2 sites were also stained with ochre so these tools are not unequivocal evidence for the use of plant foods in Mesolithic 2. It should be noted, however, that many more of these tools have been found on Mesolithic 2 than on Mesolithic 1 sites. Whatever tasks they were used for were performed more frequently than before.

The idea has been put forward[4] that the people of Mesolithic 2 used acorns for food. Acorns are quite nutritious (Renfrew, 1973, 194) and may be harvested in considerable quantities in the autumn. They have to be processed before they can be eaten since they contain bitter tannin. Once these have been removed the acorns may be baked as cakes or bread or used in other ways. There is evidence that acorns were used by various peoples in the past since their remains have been found on many archaeological sites (Renfrew, 1973, 154). They were also eaten in considerable quantities by Californian Indians until quite recently (Gifford, 1936, 87ff). A peasant from a village in the Jebel Barisha in north-west Syria told me in 1977 that acorns were still eaten by the poor there in years when the harvest failed. He himself was fully conversant with methods of preparing acorns for food.

Remains of acorns have not been found on Mesolithic 2 sites but there is some other evidence supporting the idea that they may have been eaten. Oak trees were an important constituent of the Mediterranean forest which was more extensive during Mesolithic 2 than in any later period. Most of the larger Mesolithic 2 sites and many of the others were situated in this zone. Cereal grasses would not have grown so prolifically in the Mediterranean forest as in the more open country of the intermediate forest and steppe so this source of food would not have been particularly abundant. Acorns, on the other hand, would have been available in great quantities and could have been a useful supplement or even a staple of the diet. One method of preparing acorns for food involves crushing the kernels to a paste in a mortar. It may be more than a coincidence, therefore, that large mortars and pestles, often showing considerable signs of wear, which could have been used for crushing acorns have been found on many of the large sites in or on the fringe of the Mediterranean forest zone such as Mugharet el Wad, Nahal Oren, Jericho, Ain Mallaha and Jebel Saaideh. They have not been found at Abu Hureyra, Mureybat nor on sites in other steppic areas where oaks could not have grown during Mesolithic 2. If acorns were eaten in some quantity in Mesolithic 2 then it is probable that they continued to be consumed during the Mesolithic.

One other modest piece of evidence suggesting the use of plants was found at Ain Mallaha. A number of plaster-lined pits were excavated there and these were interpreted as storage containers for vegetable foods (Perrot, 1966a, 460). The pits may well have been used for this purpose although there are other possible interpretations. Storage facilities would be needed by communities using large quantities of plant foods and inhabiting extensive settlements like Ain Mallaha for more than one season of the year. This is the earliest record from a Levantine site of features possibly used for storage. Large pits have been found at Nahal Oren (Stekelis, Yizraely, 1963, 11) but at no other Mesolithic 2 site; The only other contemporary settlement with large pits was Abu Hureyra but here they almost certainly served a different purpose. If the pits at Ain Mallaha and Nahal Oren were for storing food they were uncommon elsewhere.

Skeletons from Ain Mallaha and Mugharet el Wad have furnished rather better evidence for the use of plant foods in Mesolithic 2. A recent study of the teeth of these skeletons has shown that they were very worn, like thos of burials from later Neolithic sites (P. Smith, 1972, 237). This was almost certainly caused by eating coarsely-ground cereals. Interestingly enough, Smith found that the teeth of Natufian skeletons from Kebara were much less worn as though the inhabitants had eaten only relatively soft foods such as meat and unground plants.

If we examine the siting of Mesolithic 2 settlements this gives us some information about the potential suitability of the environment of these sites for hunting, gathering or simple farming. A large number of Mesolithic 2 shelter sites were situated in wadis on the fringes of or actually in the upland zone of the Anti-Lebanon, on the western side of the Mountains of Lebanon, Galilee, Carmel and Judea, in the Judean desert, the Negev and in Transjordan. They were surrounded by woodland with abundant vegetable resources and a good water supply near more open country, often with good hunting potential. As Henry has noted (1973a, 188) they were also in the presumed habitat of wild cereals. All these sites were well placed for intensive hunting and gathering but their catchments included very little potential arable land (Vita-Finzi, Higgs, 1970, 16) so it is unlikely that their inhabitants practised any form of agriculture.

Other Mesolithic 2 sites were situated in more open country. The catchments of a number of these, Saaideh, Ain Mallaha, Rakafet (Vita-Finzi, Higgs, 1970, 21) and Qornet Rharra included much potential arable land so that it would have been possible for the inhabitants to have planted crops nearby. This also applies to the four Euphrates sites, all of which had abundant potential arable land in their catchments, much of it with light soil particularly suitable for simple agricultural techniques. In contrast, very few Mesolithic 1 sites had a catchment area with significant quantities of potential arable land. It is also significant that Mesolithic 2 occupation has now been found at the bottom of four tell sites with later substantial Neolithic settlements which depended on agriculture, Jericho, Beidha, Abu Hureyra and Mureybat, yet no Mesolithic 1 occupation has been found at the foot of any agricultural tell settlement.

Because the Levant is a region of great geographical variation a number of Mesolithic 2 sites only a few kilometres apart from each other were situated in contrasting environmental zones. Thus their catchments offered complementary resources with marked seasonal differences. One such area with several Natufian sites close together was Mt. Carmel. Vita-Finzi and Higgs have suggested (1970, 22ff) that the inhabitants of sites such as Nahal Oren, Mugharet el Wad and Kebara at the foot of the Carmel range may have moved into the uplands behind at certain seasons in order to exploit the resources of the area more fully. Such a pattern of transhumance might have led these groups to spend the early summer in the hills harvesting cereals and hunting or herding animals on the upland pastures. In the dry late summer they and the animals would have descended to the coastal plain to live near permanent sources of water available near the sea and stayed on through the winter while the animals grazed on the lush lowland pastures. Excavation has since confirmed (Noy, Higgs, 1971, 225) that the upland site of Rakafet had a long sequence of Mesolithic occupation and so it could have been a complementary site to Nahal Oren for transhumance in Mesolithic 2 as well as in Mesolithic 1 (Noy et al., 1973, 95ff).

The principal advantage of transhumance was that it permitted more people to live off the resources of the region than would otherwise have been possible. Lowland and upland sites would have offered an abundance of plant and animal foods at different seasons. Human groups could move between them at the most favourable time, probably in early summer and autumn. Thus the group could be larger than would be possible if it remained in the vicinity of a single lowland or upland site. This pattern of vertical movement was also advantageous when the presence of other groups in neighbouring territories made it impossible for the inhabitants of a site to split up and spread out across the landscape in the lean season.

Transhumance may well have been practised by Mesolithic 2 groups elsewhere in the Levant where different environments were to be found only a few kilometres apart. One such area might have been the Judean hills with the lowland zones of the coastal plain and the Jordan valley on either side. Another might have been the hills of Galilee with the Plain of Esdraelon below while a third might have been the seaward slope of the Lebanon Mountains where there was a great environmental contrast between the coastal plain and the upland pastures in the mountains behind. Transhumance is less likely to have been practised east of the Rift valley and in the semi-arid zone because here there was insufficient contrast for neighbouring zones to have offered complementary resources.

To summarise, the people of Mesolithic 2 practised selective hunting of specific species, at some sites killing a high proportion of immature animals. At each site this hunting pattern was strongly influenced by the local environment. They also took a great variety of other species for food. This pattern had much in common with the Mesolithic 1 economy but was clearly a more intensive and refined version of it.

Plant foods were very important in the diet; the fruits, seeds and other parts of many different plants were eaten but, on the Euphrates sites at least, cereals seem to have been the main source of food. This may have been so in earlier times but it is only now that we find clear evidence of the importance of cereals in the diet. There seems little doubt that on most sites these plants were gathered from the wild as in the past. A few sites were situated in areas with land suitable for cultivation nearby and it is possible that on these sites cereals and vetches were being cultivated for the first time.

Mesolithic 2 sites may be divided into three groups according to size. The smallest sites were all under 100 sq m in area. This group included several shelter sites of which Yabrud III with a probable maximum area of 50 sq m was typical (Rust, 1950, 100, pl. 96) and a number of open stations. There were some of these on the coastal plain of Palestine such as Kfar Vitkin III, Caesarea sands and Kefar Darom 28 on which a few Mesolithic 2 flints have been found (Stekelis, 1968, 333; Bar-Yosef, 1970a, 59, 94) together with earlier material. Others like Nahal Lavan IV (20 sq m) were in the Negev (Phillips, Bar-Yosef, 1974a, 478).

The next group of sites was those of medium size between 100 and 500 sq m. Erq el Ahmar (165 sq m), Kebara (300 sq m), Jiita II (about 350 sq m in Mesolithic 2[1]) and Mugharet el Wad (475 sq m taking terrace and cave occupation together, Garrod, Bate, 1937, pl. III) were all in this group. Moshabi IV (200 sq m) in Sinai was also of medium size (Phillips, Bar-Yosef, 1974a, 478). It is probable that Abu Hureyra and Dibsi Faraj East (Wilkinson, Moore, forthcoming) were about this size. These sites were of the same area or a little larger than Mesolithic 1 composite band sites.

The large sites which could be from 800 up to 2000 sq m in area formed the third group. Shukbah (800 sq m) and Rosh Zin (900 sq m) (Garrod, 1942, 3; Henry, 1973b, 129), were two of the smaller sites in this group; Hayonim where the area of the terrace and shelter was somewhat more than 1000 sq m (Bar-Yosef, Goren, 1973, 49) came in the middle. Wadi Fazael IV (1000-1500 sq m, Bar-Yosef <u>et al.</u>, 1974, 423) was about the same size as Hayonim. Ain Mallaha was at least 2000 sq m in area (Perrot, 1966a, 437) and so one of the largest known Mesolithic 2 sites. There is one other site, Rosh Horesha, which was much larger even than this. The site is now about 7000 sq m; the original area of occupation was somewhat smaller (Henry, 1973a, 129) but it was still far bigger than any other known Mesolithic 2 site. Rosh Horesha was discovered quite recently and it is not yet clear if in fact it was a single phase site or if several phases of occupation were represented there. The terrace at El Khiam was about 7500 sq m in area (Perrot, 1951, fig. 59) and it is possible that the Mesolithic 2 site covered much of it. If so, it would have been another exceptionally large site but this cannot now be determined with certainty.

Most Mesolithic 2 sites fall into the small and medium groups and were thus similar in size to Mesolithic 1 and Aurignacian sites. Only a few activities were carried out on the small sites and their occupation was short-lived. This is reflected in the small number of artifact types found on these transitory stations: flints and a few bone tools at Abu Usba (Stekelis, Haas, 1952, 21) and Yabrud III (Rust, 1950, 119), flints only at Tulmeh and Poleg 18M (Bar-Yosef, 1970a, 72ff, 145) and very few flints even at Ala Safat (Waechter, 1948, 101ff). These sites were hunting stations that were used intermittently by families or other small groups.

Greater artifact variability on the medium-sized sites indicates that a wider range of activities was practised on them. Erq el Ahmar, Kebara and Mugharet el Wad all had numerous flint, bone and ground stone artifacts and decorative objects. These sites were probably used by communities of composite band size principally engaged in hunting and gathering, as their ancestors had been in Mesolithic 1 and the Aurignacian.

The big Mesolithic 2 sites found in the southern Levant were a significant new group. They appear to have been inhabited by larger communities of people than before. Furthermore, the occupation of these sites was more intensive and longer-term: the numerous species of mollusca and human commensals found in the Natufian layers at Hayonim are evidence for this (Bar-Yosef, Tchernov, 1966, 135, 138). The archaeological deposits themselves were usually thicker than in Mesolithic 1, a maximum of 3m at Mugharet el Wad, 3.5 m at Shukbah (Garrod, Bate, 1937, 9; Garrod, 1942, 2) and 3 m at Ain Mallaha (Perrot, 1966a, 439), composed mostly of occupation debris with relatively little erosional deposit. Many pestles, rubbers, mortars and other ground stone tools have been found on large as well as medium Mesolithic 2 sites, far more than in Mesolithic 1. These implements took a long time to make and were too heavy to carry far so they are another indicator of long-term occupation. A recent study of the numerous human remains from Hayonim has shown that they probably all belonged to the same family (Smith, 1973, 70). These individuals were buried at intervals throughout the period in which the Natufian deposit accumulated, indicating long-term use of the site by at least one family. These large settlements were unknown before Mesolithic 2. Some change had taken place, therefore, creating conditions which favoured the establishment of these new sites.

Occupation on most of the small and medium sites was still transient or seasonal but on some of the medium sites it was now repeated quite often and so was more intensive than before. Occupation on the new large sites was both long-term and intensive. This could mean either that these sites were visited regularly and repeatedly or that they were occupied all the year round for a period of years. As the groups that inhabited these sites were more numerous than any known before, they needed a larger guaranteed regular food supply. This and more regular occupation of the sites of medium size explains why the pattern of hunting was more intensive. There would have been more pressure on plant resources too, reflected in more intensive collecting. The need for a larger guaranteed supply of plant as well as animal foods would have provided the incentive to begin cultivation, once the demand exceeded the supply available from the wild. Although much of the demand could still be satisfied from wild resources I think it is likely now that some form of cultivation was undertaken for the first time on those sites situated in the most favourable areas. As occupation of many sites was now more long-term, storage facilities would have been needed to keep food harvested in one season until it was consumed later on, whether it was gathered from the wild or from cultivated plots; there is some archaeological evidence of possible storage facilities at two sites, as we have already noted, and perishable containers of wood or basketry may have been used on others. One advantage of cereals over other plant foods is that they can quite easily be stored for many months without decaying.

We must now ask what brought about these changes in settlement and economy that we have noted in the archaeological record? One possible explanation is that there was an expansion of population at the end of Mesolithic 1. The idea that population growth might be a cause of economic and social change in primitive societies has been much discussed by anthropologists and others in recent years. An important theoretical contribution was made by an economist, Boserup, in 1965. She wished to explain agricultural change in the recent past and concluded that growth or decline in population was an independent variable that determined pressure on the food supply. Under conditions of sustained population growth this pressure would lead to progressively more intensive methods of food production (1965, 15ff). She also believed that population pressure had caused the earliest experiments in agriculture (1965, 53). Her views are helpful, therefore, when trying to understand the beginnings of agriculture in the Levant.

A few years later Binford came to the same conclusion independently (1968, 332ff), when he examined world-wide changes in subsistence patterns at the end of the Pleistocene. He argued that man came to depend on seasonal food resources, particularly aquatic foods, at the beginning of the Holocene and that this was accompanied by increased sedentism. As communities became more sedentary so the population grew, pressing upon the available food supply; agriculture was then developed as a response to this pressure. Several of Binford's premises seem improbable when applied to the Levant; man was partly dependent upon seasonal food resources, for example, as far back as the Aurignacian. He also ate fish and aquatic molluscs during the Pleistocene, not just at its close. On the other hand, as we have already seen, the people of Mesolithic 2 did not depend on these resources as Binford supposed (1968, 334ff). Nevertheless, Binford may have been correct when he surmised that the population was larger and more sedentary in Mesolithic 2 than before.

Boserup's thesis formed the theme of a conference held in 1970 which explored its application to archaeology and anthropology. In a paper on Greater Mesopotamia Smith and Young agreed that population increase at the end of the Pleistocene led to the development of agriculture in that region (1972, 32ff). For the transition from Mesolithic to Neolithic their conclusion was based largely on theoretical considerations because not enough was known about the Zarzian to determine if there was an actual increase in population then or not. They were on surer ground when discussing the period from Hassuna to Uruk (Smith, Young, 1972, 41ff) for which there was ample evidence from surveys and excavations of population growth in several regions of Mesopotamia.

We are in a stronger position if we attempt to apply this reasoning to Mesolithic 2 because we have much more archaeological evidence for this phase than for contemporary societies elsewhere in the Near East. About 70 Mesolithic 2 sites have been found to date throughout the Levant (Fig. 6). This is about the same number as the total of Mesolithic 1 sites discovered (Fig. 5). Yet all the known Mesolithic 2 sites, large, medium and small, were occupied in a much shorter period of time, about 1500 years, whereas Mesolithic 1 lasted perhaps as long as 8000 years. If, as seems likely, the ratio of sites discovered to those which once existed is the same for Mesolithic 2 as for Mesolithic 1 then there was a great increase in the density of settlement in Mesolithic 2.

A greater density of settlement suggests that the population grew quite markedly at the end of Mesolithic 1 and during Mesolithic 2. This population pressure would also account for the growth of the group of larger sites in Mesolithic 2 and the tendency for these to be occupied for longer periods of time. In turn it would also explain the changes in the economy that we have noted.

The evidence for an increase in population in Mesolothic 2 is strongest in Palestine since far more sites have been discovered there than in other regions. Too few sites have been found so far in the rest of the Levant for us to be certain that the same was happening elsewhere. There are hints of a possible similar increase of population in Lebanon. Mesolithic 1 stations there fell within the size range of sites in Palestine but one or two of the Mesolithic 2 sites were significantly bigger. Mesolithic 2 occupation at Jiita II covered a significantly larger area then the Mesolithic 1 levels at the same site and Saaideh also appears to have been an extensive site. Too little is known about the later prehistory of Syria for one to apply these arguments there. All that can be said is that a cluster of Mesolithic 2 sites, two at least of medium size, have been found in the Euphrates valley but only one Mesolithic 1 site in the same area.

Having examined the economy, settlement pattern and the changes brought about by population expansion we must now consider how Mesolithic 2 society was organized. We have already noted that the medium-sized Mesolithic 2 sites were probably occupied by composite bands, that is by groups of about 25 people. Some medium Mesolithic 2 sites were bigger than Mesolithic 1 and Aurignacian camps so the bands which inhabited them may have been larger. This postulated slight increase in band size may itself be a reflection of increased population.

The groups which inhabited the larger Mesolithic 2 sites were several times bigger than these composite bands. Extrapolating from the overall area of the larger sites one might suggest on a conservative estimate that they had from 50 to 150 inhabitants and in some cases more. A few of these groups may have been large composite bands but most were too big for this kind of social arrangement. The most likely explanation for the formation of these larger population groups is that they came about through the coalescing of several composite bands. In circumstances of population expansion these larger groups would have been better able to exploit their environment in the manner suggested by the evidence for the Mesolothic 2 economy. Intensive, selective hunting of herds of ruminants would have been more effective when practised by a large group of hunters. This required more people than a single band could supply. The need for extra hands would have been even greater when cereals became an important constituent of the diet. These plants, whether wild or cultivated, were ripe for a short period only and had to be harvested rapidly. Since the available technology was simple many people were needed to gather the cereals if a surplus was to be stored. This need for a large concentration of people would only have arisen for a few weeks of the year at harvest time although a large population might then have been maintained on a site for some time until the surplus had been eaten. It is possible, therefore, that at other seasons the inhabitants of the larger sites might have broken up into bands or even family groups and moved away to forage on their own, perhaps leaving a few people behind at the main settlement. This pattern, which may have taken the form of transhumance in some areas, would have been particularly advantageous in the dry summer season when plant foods would have been scarce. The bands or families, individual hunting parties and other transient groups would then have inhabited the small Mesolithic 2 stations which were quite numerous in Palestine and elsewhere.

As the population increased so contacts between groups would have been more frequent, particularly in Palestine where some sites were no more than a few kilometres apart. It follows that the territories over which bands had roamed before would have diminished in area. These pressures were bound to influence the changes in social organization that were taking place. Something more complex than a simple band society was emerging in response to these economic and social forces although the new order retained some features of hunter-gatherer organization and economy.

This new pattern may be thought of as a tribal society, a model familiar in Social Anthropology. Tribes are composed of the inhabitants of a group of villages in a defined geographical region who are united by kinship ties (Sahlins, 1968, 15). They are frequently organized in descent groups that take the form of clans or lineages (Sahlins, 1968, 49ff). Tribes are a loose social system without any formal political organization. They rely on kinship ties and individual initiative to solve disputes and regulate relations with their neighbours. Tribes, like bands, are egalitarian (Service, 1962, 114; 1971, 157) even if relationships between individuals within the tribe are more elaborate than in a band society. Members of a tribe will usually share the same customs, technical traditions and material culture (Sahlins, 1968, 15).

This model accords well with the archaeological evidence for Mesolithic 2. Some settlements now resembled villages and these were near enough to each other for their inhabitants to have been in close contact. Artifact types and burial customs on sites within the Natufian heartland had strikingly similar characteristics, as though this area was inhabited by a single tribe. Dwellings within each Natufian settlement and on contemporary sites elsewhere in the Levant were of uniform size, indicating that there was no great difference in status between the inhabitants. Now that people were more sedentary and united by more complex social relationships than before their material culture became more elaborate, at least on the medium and larger sites. This was true both in Palestine and in Lebanon and Syria where there were marked differences between the still very simple Mesolithic 1 artifact assemblages and those of Mesolithic 2 sites. Mesolithic 2 burial practices were both elaborate and diverse, much more so than anything known before; this, too, was a reflection of more varied tribal organization and greater sedentism. One suspects that the manufacture of a variety of stone, bone and shell beads, necklaces, head-dresses and other ornaments was also associated with these developments in society. The changes in population, settlement patterns and economy that were taking place gave rise to new needs and pressure on resources. The people of Mesolithic 2 responded to this by modifying their technology and developing new artifacts, using many more ground stone and bone tools for example and introducing microlithic lunates.

Evidence for social change is derived from the large Mesolithic 2 settlements and some medium sites. This indicates that already a more sedentary society living in nucleated settlements was crystallizing whose livelihood depended upon the control and conscious reproduction of a few plant and animal species. Even so some groups, while perhaps beginning to be incorporated in a tribe, remained essentially at the band level and their economy was not greatly modified.

The new mode of life was developed quickly at the end of Mesolithic 1. This contrasts strongly with Aurignacian and Mesolithic 1 society where most of the fundamental aspects of life remained the same for many millennia and the rate of cultural change was slow. After a period of rapid development the new Mesolithic 2 adaptation gives the impression of having reached an equilibrium which perhaps lasted a millennium or more. This apparent stability may be an illusion resulting from our inability to date individual sites precisely within a very general chronology. It is possible that under pressure of population change there was a continuous adjustment in society and economy against the background of a modified environment.

Chapter 3

NEOLITHIC 1

There was a further transformation in the way of life of the population of the Levant after the Mesolithic. This is marked in the archaeological record by alterations in the cultural remains and evidence for changes in economy. A new stage in the development of society and economy crystallized which since the beginning of modern archaeology has been called the Neolithic. Many objections have been raised to the continued use of this term but it has remained in circulation nonetheless. One still needs a name for this new stage of development in order to conceptualize and refer to it. I believe the term "Neolithic" serves this purpose as well as any other so long as one is careful to define one's use of the word.

In order to understand what I mean by "Neolithic" I wish to anticipate some of my later conclusions by outlining the attributes of the full Neolithic way of life in the Levant. Well before the end of the Neolithic most of the population lived all the year round in villages and supported themselves by arable farming and stock-keeping. One might suppose from ethnographic analogy that each village was composed of groups of families united by kinship ties and that these links extended to other villages in the same region. Society was probably egalitarian with no marked differences in status between the members of different families. The chipped stone industry of these people was based upon the production of blade tools. They practised a number of household crafts, among them weaving, woodworking and stoneworking, which were themselves attributes of a sedentary way of life. They also made pottery, another craft which is usually associated with sedentism.

The full Neolithic way of life thus had a characteristic economy, settlement pattern, social organization and range of artifacts. These traits were typical only of the developed Neolithic: they were not evolved immediately after the Mesolithic. Even when these characteristic features were created they did not remain static for each underwent constant change, though at varying rates. It is necessary. therefore, to visualize the Neolithic of the Levant as a way of life with certain attributes which were themselves continually evolving - a system in continuous motion. There was a point at the beginning when it began to crystallize but when it still lacked most of the attributes outlined above and a point at the end when these attributes had been sufficiently modified for the term "Neolithic" no longer to apply. The Neolithic, then, had a beginning and an ending, a chronology which it is necessary to state in order to complete the definition. The choosing of such dates cannot be entirely objective; as will be seen I prefer to propose a long Neolithic chronology in order to avoid having lengthy transition phases between one defined stage and the next, particularly as these stages are themselves such fluid concepts. Mesolithic 2 seems to have come to an end about 8500 B.C. throughout the Levant and I shall take this date as the beginning of the Neolithic. The Neolithic did not finally run its course in the southern and central Levant until the 4th millennium, about 3750 or 3500 B.C. when the Chalcolithic began. The Neolithic of the Levant, therefore, lasted about 5000 years.

The evolution of the Neolithic of the Levant may be conveniently divided into several stages. The earliest stage, which I shall call Neolithic 1, will be the subject of this chapter. I will briefly describe some of the characteristics of this stage and then examine the detailed archaeological evidence for them in the remainder of the chapter.

The people of the Levant became more sedentary in Neolithic 1, a development which was associated with the first certain evidence of cereal agriculture. They established some new relatively large settlements, one of which, Jericho, was enormous when compared with all earlier sites. These larger settlements were probably occupied for longer too, that is for much or all of the year. Other Neolithic 1 sites were no bigger than many in Mesolithic 2 and were probably inhabited on a seasonal basis.

The economy of Neolithic 1 consisted of several methods of obtaining food. Some cereals were definitely cultivated while others were gathered from the wild. Many other fruits, nuts and plants were also collected in season. A few species of animals were either killed by intensive, controlled hunting or herded while many others were hunted on a less regular basis.

The normal form of dwelling was a circular hut made of whatever materials were readily available, usually mud-brick and stone. These varied greatly in size according to the number of people who lived in them. The smallest circular structures on some sites were probably used for other purposes such as stores. These circular buildings were simply a modification of the typical huts of Mesolithic 2.

The people of Neolithic 1 buried their dead within the confines of their settlements. The bodies were often laid under the floors of the houses or sometimes in an open space between the buildings. This made of burial was in essence a continuation of the Mesolithic custom.

The chipped stone industry of Neolithic 1 was also derived from that of Mesolithic 2. The tools were still small but microliths were phased out early in this stage. The most common tool types were burins and scrapers while nibbled blades were also numerous on most sites. A new tool was the Khiamian point, probably an arrowhead, which may have superseded one of the functions of lunates. The Khiamian point is the only chipped stone tool unique to Neolithic 1. Among the other stone tools were rubbers and querns while stone bowls and other vessels were quite frequently made. Ground stone axes were also manufactured for the first time though these do not seem to have been used on many sites. Bone tools were a regular component of the artifact assemblages from Neolithic 1 sites though with the exception of the tools from Mureybat they were less elaborate than those from some Mesolithic 2 sites. Other kinds of artifacts were scarce on Neolithic 1 sites although a few items of jewelry were sometimes made. One important innovation was tools made of obsidian. This raw material began to be exchanged during this stage and in consequence the first regular contacts were established with regions distant from settlements in the Levant.

The change in culture at the end of Mesolithic 2 was first established stratigraphically at Jericho where the Natufian site was abandoned and then succeeded by other settlements with somewhat different cultural remains to which the names "Proto-Neolithic" and "Pre-Pottery Neolithic A" (PPNA) were given (Kenyon, 1969, 150). A similar sequence has also been found at Nahal Oren where immediately above Natufian layers there was another cultural level with material described as "Pre Pottery Neolithic A and B" (Noy et al., 1973, 75ff), though here the deposits were much less substantial. One site in northern Syria, Mureybat, had a phase with somewhat different cultural remains, phase IB, which has been equated with PPNA, immediately succeeding a Mesolithic 2 level, phase IA (Cauvin, 1972, 107). It would thus appear that this change in culture was taking place on sites throughout the Levant and that the new cultural configuration had sufficient similarities for archaeologists to name it by the same term. In order to examine the validity of these propositions it will be necessary to describe and compare the sequences from these and other sites on which such remains have been discovered.

Jericho

The Natufian settlement at Jericho was found at the bottom of Trench E alone of the five trenches (I, II, III, M, E) that were excavated to bedrock. This settlement was, therefore, confined to the north-east corner of the mound. Thin deposits of the next phase, the Proto-Neolithic, were found in Trench I (DI, DII, F) and Trench II on the bedrock and in E (I, II, V) overlying the Natufian. A much greater accumulation of Proto-Neolithic debris some 4m deep was found above the bedrock in Square MI (Kenyon, 1960, 99). It appears that the focus of the settlement at Jericho had moved away from the north-east corner of the tell. The maximum extent of the Proto-Neolithic settlement was quite considerable, covering perhaps one third of the area of the mound, but only part of the site in the vicinity of MI was occupied for any length of time. Thus for much of the period of occupation the Proto-Neolithic settlement was perhaps about the same size as the Natufian site.

The deposit in MI was made up of very many floor surfaces on which had been constructed shelters or huts. These huts had walls made of clay lumps, probably supported by a timber frame. The rest of the deposit seems to have consisted of occupational debris so its considerable depth here implies that the settlement was inhabited for a long period. The Proto-Neolithic occupation sequence in MI was uninterrupted, suggesting continuous, or at least repeated, occupation of the site. Likewise there was no marked stratigraphic break between the Proto-Neolithic and PPNA deposits. Although the centre of the settlement shifted between the Natufian and Proto-Neolithic phases there seems to have been no great interval of time between them. This stratigraphic evidence is corroborated by the appearance of the flint industries in these levels, as we shall see.

A very rapid growth of the site seems to have taken place after the Proto-Neolithic for the PPNA settlement was from its inception much larger than its predecessors. Very early PPNA deposits have been found above the Proto-Neolithic in Trench I (DI, DII, F) and at the northern end of the mound in Trench II. They have also been found on the bedrock in Trench III at the southern extremity of the site (Kenyon, 1960, 98). Elsewhere there were PPNA levels above the Proto-Neolithic in every trench that was excavated to a sufficient depth, in E (I, II, V), M and O. It is estimated that the settlement was about 4 ha (10 acres) in area.

The early PPNA settlement was open but soon after the initial expansion a wall was built around it. The settlement continued to be occupied for a long period but the considerable depth of debris that accumulated was contained within the confines of this wall, at least on the evidence from Trenches I, II, and III. We do not know exactly how far the settlement extended to the east nor if it subsequently expanded on that side.

The typical buildings of this phase were subcircular structures constructed of plano-convex ("hog-backed") mud bricks. They seem to have been free-standing but were set close together. When replaced they were not always rebuilt on the same alignment (Kenyon, 1957a, 102). Most of these structures, which have been interpreted as houses, seem to have had a single room, although one example had at least three (Kenyon, 1957a, 106); none was excavated in its entirety so one cannot be certain of the exact number. The rooms were from 4 to 6m in diameter and their floors were sunk below the level of the surrounding ground, as much as 0.8m in one instance. The houses were entered through a timber-framed projecting doorway or porch and down a flight of several steps with stone or wooden treads (Kenyon, 1957a, 102). Inside they were simply finished with mud floors and plain walls although in one instance the latter were lined with reeds or bamboo covered with mud (Kenyon, 1956, 72). The walls were strengthened with timber or wattle and enough debris was found in some of these houses to suggest that they stood quite high originally (Kenyon, 1959, 6). They also sloped inward which shortened the roof span. The roofs themselves may have been conical or domed and were probably made of timber, branches, reeds and mud. A depression was found in the floor of one hut in Trench M indicating that its roof had been supported on a central post.

The houses seem to have contained few domestic structures although in a yard adjoining one building a grinding stone and possible oven were found (Kenyon, 1957a, 106). These were surrounded by an expanse of charcoal indicating that fires had been lit in the area, possibly for preparing food-stuffs.

The stone walls surrounding the PPNA settlement were best preserved in Trench I. The sequence of construction here was complex, indicating that the walls had been modified several times during the life of the settlement.

The first perimeter wall, designated TW I, was built on sterile soil; it was freestanding and aligned approximately north-south. The wall was 1.5m wide (Kenyon, 1957a, 102) and still stood 3.9m high when excavated (Kenyon, 1960, 93). Behind this wall to the east and above an earlier PPNA structure a solid stone tower was built; this tower was semicircular at the bottom where it was joined to the wall and circular at the top. The tower survived to a height of a little over 8m but may have been slightly taller originally. Its shape suggests that it was built higher than the perimeter wall in front. To reach the top one entered a passage at the foot of the tower and climbed a staircase up through the centre. From the top one would have commanded a view over the roofs of the houses within the settlement and the Jordan valley beyond.

The function of these structures is not entirely clear. The wall which apparently surrounded the whole settlement seems to have been too tall for a simple enclosure wall to protect stock and humans at night from predatory animals and so may have been intended as a defensive curtain wall against other human groups. As the tower and the wall were built together they probably had a combined function. The tower is altogether too massive to have served simply as a buttress although it would have afforded a good lookout. Even this seems inadequate as a functional explanation, for a structure as large as this which took much time and labour to build would presumably have been constructed in response to some compelling need. Yet it is hard to see what essential purpose it might have served in a defensive system, beyond functioning as some sort of observation post and fighting tower.

The area around the foot of the tower seems to have been open at first but later it was completely built over. A series of curved stone walls thickly coated with mud plaster was constructed around the foot of the tower forming at least five enclosures (Kenyon, 1957a, 103ff; 1960, 93ff). These walls originally stood at least 3.12m high without any connecting doors between the enclosures, only a small window or porthole high up in one wall. It is possible that these structures were covered over and approached through an opening in the roof. The entrance at the foot of the tower was now almost closed in and could only have been reached across the roofs of the surrounding rooms. Two suggestions have been put forward to explain the purpose of the enclosures, one that they were water storage tanks (Kenyon, 1960, 95) and the other that at least some were for storing grain (Kenyon, 1969, 153). Large quantities of water would soon have washed away the mud plaster of these structures so the latter explanation seems more probable, especially as possible burned vegetable deposits were found within one of the enclosures. If these enclosures were used as granaries they would have held enough grain to feed many households. Such indications of communal storage combined with the evidence for large-scale structures such as the tower and wall would suggest that PPNA Jericho had a system of community organization.

Eventually these enclosures ceased to be used and the area around the tower was remodelled. First the walls of the enclosures began to collapse and their interiors were filled with coarse rubble (Kenyon, 1957a, 104). Then a new stone face was built around the outer surface of the tower. Part of the new face of the tower and the open area around its foot were plastered over, completely burying the old entrance to the stairway which now passed out of use. The old town wall was replaced by a new one, TW II, on a slightly different alignment. This wall ran 3.75m to the west of wall TW I and was joined to the new outer face of the tower. At about this time a ditch 8.5m wide and 2.10m deep was cut in the bedrock to the west of the new wall (Kenyon, 1960, 97) and the chippings from the ditch were used to fill the gap between the old and the new town walls.

The area around the tower remained open for a while and some layers of washed-out debris accumulated on the plastered surface. Then a new series of enclosures was built behind the town wall around the tower (Kenyon, 1957a, 104). These structures, which were made of stone, mud-brick and plaster, were built in at least three stages. There was a doorway between two of the enclosures with a sill raised 0.35m high above the floor. This doorway did not survive intact but it is similar in size and type to the complete doorway found at Tell Abu Hureyra in a later context (Moore, 1975, 60). The raised sill would have helped to keep the floors free of rubbish from outside. Like the earlier enclosures this series may have been used for storage.

In the next stage the wall and tower were modified further. Another stone face was added to the west side of the tower (Kenyon, 1956, 71) which now stood only a few metres above the surrounding structures. The stone wall of the settlement was considerably heightened though the new face was set back slightly from the old one below. This wall was joined to the new face of the tower which probably served as an additional support. The wall itself was set on a slight batter and presented a formidable exterior rising above the ditch which continued in use. It would appear to have still been a defensive structure but the tower probably played little part in such a scheme now. As the interior of the settlement built up, this perimeter wall also served as a terrace wall supporting the considerable depth of deposit within.

The second series of enclosures behind the wall was partly filled in and then rebuilt on much the same alignment (Kenyon, 1957a, 104). These were then in their turn filled with debris and no more buildings of this type were built here. The character of the area now changed. The wall and ditch were no longer maintained, the top of the wall began to collapse and the ditch gradually filled with silt and debris. The area over the tower reverted to domestic use and several phases of typical PPNA houses were built on top (Kenyon, 1957a, 105). These houses were built out over the wall and down the slope of the mound. This enlarged settlement now covered the top and part of the slope of a steep-sided mound. Then the site was abandoned and the surface of the tell was considerably eroded (Kenyon, 1956, 73).

The dead of the PPNA settlement were buried in a contracted position in graves about 1m deep beneath the floors of the houses (Kenyon, 1957a, 106). The inhabitants were thus continuing a burial tradition that typified Mesolithic 2 and which had been practised at least as early as Mesolithic 1. One interesting modification of the burial rite was the custom of treating skulls separately from the rest of the skeleton. This rite began quite late in the PPNA sequence when two elaborate instances of it were found: in one seven skulls had been set upright around an eighth and in another several groups of three skulls each were buried close together (Kenyon, 1956, 75). A third group consisted of several infants' skulls and a complete infant skeleton. This preoccupation with skulls had a long history in subsequent cultural stages throughout the Levant and further afield.

Flint and bone tools were the most common artifacts in the PPNA settlement but a range of other tools and ornamental objects was also made. A number of hollow querns and many rubbing stones were found as well as grooved stones and rough stone bowls. The inhabitants also manufactured stone axes with ground and polished cutting edges. The ornamental artifacts consisted of a variety of beads.

The bone tools were numerous and included several different types (Kenyon, 1956, 72). These consisted principally of points, none on which was very large, and spatulae. Some of the latter are better described as scoops and these seem to have been characteristic of the assemblage. There were some pins and scrapers made of rib bones as well as a few tiny toothed combs, too small for an adult's personal use.

Both Proto-Neolithic and PPNA flint tools[5] were made from the same kind of very varied raw material. Most of this came from small pebbles presumably collected from the beds of wadis running down from the Judean hills to the west of the site. Almost all of the material was carefully selected, fine-

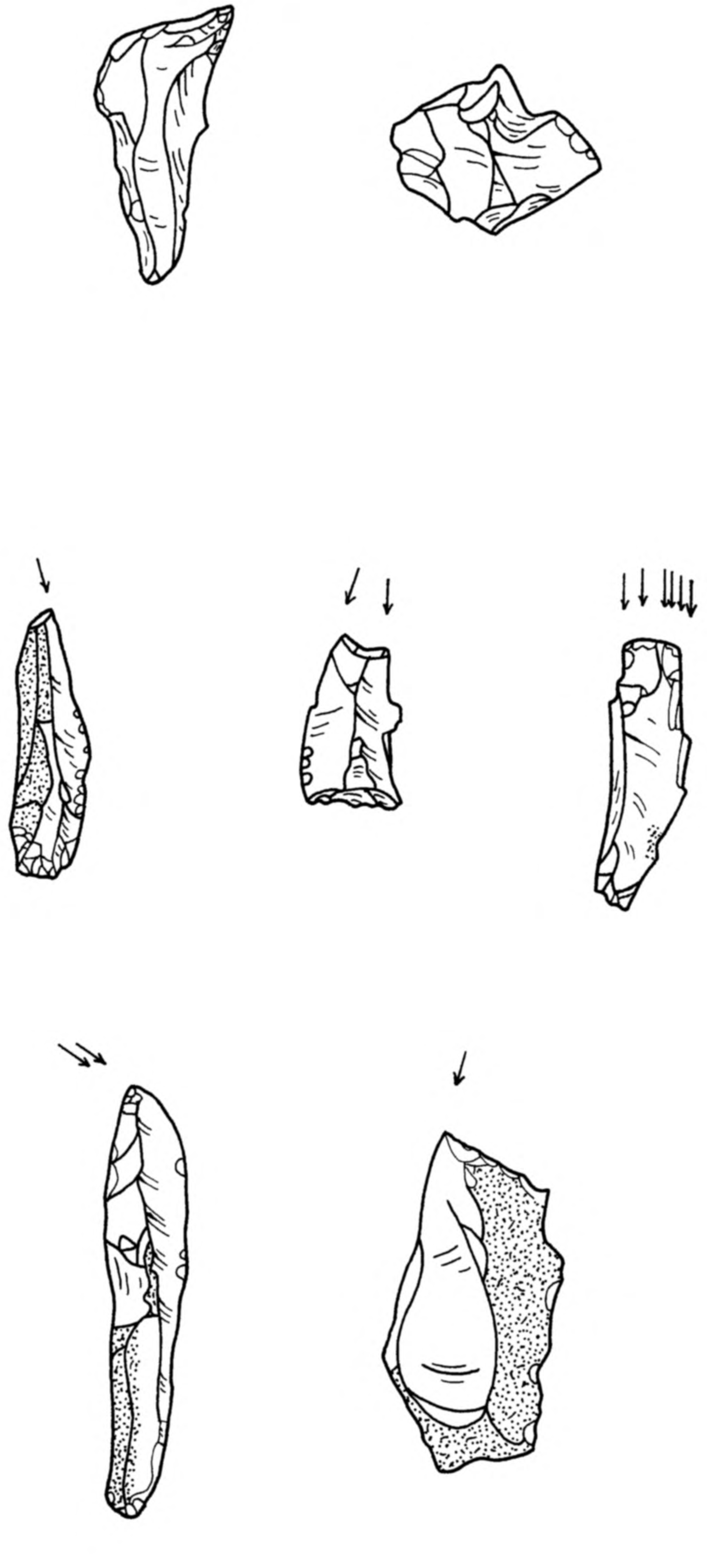

Fig. 7 Jericho Proto-Neolithic –
flint borers and burins

grained flint although some coarse flint was used. The flint was of many different colours and shades, both opaque and translucent, including grey, brown, veined purple and pink; the latter two in particular are usually thought of as being distinctive of the "Pre-Pottery Neolithic B" (PPNB) in Palestine but they were used throughout the Jericho Natufian and Neolithic sequence. A few fragments of obsidian, usually from small blades, were found in the Proto-Neolithic and PPNA layers. This was the first time that this material had been used in Palestine. Six pieces from the PPNA layers were analysed by Renfrew and his collaborators in the first major programme of analyses of Near Eastern obsidian ever undertaken. All of them proved to have come from Çiftlik (source 2b) in Anatolia (Renfrew et al., 1966, table I). I am conducting another programme of obsidian analyses in association with Bradford University in which we have analysed three more pieces from Neolithic 1 levels at Jericho, one from the Proto-Neolithic and two from the PPNA. These three pieces likewise came from Çiftlik. Obsidian from the Çiftlik source reached the Levant more regularly than that from any other locality throughout the Neolithic on present evidence.

Tools in the Proto-Neolithic were fashioned on flakes and blades struck from small prismatic or pyramidal cores. Crested blades were a regular by-product. Flakes and blades usually had tiny prepared platforms and probably were struck off with a punch. Blades were short and irregular, most being between 3 and 5cm long though a few were as much as 6 to 7.5cm long.

All the flake and blade tools were small like the waste material. The most numerous retouched tools were burins and scrapers while nibbled blades were also common. Retouched blades and flakes of no specific type occurred quite frequently. Although burins were abundant there were very few types (Fig. 7) for, apart from some single and multiple blow burins, most were angle burins on preparation or truncation. The scrapers were a little more varied (Fig. 8) consisting of flake, side and steep-scrapers and end and nosed scrapers on blades. There were some borers on flakes and

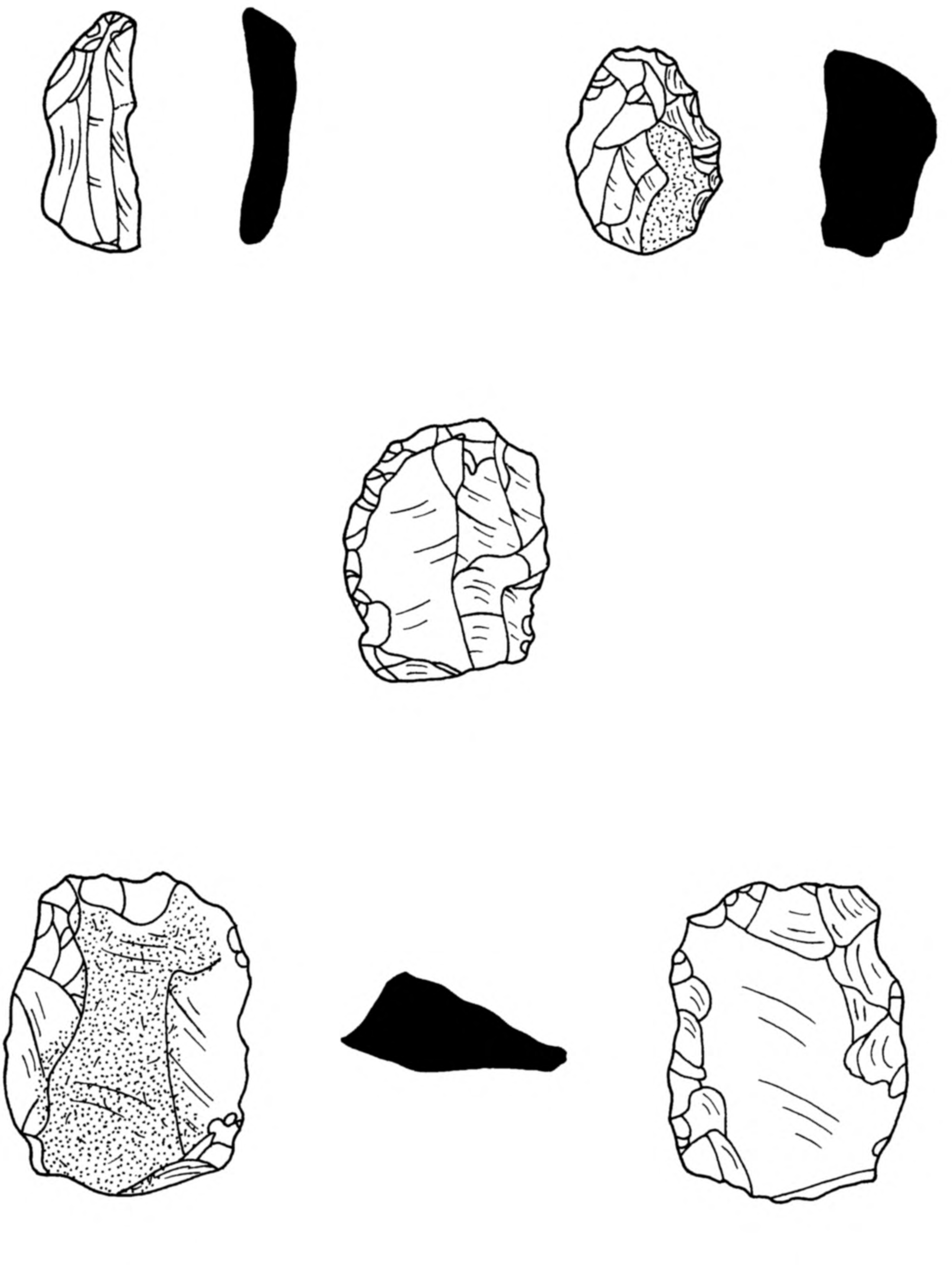

Fig. 8 Jericho Proto-Neolithic – flint scrapers

and blades with a short point defined by a little retouch (Fig. 7). Sickle blades, that is blades with silica sheen, were also found (Fig. 9) though these do not appear to have been very common. They were made on irregular flakes and blades and usually had some retouch, particularly on the back. All were quite small so several must have been hafted together to make a composite cutting tool. These tools were all finished with abrupt retouch or nibbling.

One new tool was the axe or adze (Fig. 9). These had a straight or convex flaked cutting edge with a rounded or pointed butt. They were oval or circular in cross-section and were flaked all over. These tools were almost certainly hafted and were probably used for woodworking. Most were too small to have been used to cut large pieces of timber so it is likely that trees were felled and split by other means.

This industry was based more on retouched flakes than on blades and so cannot be described as a blade industry. The typological range was restricted which suggests a fairly limited range of tool uses. Microliths and microburins were not found but this may be because the deposits were not sieved. Composite tools as such were certainly made and as the tools were so small many of them would have been hafted for use.

The raw material used in the PPNA industry was the same as in the Proto-Neolithic. The core technique was also similar in that most flakes and blades were struck from prismatic and pyramidal cores, although discoid cores were now used as well. Blades were still irregular although some were longer than in the Proto-Neolithic and had parallel sides. These larger blades were used for sickle blades and knives. Some of them were struck from double-ended cores, a few of which were found for the first time. A further refinement in the choice of raw material was discernible: the larger blades were usually fashioned from fine-grained purple and honey-coloured flint while the smaller ones were made on coarser raw material.

Burins, scrapers and nibbled blades were still the most common tools.

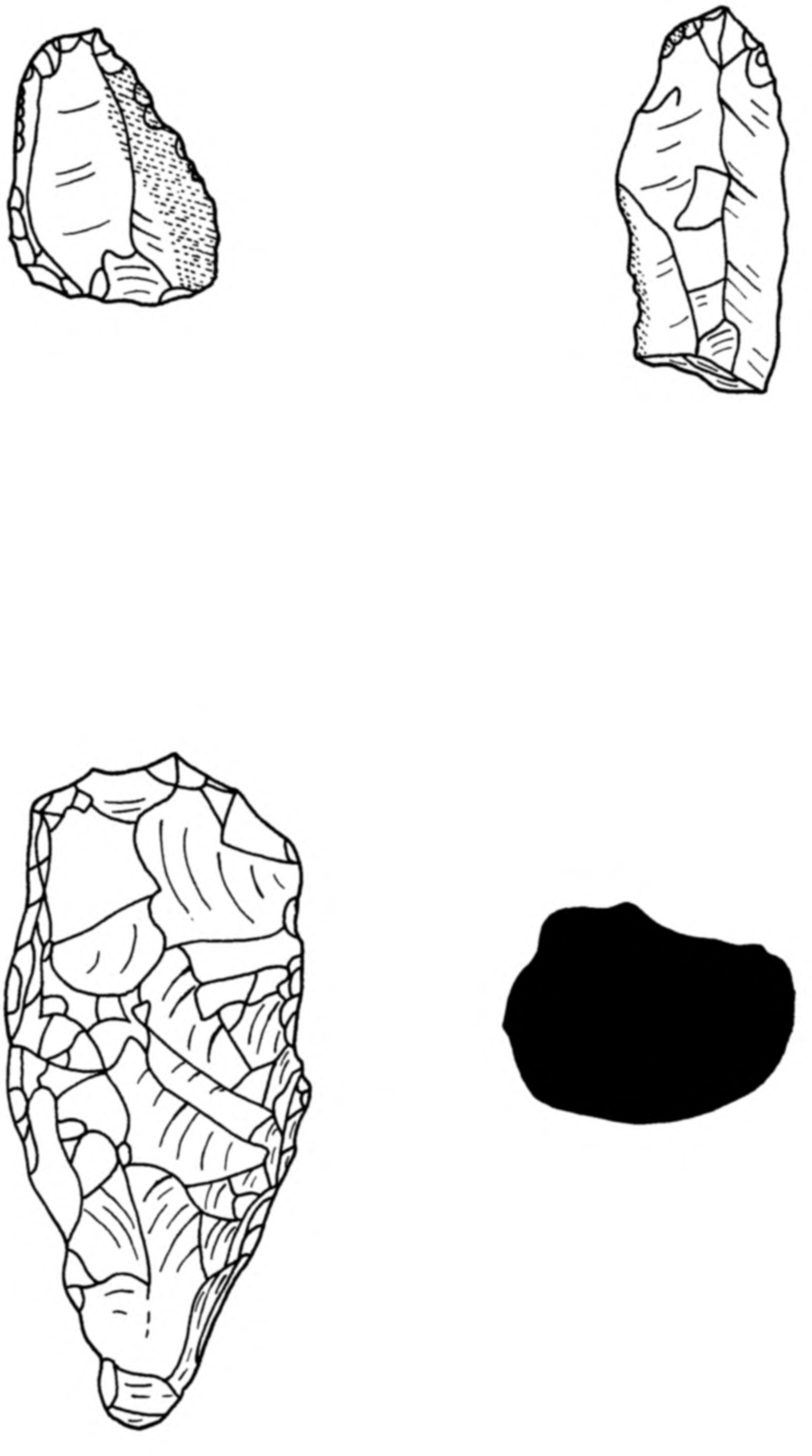

Fig. 9 Jericho Proto-Neolithic –
flint sickle blades and adze

The same range of burin types (Fig. 10) was used as in the Proto-Neolithic with the addition of a number of dihedral burins but the scrapers (Fig. 10) now included a few discoids. Scrapers in general were perhaps less frequent than before. Borers (Fig. 10) appear to have been more common and now included drills and long awls. Sickle blades were also more common and somewhat different (Fig. 11); most were made on long blades with little retouch. Their form suggests that they were still probably hafted to make composite tools. Axes and adzes (Fig. 11) were similar to those found in the Proto-Neolithic. A few had such narrow ends that they are better described as picks. As before the tools were formed by flaking. Axe/adze rejuvenation flakes were common in the PPNA indicating that the cutting edges frequently broke and needed renewing. This was done by a blow from the side, followed by further flaking. The true tranchet edge occurred rarely.

A few new tools were found in the PPNA levels, the most important of which were Khiamian points. These were the first recognisable projectile points in the Levant although as many microliths and other retouched tools or even flint waste can be used to arm an arrow or lance (Allchin, 1966, 203) there is no reason to suppose that the use of the bow did not begin much earlier. Another new type was a tanged knife retouched by squamous pressure-flaking. A lunate was also found in the PPNA levels but it is not known if it belonged to this industry or was derived from the Natufian by subsequent disturbance. A few of the obsidian blade segments were now retouched at both ends to form rectangles. Most tools were still finished by nibbling or abrupt retouch as in the Proto-Neolithic. The use of squamous pressure-flaking was new but it was not yet used on many tools.

The flint industry of the PPNA was similar to that of the Proto-Neolithic. The same raw material and techniques of preparation were used and the same tool types. Techniques were a little more varied in the PPNA, some new tools were introduced and the relative proportions of the main tool types were somewhat different but these changes were such as one would expect in a

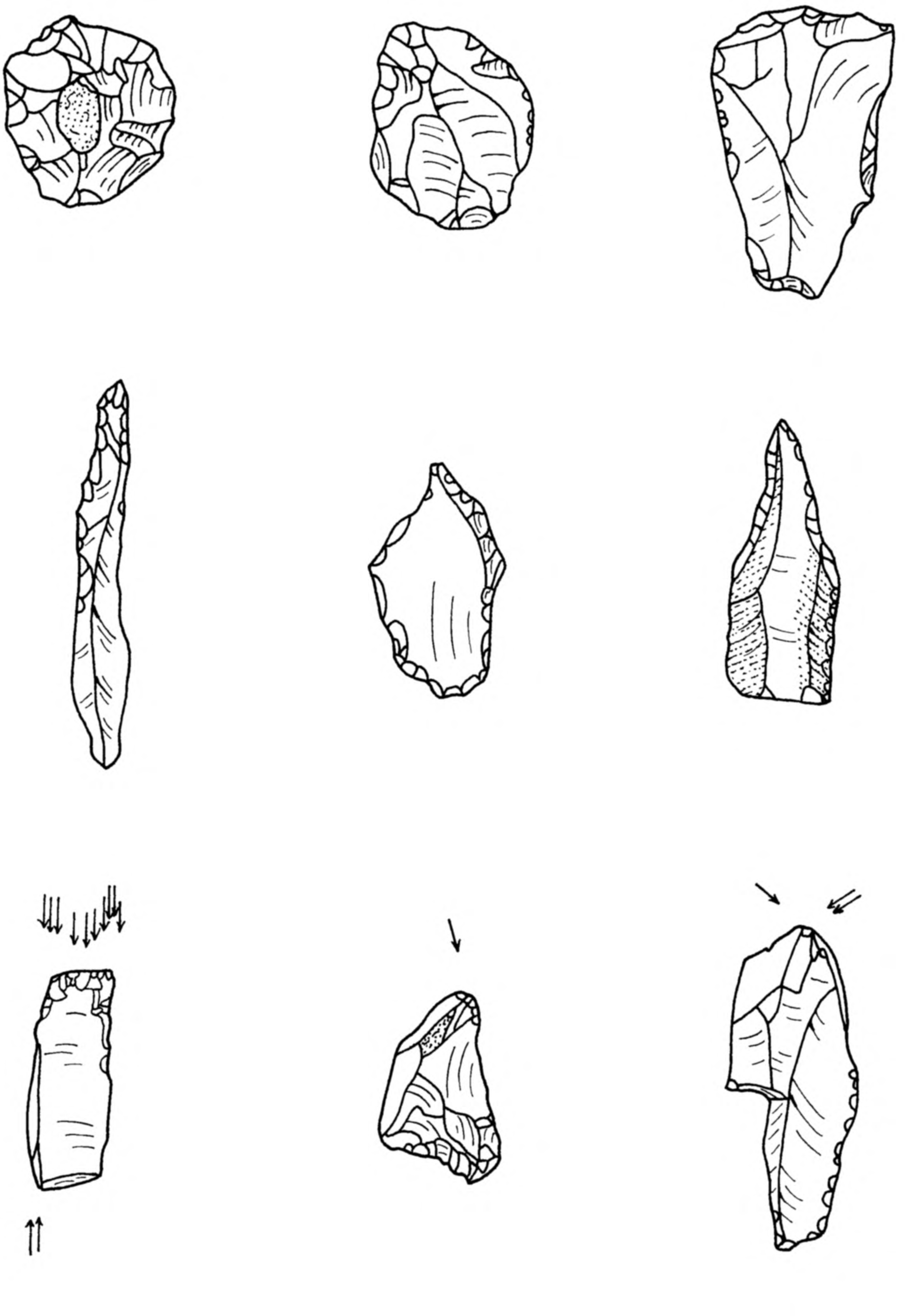

Fig.10 Jericho PPNA – flint scrapers, borers and burins

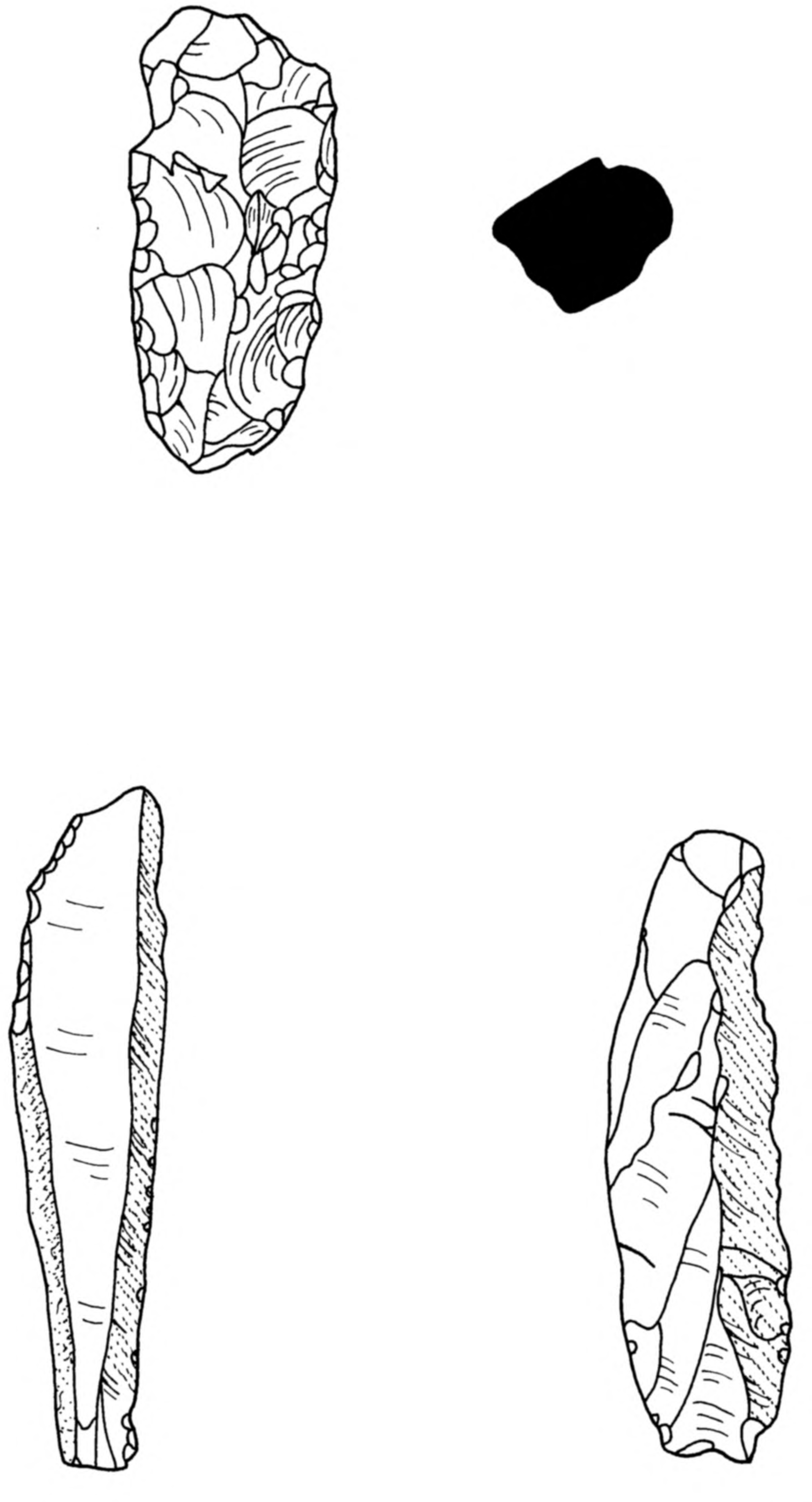

Fig.11 Jericho PPNA – flint adze and sickle blades

long-lived industry. Gradual changes would take place with the passage of time and new tool types would be developed in response to new needs. As the excavated material represented only some of the activities that were practised on the site differences were bound to occur from level to level which would affect the total sample we have of the industry.

This Neolithic flint industry had many similarities with the Natufian industry at Jericho. The same varieties of raw material and the same techniques of production of small blades and flakes from prismatic cores were used in the Natufian. The waste blades and flakes were similar and both this component and the tools were all small; neither could be described as a blade industry, not before the evolved PPNA anyway. Some of the tool types such as the scrapers, sickle blades and borers were common to both industries. There were differences of course: microliths and the microburin technique appear to have been absent in the Neolithic industry for example but nevertheless, the similarities are striking. Since they embrace raw material, techniques of production and tool types it would appear that the Neolithic industry developed directly from the Natufian. One can go further and suggest that for such an industry to be continued in this way the population must have remained the same. Although other cultural and economic changes were taking place the earlier Neolithic population of Jericho was descended from the Natufian inhabitants of the area.

It is very difficult to determine when the Proto-Neolithic/PPNA at Jericho began and how long it lasted because although no less than eleven ^{14}C determinations have been made on samples from PPNA levels the dates do not form a consistent series. Two determinations made when ^{14}C dating was a new technique, 6850 ± 160 B.C. F-39 (Kenyon, 1959, 7) and 6775 ± 210 B.C. F-40 (Henry, Servello, 1974, 37), should probably be ignored from the outset as they give no more than a general indication of the age of the deposits. The remaining determinations were all carried out by the British Museum and Philadelphia laboratories, often on samples from the same phases.

Unfortunately these two series of dates differ by as much as 500 or 600 years, the British Museum dates being the older. The earliest dated phase is one immediately after the construction of the PPNA wall and tower. The two British Museum dates for this are 8350 ± 500 B.C. BM-250 (Radiocarbon 11, 1969, 290) and 8300 ± 200 B.C. BM-105 (Radiocarbon 5, 1963, 107) but the Philadelphia date is 7825 ± 110 B.C. P-378 (Radiocarbon 5, 1963, 84). There is another series of dates for phases late in the PPNA: 8350 ± 200 B.C. BM-106 for a phase succeeding stage VI of the defences and 8230 ± 200 B.C. BM-110 (Radiocarbon 5, 1963, 107) for the final destruction of the wall, both of which may be compared with 7705 ± 84 B.C. P-379 (Radiocarbon 5, 1963, 84), also for a stage succeeding stage VI. The problem is made even more difficult by other dates obtained more recently, 7440 ± 150 B.C. BM-251 for stage VI and 7370 ± 150 B.C. BM-252 (Radiocarbon 11, 1969, 290) for a phase succeeding stage VII, both much later than the series above and which may be aberrant. One other date should be mentioned here to give a complete picture, 7632 ± 89 B.C. P-377; this is for the earliest PPNA occupation in Trench E (I, II, V) and so unlike all the other determinations mentioned which were obtained from material in Trench I.

One of the difficulties with these determinations is that the charcoal from which they were obtained was excavated many years ago and most of the dating was done soon after the excavations were finished. This means that the dates are probably not very exact, although it does not explain the discrepancies between dates from the two laboratories. This has to be a accounted for by different sample preparation and counting procedures. If one considers the British Museum dates alone then it would appear that the PPNA at Jericho began about 8500 B.C. although from the Philadelphia dates 8000 B.C. would be more correct. In either case the Proto-Neolithic settlement must have been founded some time before. The end of the PPNA came about 8000 B.C. on the British Museum dates or 7500 B.C. on those from Philadelphia. From these determinations it is possible to argue for either a long duration of the PPNA from 8500 to 7500 B.C. or for a much shorter sequence of two or three hundred years. For the moment it is best to be cautious and to take an average of the dates recognising that this can only be an estimate. On this basis PPNA may have begun about 8200 or 8300 B.C. and ended about 7700 or 7800 B.C. The Proto-Neolithic may thus be dated to about 8500 B.C., an estimate that accords reasonably well with the date suggested earlier for the end of Mesolithic 2 in the Levant.

Nahal Oren

The site of Nahal Oren is situated on the north side of the Wadi Fellah and consists of a small cave with a terrace in front which slopes steeply down to the wadi floor. It has been extensively excavated by three teams in separate campaigns. The first excavation was in the cave and on the terrace in front (Stekelis, 1942, 4). It was believed that the site had been occupied in the Aurignacian and Mesolithic 2. The second series of excavations exposed a large part of the terrace and showed that it had been occupied in Mesolithic 1 and 2 and the Pre-Pottery Neolithic (Stekelis, Yizraely, 1963, 1ff). The third excavation took place on the terrace a little to the west of the area already dug. It was intended that the soundings here should confirm the stratigraphic sequence of the site and provide samples of organic remains from which the economies of the different phases of occupation could be determined (Noy et al., 1973, 75ff).

The occupation sequence at Nahal Oren covers a long period of time yet the remains of the superimposed phases of the settlement are less than 4m deep (Noy et al., 1973, fig. 2b). Much of the deposit consists of stones and other debris washed down from the steep slopes above. Although the archaeological cultural sequence is complete from Mesolithic 1 to the Pre-Pottery Neolithic B there is too little occupation deposit on the site for it to have been continuously occupied by man. It is more likely that occupation was discontinuous but that people returned to the site in each cultural phase.

The Neolithic occupation deposits were found to be stratified directly above Natufian layers in the excavations of both Stekelis and Yizraely (Noy) and Noy, Legge and Higgs. In the most recent excavations these deposits have been divided into a lower series, layers II and III, which has been equated with the PPNA at Jericho and layer I above ascribed to the PPNB (Noy et al., 1973, 86). Two stone-walled structures with associated floors and hearths, considered to be houses, were found in the lower, PPNA layers (Noy et al., 1973, 78ff). These layers cannot be linked directly with stratum II described as PPNA in the earlier excavations (Stekelis, Yizraely, 1963, 10) but it would appear that the much more extensive structural remains excavated then belonged to the same cultural phase. The stratigraphical position of both was the same in their respective sequences, sandwiched between Mesolithic 2 and PPNB layers (Stekelis, Yizraely, 1963, 2; Noy et al., 1973, fig. 2b).

Stratum II consisted of a village of at least 13 subcircular structures (Fig. 12), most of which were probably houses (Stekelis, Yizraely, 1963, 4ff, fig. 3). The buildings were from 2 to 4m in diameter, the smaller ones perhaps serving as stores or workshops. They were built on a descending series of four terraces cut back into the natural slope and set so close together that the walls of some interlocked. These walls made of rough stones were up to 0.8m wide and stood about 1m high. Originally they must have carried roofs of timber with perhaps reeds and mud. The buildings had earth or pebble floors, which had been renewed in some instances, and stone-lined hearths sunk in their floors. Cup-marked stones were often found associated with these hearths; as the cup marks were quite small they may have been used in some craft activity rather than as roof supports as Stekelis and Noy suggested. The doors of these dwellings opened down the slope towards the bottom of the wadi. Allowing for the differences in situation and building material, these structures were quite similar to the houses of PPNA Jericho. Both types were round or subcircular with a single

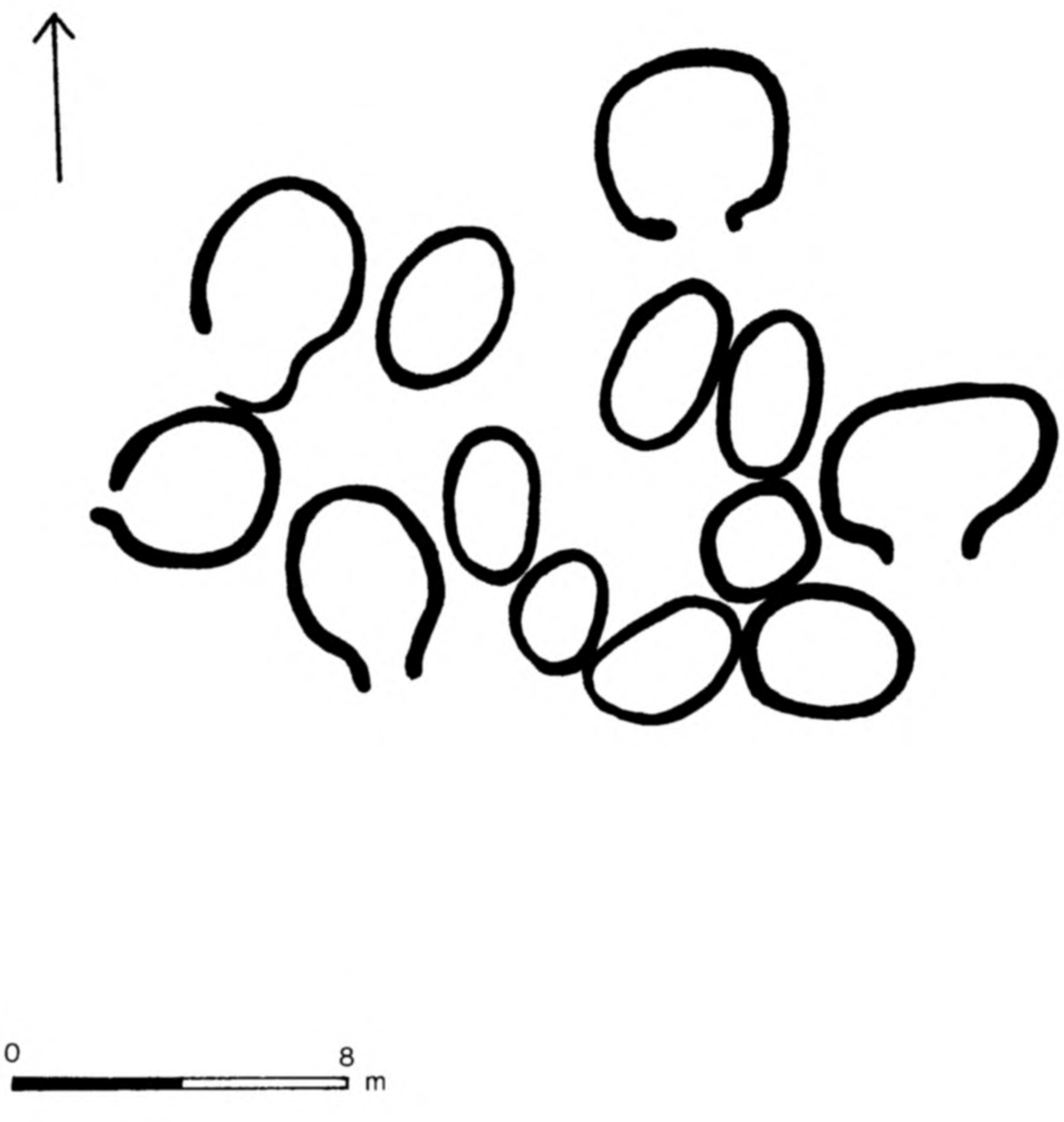

Fig. 12 Neolithic 1 village at Nahal Oren
(after Stekelis and Yizraely)

entrance and a number of the Nahal Oren buildings were dug at least partly into the hillside, so resembling the semi-subterranean houses at Jericho. The walls of the Nahal Oren buildings were low as at Jericho, though broad enough to support a superstructure. It is likely that both types had a conical, tent-like roof which sloped down to the tops of the walls and was supported by one or more posts within the building.

Only one burial has been reported for these levels at Nahal Oren (Noy et al., 1973, 79). This was a semi-flexed skeleton laid on its right side in a shallow pit without accompanying grave goods. The skull was missing although the mandible was in position. This would appear to have been another early example of the practice of removing skulls from corpses which was so common later in the Neolithic. As this burial was the only one reported from inside the settlement at this period it is likely that most of the inhabitants were buried elsewhere, in contrast with the practice in Mesolithic 2 and later in the Neolithic.

The finds from these levels of the Neolithic settlement were restricted in type, lacking the elaboration of material culture found on some Mesolithic 2 sites and later in the Neolithic. Cylindrical pestles and plano-convex rubbing stones of limestone or basalt were quite common (Stekelis, Yizraely, 1963, 8ff), the latter material being imported probably from Galilee. Only one hollow quern, on the other hand, was found in stratum II and none was reported for Nahal Oren IV - II. A number of other limestone bowls, dishes and platters were found in stratum II, several of them ground thin. One pebble incised as a female figurine was also discovered in house 16.

Bone tools were the second principal category of artifacts[6] but these were quite restricted in range. Most were simple borers of varying sizes. A number of small, cylindrical bone, stone and shell beads was found in the most recent excavations. One was a malachite spacer bead (BM no. 1973 7-11886), the material for which must have been imported from some distance away, perhaps as far south as the Wadi Arabah or Sinai.

A very brief account of the flint industry from stratum II was published in the preliminary report on the second series of excavations (Stekelis, Yizraely, 1963, 6ff) but a full study has not been carried out. A more detailed account has appeared of the Kebaran and Natufian flint industries from the most recent excavations but very little information was given about the Neolithic assemblages (Noy et al., 1973, 86ff). Most of the flints from rectangle 500 in this excavation, however, have been deposited in the British Museum where I have been able to study them. The full occupation sequence on the site was present in this area. It is clear that the flint industry of stratum II in the earlier excavations was essentially the same as that of layers IV, III, and II in rectangle 500, thus confirming the atratigraphic equation of the remains from both deposits.

The uppermost level with a Natufian industry was layer V. Stratified above that was layer IV which was described as "a small layer between the Natufian and 'pre-Pottery Neolithic A' levels (Noy et al., 1973, 86). The industry of this layer was quite characteristic and somewhat different from the Natufian. The raw material consisted of pebbles and other small pieces of various shades of grey, brown and buff flint. A little of it was quite fine but most was medium or coarse-grained. It was probably collected from wadi beds and terraces in the neighbourhood.

Flakes and rather irregular blades with prepared platforms were struck from prismatic or, more rarely, pyramidal cores. The waste material consisted of crested blades and small rough flakes and blades and most of the tools were also small. Little parallel-sided nibbled blades were common, as were single-blow and angle burins. The other major group of tools was the scrapers which were more varied in type. They included both disc scrapers and end-scrapers on blades (Fig. 13a), both absent in the Natufian at Nahal Oren. Small sickle blades while not numerous were typical of the industry. Another innovation of which several examples were found was a hollow-based arrowhead with side notches (Fig. 13a), quite like a Khiamian

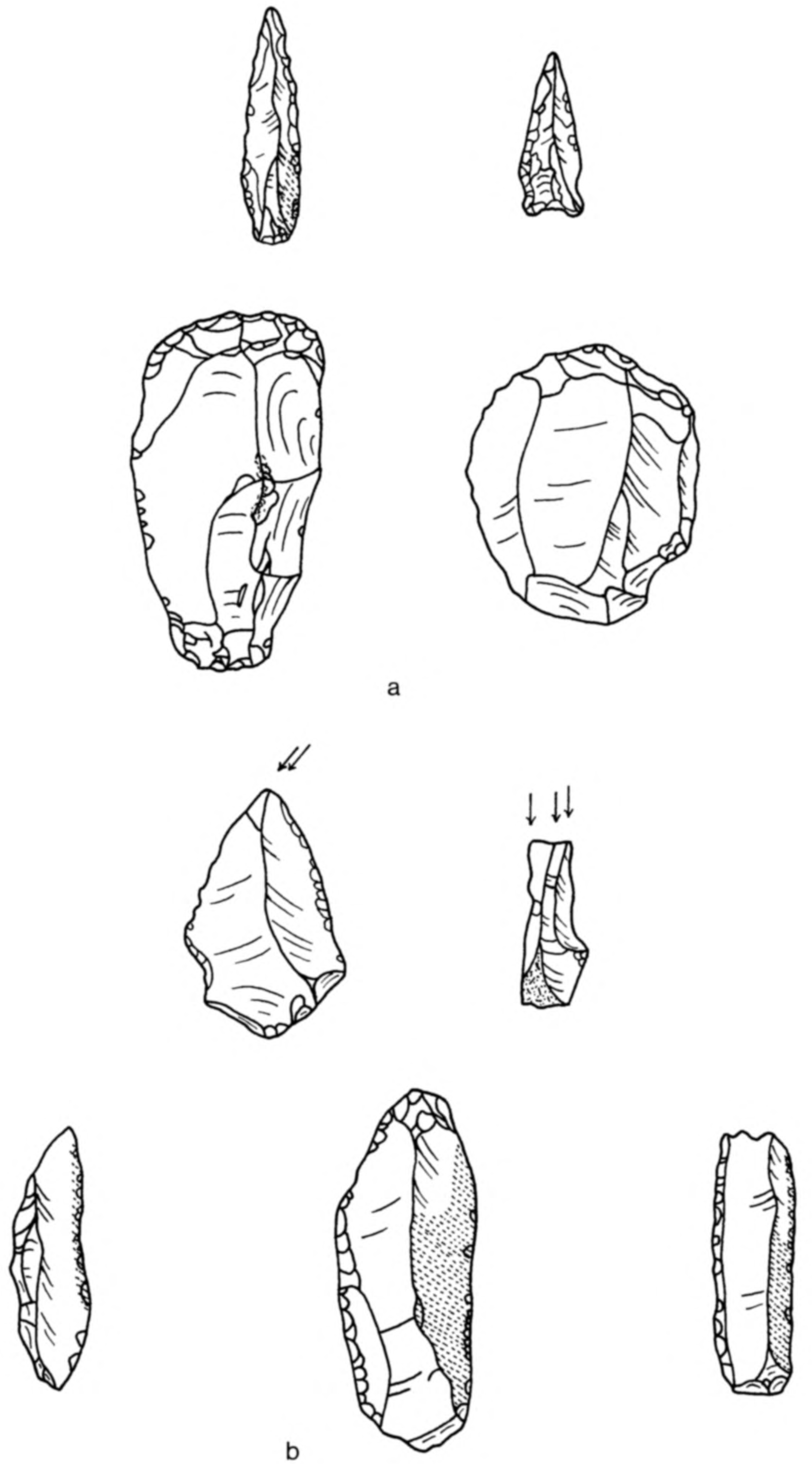

Fig. 13 Nahal Oren Neolithic 1 flint tools

a – layer IV borer, arrowhead, scrapers

b – layer III burins, sickle blades

point. Several edge renewal flakes were found of flaked axe/adzes indicating that these tools were also made by the inhabitants of the site; they too were unknown in the Natufian.

The excavated material at Nahal Oren was passed through sieves and a flotation machine. In consequence many microliths were found in the Kebaran, Natufian and all later layers. Layer IV yielded lunates, microburins and microborers as well as typical Kebaran backed and truncated bladelets. It is difficult to be sure how much of this material really belonged in this layer. Much of it was probably derived from earlier deposits through disturbance during the layer IV occupation. This would certainly be true of most, if not all, the tiny lunates found which were typical of the Natufian layers on the site. One lunate though was 3.3cm long, much bigger than anything found earlier and so it was probably in context. This was also true of the microborers which were not found in earlier deposits on the site. It would thus appear that there was still a microlithic element in the layer IV industry.

Stratified above layer IV were layers III and II. These two layers had the same flint industry. The raw material was similar to that of layer IV although some larger flint was used. The core technique was also quite like layer IV in that most flakes and blades were struck off prismatic or pyramidal cores. There was a little more diversity, however, as some discoid cores were now found and at least one double-ended blade core. The waste still consisted largely of small, irregular flakes and blades with some crested blades. A few pieces of obsidian were imported in these levels.

The same principal classes of tools dominated the industry as in layer IV but there was a greater variety of types. Scrapers were particularly numerous (Fig. 14) with end-scrapers on blades and disc, steep and side-scrapers on flakes or nodules of flint, some of which were larger than anything found earlier at Nahal Oren. Burins were also quite common, though still restricted to angle and single or multiple-blow types (Fig. 13b). Nibbled blades remained an especially large class of the retouched tools. Less common were sickle

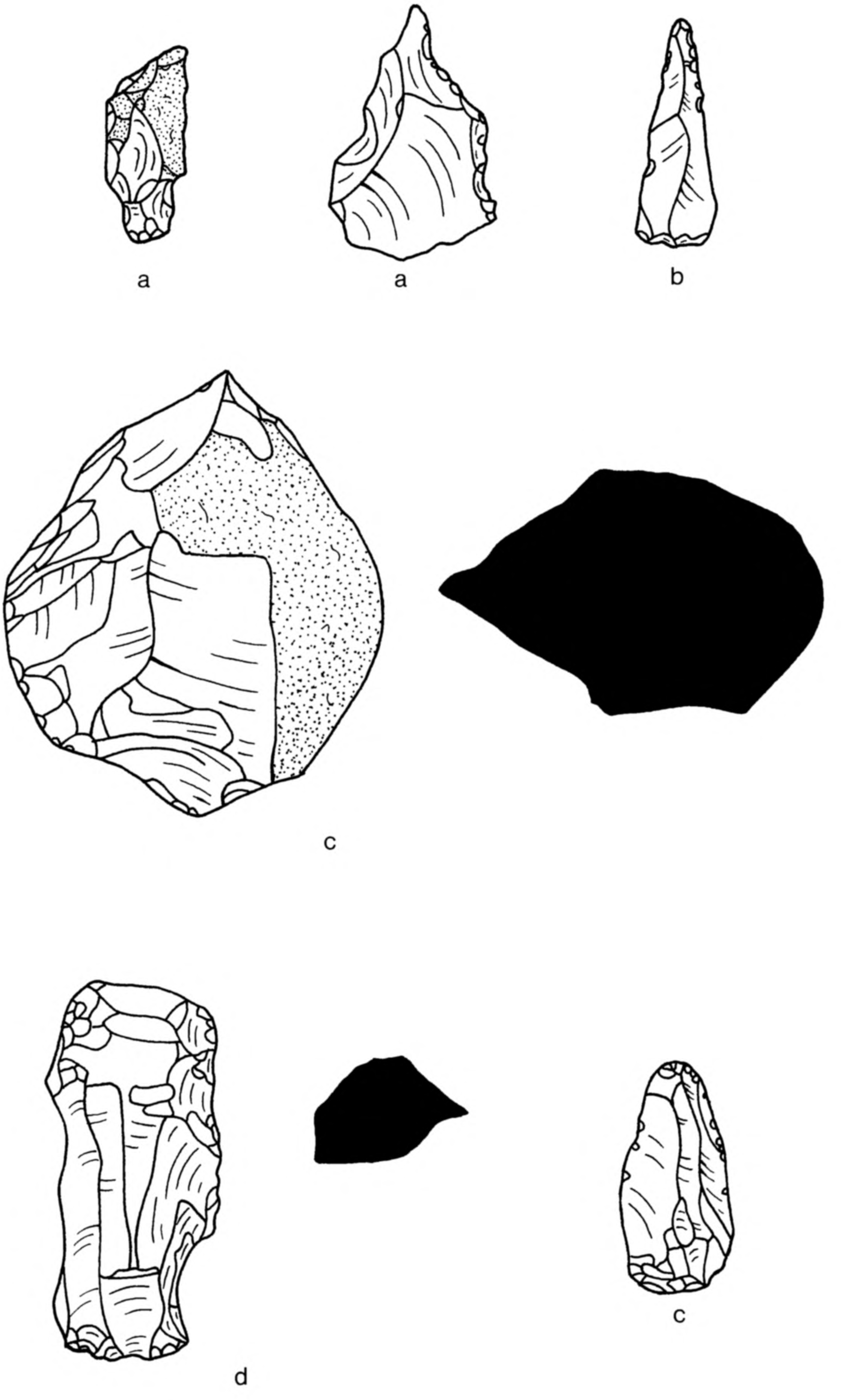

Fig. 14 Nahal Oren Neolithic 1 flint tools

a borers c scrapers

b point d adze

blades: some of these were now quite large with backing (Fig. 13b). There were a few borers (Fig. 14) and arrowheads were still scarce. A point with retouched butt which was found in layer III (Fig. 14) may have served to arm an arrow and hollow-based arrowheads with side notches of Khiamian type were found in stratum II of the earlier excavations (Stekelis, Yizraely, 1963, 8). A few notched arrowheads with tangs were reported from the unpublished material in these layers (Noy, Cohen, 1974, 79) which, if in context, would be the earliest occurrence of this type. Notched blades and flakes on the other hand were quite common and seem to have been typical of the industry of these layers. Flaked axe/adzes were found throughout the deposit (Fig. 14), together with cutting-edge rejuvenation flakes. The edges of a few of these axe/adzes had been prepared with a true tranchet blow. The material from layers III and II like that of layer IV included many microliths, almost all of which were probably derived from earlier deposits. Nevertheless there were a few of the large lunates (Fig. 14) not found in the Natufian which probably were part of the industry.

The first point to be made about the flint industries of layers IV, III and II is that their underlying features were the same. The raw material, core technique, and the principal types of tools, burins, scrapers, nibbled blades and the others were all similar. There were differences within the layers such as the trend towards larger tools, greater typological variation and the development of true blade tools in layers III and II but one would expect these in a long occupation sequence. Far more flint was found in layers III and II than in layer IV but this is because the excavated volume of these layers was much greater (Noy et al., 1973, fig. 2b). Layer IV had essentially the same flint industry so should be thought of as a similar cultural deposit to layers III and II rather than a phase intermediate between the Natufian and the two overlying layers.

The second point is that the chipped stone industry of layers IV, III and II at Nahal Oren was similar to the Proto-Neolithic/PPNA industry at

Jericho. The similarities extended through the techniques of tool preparation, the overall size of the tools and the principal tool types; they even included such distinctive innovations as the flaked axe/adzes and Khiamian points. There were some differences between these two industries, the most obvious one being raw material. The inhabitants of both sites used local sources of flint, deliberately selecting small chunks and wadi pebbles, yet the different colours, textures and striking properties of the material from Nahal Oren and Jericho are noticeable and give a slightly different look to each collection. The second difference was in the proportions of the main types of tool at each site. Burins and borers, for instance, appear to have been less common at Nahal Oren than at Jericho. Such differences may well be accounted for by the different situations of the two sites and the different activities practised on them. Variations in proportions of tools did not extend throughout the industries, however: scrapers and the ubiquitous nibbled blades seem to have been equally common and sickle blades equally rare at both sites. It is also doubtful if many microliths were used at either Nahal Oren or Jericho.

The third point is that the industry of layers IV, III, and II at Nahal Oren appears to have been a direct development of the Natufian industry on the same site in the same way as the Proto-Neolithic/PPNA industry at Jericho was derived from the Natufian there. The raw material used in the Natufian was the same local flint of small chunks and pebbles. This was prepared in the same basic way as in layers IV, III and II with small blades and flakes being struck off prismatic and pyramidal cores. The range of tools was small, consisting mainly of angle and multiple-blow burins and scrapers (Noy et al., 1973, fig. 6). The scrapers were usually made on flakes, steep scrapers being quite common; end-scrapers on blades were present but only in small quantities. Backed and other irregularly retouched blades were used as sickle blades although these were not very numerous. Microliths of which lunates were the most common type formed a major component of the industry.

Although the making of microliths seems to have diminished rapidly after the Natufian, large lunates were still being made in layers IV, III and II. Both the techniques of manufacture and the range of tools were common to this Natufian industry and that of the overlying layers. This strongly suggests that the later industry developed from the Natufian at Nahal Oren and that therefore, as at Jericho, there was no major replacement of population between the Natufian and the earliest Neolithic occupation.

The early Neolithic at Nahal Oren cannot be independently dated as there are no ^{14}C dates for this phase. The close typological similarity between the artifacts from Nahal Oren and Jericho in this phase suggests that they were contemporary and that Nahal Oren was therefore inhabited during the Proto-Neolithic/PPNA phase at Jericho.

Mugharet el Wad

There were indications of transient occupation contemporary with Nahal Oren IV to II nearby at Mugharet el Wad. A few arrowheads were found here in layer B1 (Garrod, Bate, 1937, 30), described as Upper Natufian. There is no doubt that the bulk of the material in this layer was derived from a Natufian settlement but in the presence of the arrowheads hints at a slightly later phase of occupation as well. Although two of the arrowheads were later Neolithic types at least one was a Khiamian point (Garrod, Bate, 1937, pl. VIII, 31) which at Jericho and Nahal Oren was associated with the earliest post-Natufian industry. The picks and axe or adze butt (Garrod, Bate, 1937, 32) were almost certainly post-Natufian also. Many of the other tools in layer B1 would not be out of place in such a context so it would appear probable that there was some transient use of Mugharet el Wad by human groups using the same tools as Nahal Oren IV to II and Jericho Proto-Neolithic/PPNA. Evidence was found in layer A of such temporary use of the site in succeeding stages of the Neolithic and later periods also (Garrod, Bate, 1937, 29).

Rakafet

This site in the hills east of Mugharet el Wad had been occupied in Mesolithic 2 and there is evidence now that it was also inhabited in Neolithic 1. Some Khiamian points have been found here in layers overlying the Mesolithic 2 deposits (Noy, n.d.).

El Khiam

Material comparable to the chipped stone industry at Jericho in the Proto-Neolithic/PPNA has been found at a fifth site in Palestine, El Khiam. This site lay on the west side of the Wadi Khareitun in the Judean Desert. In a limestone cliff above the wadi there was a series of shelters, now empty (Perrot, 1951, 134) but which may have been occupied in prehistory. In front of these a wide terrace sloped steeply down to the wadi floor. This terrace appears to have been a large open air site that was occupied in each cultural stage from the Aurignacian to the Neolithic. The site has been excavated twice, by Neuville in 1933 and Echegaray in 1962. Neuville dug two trenches, trench I in the centre of the terrace and trench II 20m further south. Echegaray placed his trench further up the slope behind Neuville's trench I (Echegaray, 1964, 19). Because the site inclined so steeply all the archaeological layers had suffered from heavy erosion and mixing so that little of the material excavated was recovered from its original position. Thus, although the occupation sequence at the site is fairly clear, the composition of the industries associated with each phase cannot be precisely determined.

Level B in the upper part of Neuville's sequence was divided into two subphases, B2 which was ascribed to the Natufian (Perrot, 1951, 155ff) and B1 called Upper Natufian by Perrot. It was in this layer, B1, that El Khiam points were found for the first time (Fig. 15a), the type-fossil of the Proto-Neolithic/PPNA at Jericho and layers IV to II at Nahal Oren. The presence of this type and certain other differences distinguished level B1

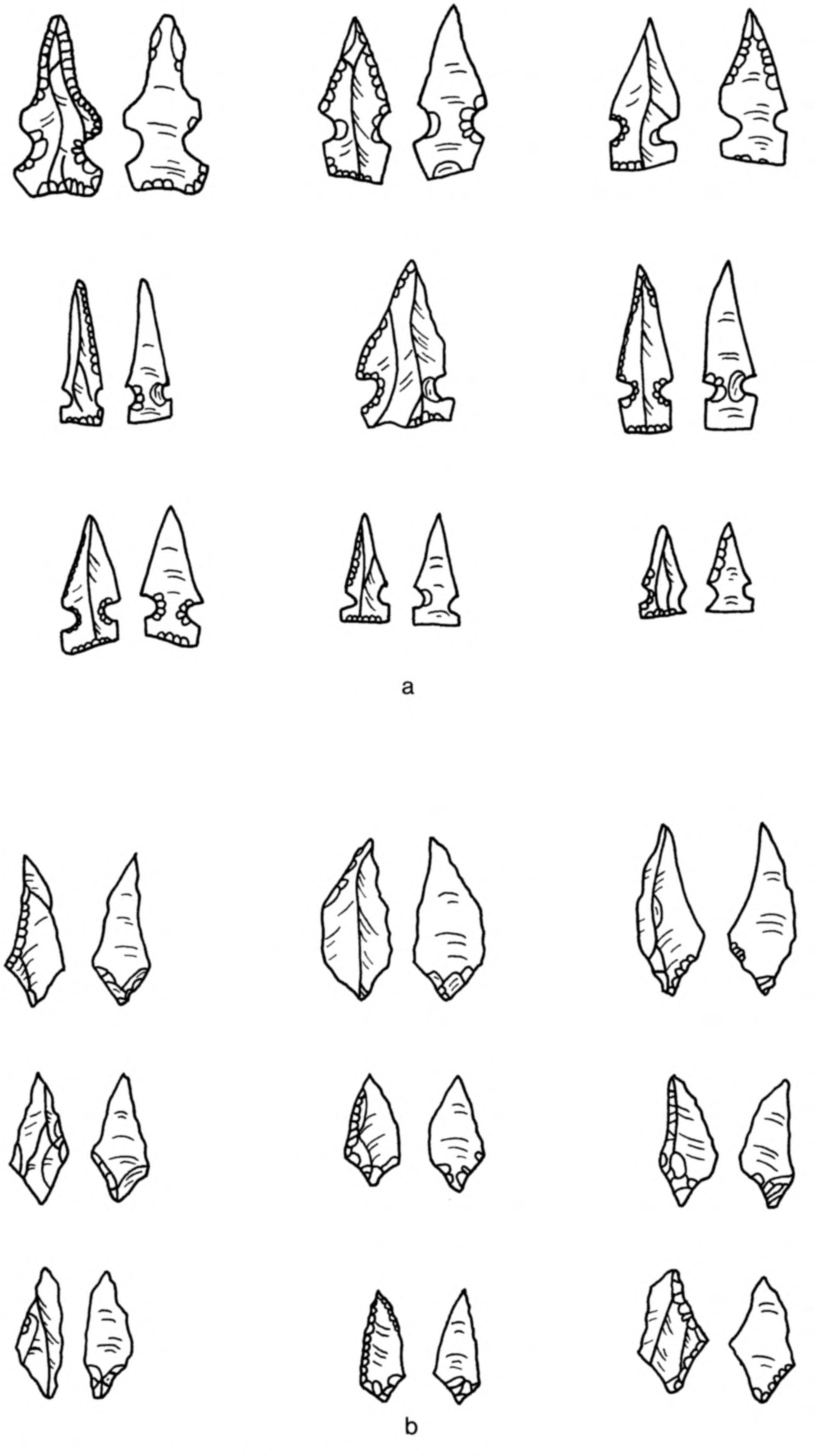

Fig. 15 a – El Khiam points (after Perrot)
b – Harif points (after Marks)

from the Natufian B2 and also from levels A3 and A2 above. The industry in the latter layers had much in common with PPNB levels at Jericho and levels 6 to 3 at Munhatta.

If one compares the stratigraphy and typology of the assemblages in these levels with Echegaray's more detailed sequence then Neuville's B2 is the same as levels 7 (Kebaran II) and 6 (Kebaran III). Levels 8 (Kebaran I) and 5 (Khiamian I) also had a number of lunates and other microliths which suggest that they were principally composed of Natufian remains. True El Khiam points did not occur until level 4 (Khiamian II) in Echegaray's sequence (1966, 49ff) although certain heavy tools such as stone axes which might more properly belong with this industry were found in level 5 (Echegaray, 1966, 47); each level contained material derived from other phases as is only to be expected in a site where much soil movement had taken place. Levels 4 and 3 (Prototahunian) appear to correspond to Neuville's B1 and levels 2 (Prototahunian) and 1 (Tahunian) to Neuville's A, 1 to 3.

The assemblage in levels 4 and 3 included a number of burins and scrapers as well as many retouched blades, rather more than Neuville found apparently (Perrot, 1951, 165). These discrepancies can partly be explained by the idiosyncratic typing practised by Echegaray.

There were also lunates, backed and truncated bladelets, microburins and in level 3 a few tanged arrowheads with squamous retouch and some large blades, most of which were probably intrusive from other layers; Neuville's B1 contained the same admixture. This makes it particularly difficult to determine the principal characteristics of the industry in these levels so that one can do no more than point to a general similarity with the industries in Proto-Neolithic/PPNA Jericho and Nahal Oren IV to II. This similarity extended to the use of pestles, other grinders, mortars, stone bowls, all of which occurred in level 4 (Echegaray, 1966, 60) and which were abundant in Neuville's trenches (Perrot, 1951, 136); there was also a clay anthropomorphic figurine from this level. Bone tools do not appear to have been recovered in either excavation.

Gilgal

Another Neolithic 1 site in the Jordan valley has recently been discovered and partly excavated. This is Gilgal situated 20km north of Jericho. A dozen elliptical huts were identified here, one of which has been dug (Noy, 1976a), 48). The flints in and around the excavated hut included burins, borers and scrapers as well as Khiamian points and notched arrowheads. Some bone tools were also found. Among the coarser artifacts were basalt tools and some polished limestone axes like those from Jericho.

Poleg 18M

Another site which may have been occupied at this time is Poleg 18M. The surface material from this site had Mesolithic 2 affinities but there were at least two points with side notches and basal retouch (Burian, Friedmann, 1963-64, 11) which on stratified sites have been found in early post-Mesolithic 2 contexts. Some of the other tools such as the burins, scrapers and sickle blades could equally well have occurred on an early Neolithic site. It is possible, therefore, that this site was occupied briefly in Neolithic 1.

All these sites in Palestine had occupation deposits with a similar flint industry and other artifacts. Where buildings were preserved these, too, were found to be of a similar type. On the stratified sites, Jericho, Nahal Oren and El Khiam, these were also the earliest post-Mesolithic 2 remains. It is for these reasons that I believe all these sites belong within the first stage of the Neolithic in the Levant, Neolithic 1.

Beidha

The discovery at Beidha of Neolithic occupation layers stratified between Mesolithic 2 remains and the 7th millennium B.C. village of stone-built houses raises the possibility that the site was occupied contemporaneously with PPNA Jericho and Nahal Oren layers IV - II by people with similar material culture. The earliest occupation at Beidha discovered so far consisted of a settlement with an associated Mesolithic 2 flint industry designated as layer X (Mortensen, 1970a, 4). Soundings made in the first two seasons on the eroded steep western slope of the site revealed 0.5 to 0.75m depth of sandy deposit with a hearth, stone slabs, a stone-lined pit and many animal bones (Kirkbride, 1960b, 141). In later work more Mesolithic 2 occupation was found in squares L4 and M4 on the southern side of the site under House XVIII of layer VI; this consisted of part of a structure of mud-bricks and plaster (Kirkbride, 1967, 10). Towards the centre of the site in a sounding beside House XXXVII there was more Mesolithic 2 occupation with a wall 1m high built of the same sandy irregular mud-bricks on a curved stone foundation. These and other soundings established that the Mesolithic 2 occupation was up to 2.5m deep and extended under the southern half of the Neolithic village (Kirkbride, 1967, 12).

This Mesolithic 2 settlement was overlain by between 2 and 3m of virtually sterile windblown sand (Kirkbride, 1960b, 141; 1966, 47), except in squares L4 and M4 where House XVIII was built directly on top of the Mesolithic 2 layers. The sand was not sterile everywhere: in another sounding in the centre of the site a stone was found which had been deliberately set upright with clay and pebbles (Kirkbride, 1968, 92). Apart from this slight trace of human activity the site appears to have been deserted while the sand accumulated (Kirkbride, 1967, 12).

Above this thick layer of sand lay several levels of occupation, Levels IX - VII (Mortensen, 1970a, 4), with no trace of substantial structures. These levels consisted of a sandy deposit with layers of human occupation within it and some associated features. A deposit of this nature was found in squares H4 and H5 near the middle of the site (Kirkbride, 1967, 5ff); this was Level VIII. There was a similar deposit with a small hearth in squares E4, E5 and E6 beneath the houses of the later village. In the same squares two large floors were found side by side on top of the sandy occupation layers. These floors, described as level VII, were made of a mixture of sand and calcareous clay resembling plaster; one of them had three post-holes in it. Many more of these firm floors were found during the last season's digging in squares G4, H4 and J4 in the middle of the site (Kirkbride, 1968, 92) stratified beneath Level VI and so presumably ascribed to levels IX, VIII and VII. Post-holes, some with stone packing, were associated with some of these floors. There were also many hearths hollowed out in the floors, one of which was surrounded by clay lumps. Traces of two squared timber beams were noted in one layer and the outline of a large wooden platter or basket in another. Apart from these finds the floors were fairly clean so that few artifacts or animal bones were recovered. These floors were stratified directly beneath a series of courtyards belonging to the later village which were also quite clean. As no break in the occupation sequence is suspected and as there was some continuity of internal settlement arrangements at Beidha it may be that these floors were also open yards and that houses built of wood and clay, if not stone, lay beyond them in the unexcavated areas. These surfaces seem to have represented living floors in which some domestic activities were carried out and where several slight wooden structures were built. Because they were regularly replaced the site must have been repeatedly occupied, either continuously or on a seasonal basis. None of the artifacts from these levels at Beidha has been published so that it is not possible yet to say whether the flint industry was like that of Neolithic 1 sites in Palestine or not. All we do know is that there were very few artifacts in Levels IX - VII, that the flint industry was Neolithic in aspect (Kirkbride, 1967, 6) and that there was no break in the tradition of flint working between Levels IX - VII and the later levels (Mortensen, 1970a, 13).

The flint industry from Levels VI - I at Beidha has been described as resembling the PPNB industry at Jericho and elsewhere (Mortensen, 1970a, 51), although there were in fact some significant differences between them. Two of the arrowhead types, A1 and A2, found in these layers had a distinctly archaic look. They both had a pair of side notches and a straight snapped or rounded retouched base (Mortensen, 1970a, 22). Type A1 was almost a Khiamian point (especially Mortensen, 1970a, fig. 12, c) which could be paralleled at Jericho in the PPNA and in the contemporary levels at El Khiam while type A2 was found in both the Proto-Neolithic and PPNA at Jericho (Kirkbride, 1960a, pl. XIII A: O,P,R,S). As these types are characteristic of an earlier phase when they are found stratified on other sites their presence, even in small quantities, in Levels VI to I at Beidha merits comment. Either they were definitely contemporary with the rest of the material in the layers in which they were found and so late examples of a type which had ceased to be made elsewhere or they were secondary. Mortensen has pointed out (1970a, 46) that the lower levels of the site were disturbed by later building and that material from these levels was consequently found higher up. It is possible, therefore, that these arrowheads and no doubt some of the other material in levels VI - I such as the burins and scrapers were derived from an earlier assemblage in levels IX - VII that had some of the characteristics, at least, of the PPNA at Jericho.

No ^{14}C determinations have been made on material from levels IX - VII but there are no less than seven dates now for level VI. These have a wide range from 6990 ± 160 B.C. K-1086 to 6596 ± 100 B.C. P-1379 (Mortensen, 1970a, 13), making it difficult to estimate when the first occupation in this layer took place; all the determinations for the later layers except one fall within the same time range and the exception, P-1380 from level IV, is in fact earlier. From these determinations one might suggest with due caution that level VI began about 7000 B.C. which would mean that the occupation represented by layers IX - VII took place in the later 8th millennium B.C. This would make these levels contemporary with the PPNA at Jericho. Thus from levels IX to VII we have evidence of an 8th millennium settlement occupied regularly over many years; it also seems likely that the associated material culture had some elements in common with Neolithic 1 at Jericho and Nahal Oren. Apart from the indications of floors, hearths and some wooden structures the true nature and extent of this settlement have not yet been established because of the limited area of the soundings from which the evidence was derived.

Harifian sites

All the sites discussed so far with the exception of Beidha were situated in central Palestine, but another group of sites with a post-Mesolithic 2 industry has recently been found in the Negev and northern Sinai. The type-site is Abu Salem (G12) on the Har Harif plateau and there are two other sites, G8 and K3, with similar remains less than 2 km away (Marks et al., 1972, 81ff). The Har Harif plateau is the highest area in the Negev and these sites are all at an elevation of nearly 1000 m.

G8, which was about 3000 sq m in area had been almost entirely deflated. K3 had a thin scatter of artifacts extending over 8000 sq m but it is believed that this was the result of considerable surface movement of material since the site was abandoned and that originally the occupied area would have been much smaller. This site had a number of bedrock mortars. Artifacts at Abu Salem were spread over 2500 sq m but it is believed that this was again partly due to natural slope wash and that occupation was confined to 1600 sq m of the present site. Abu Salem had some occupation deposit in situ, 234 sq m of which has been excavated (Marks, Scott, 1976, 47).

The site consisted of a series of circular and oval stone-walled structures, the larger ones being from 3 to 4 m and the smaller from 1 to 2 m in diameter. The larger structures were presumably dwellings but the smaller ones probably served another purpose. Stone grinders were found in the excavation as well as slabs with cup-marks in them, several of which were stained with ochre. There were also nine bone points, dentalium and a variety of other marine shells from the Mediterranean and Red Sea. In contrast with this sparse inventory of artifacts the chipped stone industry was exceptionally abundant (Marks, Scott, 1976, 50). The raw material was principally a very fine-grained, translucent flint much used on Mesolithic 2 sites in the area, although some of the larger tools were made on medium and coarse-grained opaque flint. The industry was microlithic with tools being made on small flakes and blades struck from prismatic and pyramidal cores. Microliths comprised 40% of the flint artifacts. Many of these were lunates with abrupt backing, the remainder being triangles and trapezes. The type-fossil of the industry was the Harif point which comprised 8.4% of the tools. Harif points (Marks, 1973, 97ff) are diamond-shaped obliquely truncated blades with a stemmed base (Fig. 15b). The base is often prepared by the microburin technique and microburins are a common by-product of the Abu Salem industry. Harif points are very varied in shape and finish but all are quite small, usually between 1.75 cm and 3 cm in length, and so may be counted as microliths. The function of Harif points is uncertain but it may be that they were used to arm arrows as Khiamian points are presumed to have been. The other main classes of tools at Abu Salem were scrapers (10.7%), usually end-scrapers on flakes, notched (12.2%) and truncated (8.4%) pieces, a wide variety of small backed blades (20.8%), notched pieces (12.2%) and a few nibbled pieces. Burins (0.7%) and sickle blades (0.2%) were very rare.

Three samples from Abu Salem have now been dated, all from rubbish pits excavated in the settlement. One from a depth of 15 to 20 cm has given a date of 8020 ± 150 B.C. I-5498 and another from 25 to 30 cm 8280 ± 150 B.C. I-5499: a third sample from 50 to 55 cm in depth has the same laboratory number and has been given the same date (Marks, Scott, 1976, 47). These determinations are mutually consistent and indicate that the site was occupied towards the end of the 9th millennium, perhaps between 8300 and 8000 B.C.

Several more Harifian sites have been found in recent surveys north of the Har Harif and in Sinai. One site is NL 110 near Nahal Lavan (Bar-Yosef et al., 1974, 10ff) in the southern part of the Halutza sand dunes. Harif points made up 54% of the total number of tools at this site and microburins were quite common. Some related flints have been found at another site in Nahal Lavan, Nahal Lavan 108, north-west of NL 110. These were triangles with straight or concave retouched bases and side notches (Noy, n.d., pl. 5)

They would appear to be variants of Khiamian points so the site may have been contemporary with Harifian sites in the same area.

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A few Harif points have been found on three other sites in the Halutza dunes (Bar-Yosef *et al*., 1974, 78). One of these, *site 87*, which is at the northern end of the dunes near Nahal Besor (Burian, Friedmann, 1973, figs. 1, 2) also had material from a later phase of the Neolithic. A fourth site with Harif points in this district has recently been reported, *Halutza dunes 4* (Noy, n.d.).

Two more Harifian sites have been discovered in the Jebel Meghara in northern Sinai (Phillips *et al*., n.d., 9), one, *site LIV*, in the Wadi el Masagid and another, *M III*, in the Wadi el Moshabi. The material from L IV and M III was collected carefully so that it would be a representative sample of the assemblages at these sites; it can therefore be compared directly with the material from Abu Salem. The assemblages from L IV and M III included a number of Harif points and plentiful evidence of the use of the microburin technique; truncated pieces were also very common although burins were rare. These features are characteristic of the flint industry at Abu Salem but the collections from L IV and M III differed from Abu Salem in other respects. Lunates and other geometrics, backed pieces and end-scrapers were all rare at L IV and M III in contrast with Abu Salem. It would thus appear that there is considerable variability in the flint assemblages from one Harifian site to another.

The structures and chipped stone industry at Abu Salem and other Harifian sites had much in common with Mesolithic 2 in the Negev at sites such as Rosh Zin and Rosh Horesha. The sub-circular structures at Abu Salem and the bedrock mortars at site K3 were very like those at Rosh Zin (Henry, 1973a, 206). The Harifian and Negev Mesolithic 2 flint industries were based on the production of small tools from prismatic and pyramidal cores. In both microliths, particularly lunates, usually predominated and microburins were a common by-product. Of the other tool types end-scrapers on flakes and notched pieces were often numerous in both industries. These similarities are sufficiently comprehensive to suggest that the Harifian was derived from Mesolithic 2 in the Negev although there are quite significant differences between the artifacts of these two complexes. Burins, for instance, were rare at Abu Salem, L IV and M III, though common at Rosh Zin and Rosh Horesha, and the Harif point was of course an innovation found in quantity only on Harifian sites. One Harif point was found at Rosh Horesha which, taken together with other traits in the industry and the ^{14}C dates from there, suggests that this site may have been occupied towards the end of Mesolithic 2 in the Negev.

The Harifian complex also has some features in common with Neolithic 1 at Jericho and Nahal Oren. The structures at Abu Salem for instance resembled those at Nahal Oren. The flint industries shared the same core technique and small size of tools while scrapers and retouched blades were major tool types common to both. Sickle blades were rare in both industries. The Harif point may be taken to be the Harifian equivalent of the Khiamian point although it was much more numerous on Harifian sites than Khiamian points seem to have been further north. Harif points are known to occur in quantity only on sites in the Negev and Sinai but they have been found in small numbers elsewhere. They occurred at El Khiam (Perrot, 1952; fig. 2, 21), in a variant form and in a later context at Beidha as arrowhead type A8 (Mortensen, 1970a, 23), and even at Mureybat in phase IB (Cauvin, 1974b, n. 23). The type is so variable in morphology that it can resemble artifacts classed as tanged points elsewhere so these occurrences need not be very significant. They do lend a little weight, however, to the argument outlined above for equivalence between the Harifian and Neolithic 1 industries in Palestine.

Although the resemblances between the Harifian and the Proto-Neolithic/PPNA include structures, flint tool production and even certain tool type proportions, there are still differences between the flint industries. The Harifian had far more microliths, particularly lunates and microburins, than the northern sites while borers and flaked axes appear to be absent; one also notes that obsidian is not found on Harifian sites, although this may be simply due to the greater distance of the sites from the Anatolian sources and the fact that obsidian exchange was only just beginning.

The Harifian and Neolithic 1 in Palestine appear to have been contemporaneous and the distribution of sites of each group is mutually exclusive. They both developed from Mesolithic 2 in their respective areas and had many cultural features in common. This suggests that they are both variations of the same cultural complex, that is the first post-Mesolithic 2 culture in the southern Levant. The similarities in the material remains of the two groups would also indicate that their inhabitants were living in much the same way. We may thus include Harifian sites within Neolithic 1 of the Levant.

Nacharini

Few sites with occupation immediately post-dating the Mesolithic have yet been found in the Levant north of Palestine. Only one is known in Lebanon, Nacharini, a cave site in the Anti-Lebanon Mountains north-east of Baalbek. This site lies high on the side of a small valley at an elevation of about 2000m. Its position today is remote from any settlement but it lies near one of the tracks across the mountains from Baalbek to Yabrud. The area around the site is snow-covered during the winter rendering the site uninhabitable at this season.

Nacharini is being excavated by H.B. Schroeder who has dug one sounding to bedrock through the deposit in the cave. The sequence of occupation extended from the Palaeolithic to the aceramic Neolithic and it appears that the site was used intermittently throughout this long period. There was one Mesolithic 2 level which had a rich chipped stone assemblage indicating quite intensive occupation. The assemblage included many microliths of which lunates were the dominant type. There was one other tool type which was quite distinctive although of unknown function, a short blade segment retouched at both ends frequently with a concave truncation. This type was very numerous at Nacharini but was unknown at other contemporary sites.

Immediately above this layer was another with an industry of small tools of somewhat similar characteristics. There were fewer microliths now but still many of the distinctive truncated bladelets. An innovation was a point on a thin blade; this had a pair of side notches and a straight or concave truncated base. These notched points were like Khiamian points, the only difference being that the Nacharini examples were usually longer and narrower than the Palestinian type.

This assemblage at Nacharini cannot be matched exactly anywhere else and one suspects that its unique, specialised nature has much to do with the unusual position of the site. Nevertheless there are several observations that can be made about the material which allow us to place it in the Levantine sequence. In the first place, it succeeded a Mesolithic 2 industry which in all probability was itself broadly contemporary with the Natufian in Palestine and Mesolithic 2 at Abu Hureyra and Mureybat in northern Syria. Secondly, this assemblage was clearly derived from and owed much to its Mesolithic 2 predecessor so there is a strong indication here of cultural continuity. This assemblage would thus appear to be the first post-Mesolithic 2 complex in Lebanon and although it has certain unique features there are parallels for it in Palestine. We have noted there the continued use of microliths, principally lunates, in diminished numbers in the post-Mesolithic 2 industries as at Nacharini while the correspondence between the Nacharini notched point and Khiamian points is so close that it is reasonable to suppose that the Nacharini type was the equivalent of the latter at least in the Anti-Lebanon. It is very probable, therefore that the Nacharini assemblage was contemporary with Neolithic 1 in Palestine even if for the moment we have no ^{14}C determinations from the site to support this conclusion.

Mureybat

Mureybat is the only site known in Syria where occupation continued without interruption after the Mesolithic. The site is situated on the left bank of the Euphrates near a present-day ford and ferry crossing. It lies on a consolidated gravel terrace which is itself superimposed on an outcrop of soft limestone. The site faces west across the Euphrates flood-plain which is about 2.5 km wide at this point. The river flows at its foot while behind to the east the land gradually rises to the Jezireh plateau. The site today forms an elongated oval platform along the bank of the river and rises about 4 m above the level of the fields behind. The core of the site is a small circular mound 6 m high which lies on top of this platform. The total area of the site is a little over 3 ha but this was never fully occupied in any phase of the settlement's existence. The earlier phases of settlement were concentrated in the area of the central mound which extends over 4300 sq m.

Mureybat was first excavated by M. van Loon who in 1964 and 1965 dug trenches in the western slope of the central mound and also made several soundings elsewhere on the platform. The work was continued by J. Cauvin from 1971 to 1974. He excavated several more trenches a little to the south of van Loon's area and one other sounding on the east slope of the central mound. These excavations have shown that the focus of occupation altered during the life of the settlement but as most of van Loon's and Cauvin's trenches were placed quite close together we do not have a clear idea of the extent of each phase of occupation. The full sequence of occupation on the site has, however, now been determined. The earliest phase of settlement was found by Cauvin and designated phase I (Cauvin, 1972, 107). This has since been subdivided into a primary phase of Mesolithic occupation, phase IA, and a post-Mesolithic deposit, phase IB. Phase IA appears to have been confined to a small part of the western slope of the central mound, covering no more than 100 or 200 sq m, and the settlement was apparently not much larger in phase IB. The phase II settlement was more extensive, covering much if not all of the central mound; this phase is equivalent to strata I to IX in van Loon's excavation (van Loon, 1968, 267ff). Phase III, van Loon's strata X to XVII, likewise extended over much of the central mound. The deposits of phases IB to III are the remains of the early post-Mesolithic settlement with which the excavations at Mureybat have been principally concerned. The site continued to be occupied throughout the earlier Neolithic, apparently, and material like the aceramic Neolithic at Abu Hureyra and Buqras levels I and II was found in both campaigns of excavations; the ^{14}C dates for these levels at Buqras indicate that this phase, designated phase IV by Cauvin, dates from the 7th millennium B.C.

The earliest buildings at Mureybat were found in phase IB. These were circular structures with walls made of vertical wooden posts set close together (Cauvin, 1972, 107ff). The lower 50cm of the walls were made weatherproof on the inside with a clay facing 10cm thick which were the only parts of the structures that survived. Several floor surfaces were also found and hearths with horseshoe-shaped clay surrounds. Fire-pits or roasting pits filled with burned pebbles, ash and charcoal were associated with the floors and were a feature of each phase of occupation at Mureybat from phase IA to phase III.

The chipped stone assemblage from this phase had much in common with phase IA. Now and throughout the sequence most tools were made on small blades and flakes struck from prismatic cores. Microliths comprised 7 to 20% of the retouched tools in these levels. Many of these were lunates with a few triangles and trapezes. Microborers were also very common while a few backed bladelets made up the rest of the microlithic component. Among the larger tools were borers and drills with a few end-scrapers, burins, denticulates and occasional sickle-blades. There were two new tool types in the assemblage, a concave-based arrowhead with side notches resembling a Khiamian point and a heavy flaked adze (Fig. 16). The latter was probably used for shaping timber and is a characteristic tool at Mureybat in subsequent phases. The remaining artifacts consisted of quite abundant bone points and a few cylindrical bone beads.

In phase II circular structures continued to be built but these were somewhat different from those in phase IA. These were now usually made of mud and stone and much less timber was used in their construction. Most of the structures were about 4 m in diameter but some were as small as 2.7 m across. Their floors were usually made of slabs of limestone set in mud and sometimes levelled with gravel (van Loon, 1968, 267). The walls similarly were composed of stones set in mud although a few were made of mud alone (Cauvin, 1972, 108), presumably with some support of reeds or wood. Querns and grinding stones were frequently incorporated in the floors and walls. Although little more than the floors of these structures survived, their size and frequency suggest that they were dwelling huts. Outside these buildings were circular fire-pits about 80 cm in diameter lined with clay. They were full of ash, charcoal and burned pebbles. These may have been roasting pits for meat or parching seeds. After they went out of use they were frequently filled up with domestic debris.

The chipped stone industry of this phase was significantly different from phase I but the tools were still small. Microliths were still very common but these consisted almost entirely of microborers as lunates and other geometric microliths were no longer used. Of the larger tools drills were also numerous but end-scrapers, burins and sickle blades were still uncommon. Arrowheads were now much more abundant. Many of these were like

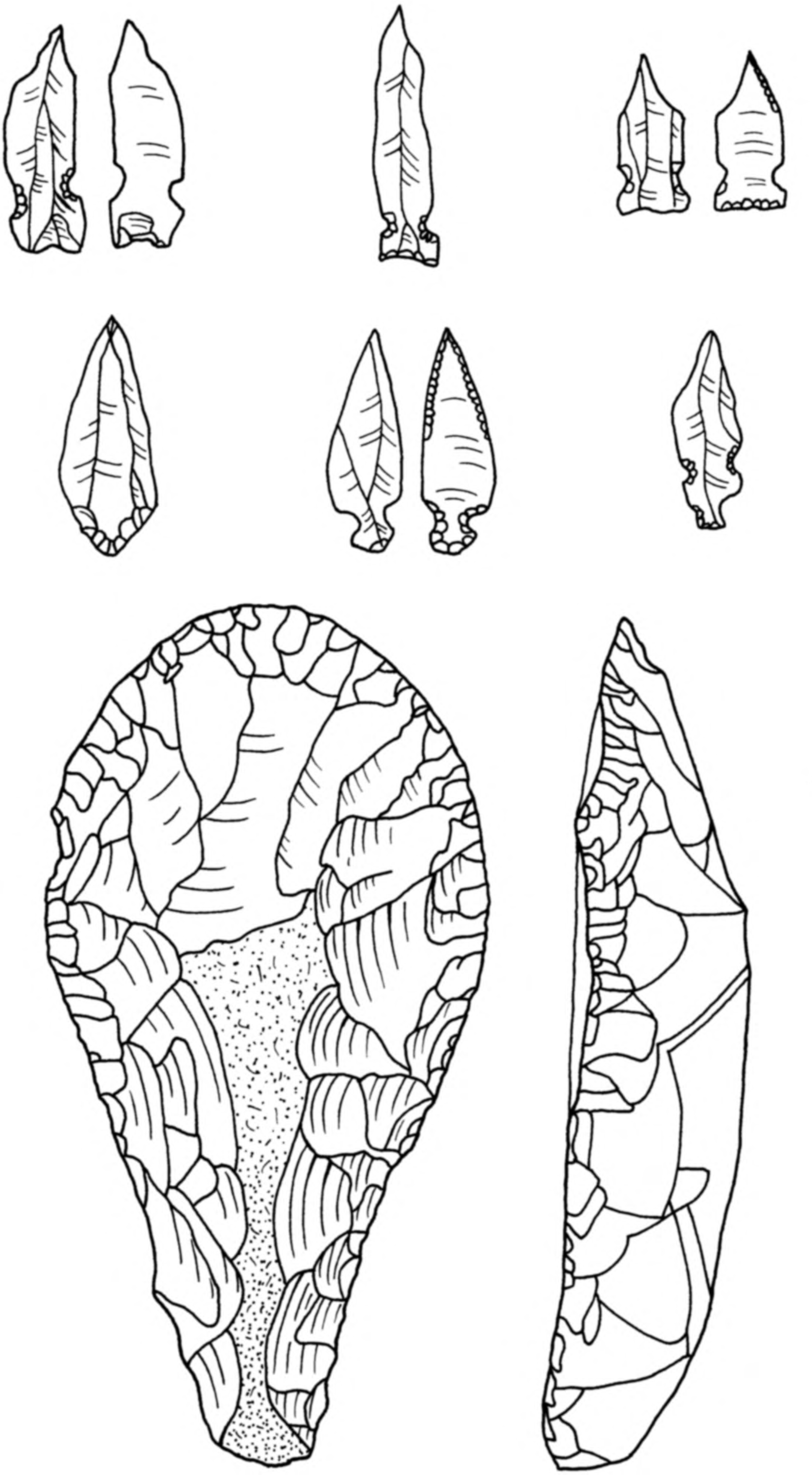


Fig. 16 Mureybat IB-III - flint arrowheads and adze (after Cauvin)

Khiamian points (van Loon, 1968, pl. IX, g-k) but there was much variety in the arrangement of the notches. A few now had a stem. Obsidian was found in small quantities for the first time in this phase.

The inventory of other finds was a little more abundant and varied in this phase than earlier. Bone tools such as borers and needles were particularly numerous and a group of these was found on the floor of Structure 1 (van Loon, 1968, 268, pl. XIVB). Cauvin has also found elaborate combs and spatulae with serrated ends (1972, figs. 3, 5).

Heavy stone tools were another innovation in these layers though querns, grinders, pestles and mortars are known from the Mesolithic levels at Abu Hureyra. The querns were oval or rectangular in shape and hollowed out in the centre (van Loon, 1968, pl. XIA). Spherical stones appear to have been used as grinders with the querns. Pestles and mortars were also quite common. One or two anthropomorphic stone figurines were also found in these levels.

The plans of the buildings changed markedly in phase III. Some were still circular but others were now rectilinear and composed of several rooms. The circular structures were larger than before, 10 m in diameter in one instance (J. Cauvin, 1974a, 46) and one at least had several compartments within it. The walls of these buildings, like the rectilinear ones, were now built with rows of dressed stones held together with mud. Posts and split logs (van Loon, 1968, 273) were used to strengthen the walls. One wall was decorated with several rows of painted black chevrons on a white background (Cauvin, 1972, 110). The floors were frequently paved with stones as in phase II. The structures were filled with much burned clay which retained impressions of the timber and straw used in the upper part of the walls and roofs. These circular buildings were found in Cauvin's excavations while van Loon found only rectilinear ones (1968, 269ff). His structures were built in the same way as the circular ones. The chambers in each building were frequently no more than 1.5 m in width. None of these chambers had a doorway at floor level so they must have been entered from porthole doors higher in the walls or from above. Within these chambers were traces of separate compartments, possibly storage bins, and hearths.

These buildings are complex in arrangement and consequently difficult to interpret, a difficulty compounded by their poor preservation. The circular structures are commodious enough to have served as houses and their internal compartments may have fulfilled a domestic function. Most of the rectilinear buildings as they survive now seem far too cramped inside for anything more than storage. It is possible, of course, that the small chambers in these buildings were in fact basement storage rooms in two-storeyed structures and that domestic activities were carried out on the first floor. There is a parallel for this arrangement at Ganj Dareh in Iran. Here rectilinear two-storeyed buildings built in this same way with walls as thin as those at Mureybat have survived remarkably intact (P.E.L. Smith, 1972, 166) and Smith has told me that he now believes the basement rooms may have served as storage chambers for the houses above. There is a marked resemblance between the two groups of buildings but it will not be possible to state with certainty what the function of the Mureybat buildings was until we know more about their precise contents.

The earliest occurrence of human burials within the settlement at Mureybat was in phase III. The inhabitants of the settlement in earlier phases may have buried their dead within the settlement but outside the area of excavation. Nevertheless the absence of burials in the Mesolithic deposit at Abu Hureyra strengthens the impression one has that in northern Syria bodies were disposed of away from the settlement in earlier periods in contrast with the Natufian in Palestine. When burial within the settlement was introduced in phase III at Mureybat it had many similarities with the custom at Jericho in the PPNA. Skulls were detached and buried in groups separated from the corpses to which they belonged (van Loon, 1968, 275). In another instance a skull and several long bones were buried together without the rest of the skeleton (Cauvin, 1972, 110); this was a form of secondary burial that was a regular practice in a later context in the aceramic Neolithic at Abu Hureyra.

The flint industry was modified still further in phase III though it was still in the same tradition as that of phases I and II. Apart from a few microborers microliths had almost disappeared. In their place the larger tools, end-scrapers, side-scrapers and burins increased substantially in number and even sickle blades were more abundant. Arrowheads were also much more common and larger too (M.-C. Cauvin, 1974b, n. 12). Many of these now had a true tang for hafting as well as side notches although there was still much variety of shape; Khiamian points, however, had all but disappeared (M.-C. Cauvin, 1974b, 314). A few of these arrowheads were retouched with squamous flaking for the first time but spare abrupt retouch remained the usual technique. Obsidian was now arriving on the site in increasing quantity.

Bone tools were still fairly abundant; the most common ones were borers as before, the remainder being flat spatulae and beads. None of the elaborate combs has been found in these levels but even in phase II they were a rare find and so perhaps not typical.

Among other finds were finely made stone dishes and bowls, one of which had a wavy band carved in relief on the rim (van Loon, 1968, 273). Querns, grinders and other heavy stone tools were very common. Then there were a few other pieces of elaborately carved stone, one of which was complete; this has been interpreted as an anthropomorphic figure (Cauvin, 1972, fig. 6) but it would appear to be more like an owl or other bird of prey.

Baked clay was used in a variety of ways for the first time in this phase. Many of the pieces were shapes of uncertain design but a few were quite carefully modelled standing female figures (J. Cauvin, 1974a, 46, 50) with large buttocks and hands supporting the breasts. Among the more remarkable objects found were five small baked clay vessels (J. Cauvin, 1974b, 200). These were little cups, bowls and dishes from 4 to 7cm in diameter. Such finds indicate that the inhabitants were now accustomed to making a variety of objects in baked clay but that the substance was not yet employed for utilitarian objects in everyday use.

More ^{14}C determinations have been obtained from Mureybat than any other Neolithic 1 site in the Levant but since the most recent dates conflict with those obtained some years ago the procise chronology of each phase is by no means certain. I discussed some of these determinations in Chapter 2 and suggested that the transition from phase IA to IB may have taken place about 8500 B.C. The duration of phase IB can only be guessed at for the moment since the single determination from this phase, Lv-607, cannot be reconciled with dates obtained for phase IA. My estimate would be that it lasted perhaps 200 years and that phase II thus began about 8300 B.C. Phase II is no better dated than phase I since two of the Louvain determinations for this phase, 8640 ± 170 B.C. Lv-605 and 8510 ± 200 B.C. Lv-606, are several centuries earlier than the three obtained by the Philadelphia laboratory, 8265 ± 117 B.C. P-1217, 8142 ± 118 B.C. P-1216 and 8056 ± 96 B.C. P-1215. One other Louvain determination for this phase should be mentioned, 7780 ± 140 B.C. Lv-604, the sample for which came from near the surface and is believed to have been contaminated by more recent humic matter (Gilot, Cauvin, 1973, 38). The Philadelphia dates agree better with the more recent series of Monaco determinations for phases I and III and so may give a more reliable indication of the duration of phase II. From them I would estimate that phase II was concluded about 8000 B.C. or possibly a little before.

Phase III is dated by three Philadelphia determinations from the first series of excavations and eight from the Monaco laboratory which have not yet been fully published. These two series are reasonably consistent so that the chronology of this phase appears for the moment to be better established than that of phases I and II. The Philadelphia determinations are: 8018 ± 115 B.C. P-1220 (levels X-XI), 7542 ± 122 B.C. P-1224 (level XVI) and 7954 ± 114 B.C. P-1222 (levels XVI-XVII) (Radiocarbon 11, 1969, 152). The earliest of the Monaco dates is 8000 ± 150 B.C. Mc-734 and the latest 7570 ± 150 B.C. Mc-612 (J. Cauvin, 1974b, 200) while the others fall in between. Phase III thus appears to have lasted from about 8000 to 7500 B.C.

Circular mud buildings were constructed in phase IB for the first time so commencing a tradition that lasted a thousand years at Mureybat. The earliest modifications to the Mesolithic tool kit also occurred in phase IB with the introduction of notched points and flaked adzes. This major building innovation and slight but significant development in the flint industry were the first stage of a gradual but ultimately thorough cultural change. As this change began in IB it seems reasonable to take this phase as the transition between Mesolithic and Neolithic. The choice is somewhat arbitrary, however, not least because in the flint industry lunates still predominated and microliths as a group did not disappear until phase III.

The development of the flint industry illustrates well how slow but far-reaching this cultural change was. First there was the change in the microlithic component dominated by lunates at the beginning and then by microborers. This would seem to indicate that some major change in activities within the settlement was taking place although the flint technology had not altered much at this stage. Then the microliths were phased out and the tools became much larger. At the same time there was a change in the core technique as double-ended cores were now used to produce blades. Some were even the keeled ("naviforme") cores more usually associated with 7th millennium and later industries but a few of these may in fact have belonged with the phase III assemblage rather than have been intrusive from phase IV. Changes in the typology of the flint tools accompanied these technological developments. The arrowheads are the best example of this: they were introduced in small quantities in phase IB but eventually formed as much as 25% of the retouched tools in certain levels in phase III (Cauvin, 1972, 110). Their typology also changed markedly throughout this long period (M.-C. Cauvin, 1974b, 314).

These changes in the Mureybat flint industry were the result of a local gradual development and throughout there was an uninterrupted continuity of culture. Mureybat is the only site known in the Levant at present where a microlithic flint industry was slowly modified until it became a blade-based industry typical of the developed Neolithic and where no break in the complete sequence is suspected. Such a gradual development of the flint industry indicates that the population remained the same, that the Neolithic inhabitants were the descendants of their Mesolithic predecessors. The increasing richness and variety of the remainder of the artifact inventory through the phases also suggests that the inhabitants were becoming more sedentary.

Tell Aswad

One other site with deposits dating from the 8th millennium B.C. has recently been excavated in Syria. This is Tell Aswad which lies in the Damascus basin about 25 km south-east of the city and about half way between the present Hijjane and Ataibe lakes. In this region the floor of the basin is almost flat with the exception of some low hills a few metres high. Tell Aswad is situated on one of these which originally stood about 2 m above the level of the plain. Until quite recently Tell Aswad lay in a marshy area only a few kilometres from the edge of the lakes. The marshes and lakes would have been even more extensive in the Neolithic then they were earlier this century.

The site is almost circular and very extensive, covering about 5.41 ha, although the occupation deposits are only from 2 to 3m deep. The site was sounded by H. de Contenson in 1971 and 1972. He excavated two trenches, Aswad East and Aswad West, each 4 m square and spaced wide apart in the southern sector of the site. The deposits consisted of dark, ashy layers with traces of burned vegetable matter and charcoal into which had been dug many pits (de Contenson, 1972, 76). These were of various sizes up to 2 m in diameter. Some were pit hearths full of burned material, others were rubbish pits but none was large enough for a dwelling. A few of these had a rim of plano-convex mud-bricks some of which were baked. A platform of bricks was found in the East trench but apart from this there were no other built structures in the trenches. The only trace of building activities was impressions of reeds in a few lumps of clay, the remains perhaps of shelters or huts built by the inhabitants out of materials readily available in the locality. The surface of the rest of the mound consisted of the same ashy deposit that was found in the trenches so that it does not seem that there were structures built of other materials such as mud-brick elsewhere on the site.

Several burials were found at the bottom of the West trench (de Contenson, 1972, 79). Most had been placed at intervals in a single pit dug in the natural subsoil. There was one complete skeleton in a contracted position, another that was incomplete and several skulls of adults and children. One other skull was found set on the natural surface in the same trench.

The flint industry at Tell Aswad was based on the production of blades. The cores were prismatic or pyramidal although 25% of them were bipolar, a few being of the keeled type. The most numerous tools were sickle blades and tanged arrowheads (de Contenson, 1972, 77) while the remainder consisted of notched pieces, burins, borers and end-scrapers. This industry was more developed than those I have discussed so far and much of it had parallels with a later cultural stage. This was true also of some of the other artifacts found at Tell Aswad such as the polished axes and abundant human and animal figurines. Yet at least some of the flint tools, the notched arrowheads in particular, were more archaic. This impression derived from typology was reinforced by the ten ^{14}C determinations made on samples from both trenches (de Contenson, 1973a, 253ff). All of these from the West trench fell within the 7th millennium but four out of the five from the East trench were from the 8th millennium.

De Contenson has divided the sequence at Tell Aswad into two phases based upon stratigraphy, the evolution of the typology of the flint tools, the other associated artifacts and the ^{14}C dates. The site is now believed to have been occupied first in phase I and the debris of this phase makes up most of the deposit of Aswad East. The earliest date here is 7790 ± 120 B.C. GIF-2633 for a deposit near the natural surface while above that there are three others of 7690 ± 120 B.C. GIF-2372, 7390 ± 120 B.C. GIF-2370 and 7320 ± 120 B.C. GIF-2371. These make a coherent series of determinations from which one might estimate that the phase began a little before 7800 B.C. De Contenson believes that the settlement then expanded towards the west for some material of late phase I character was found at the bottom of Aswad West. There are two dates for this of 6925 ± 55 B.C. GrN-6678 and 6915 ± 60 B.C. GrN-6679. The remainder of the deposit in Aswad West constitutes phase II. A little material of this phase, dated by one further ^{14}C determination, was found at the top of Aswad East suggesting that the settlement expanded to the east again before it was finally abandoned. Although the whole of the site may have been occupied at least briefly in phase II this does not appear to have been so in phase I. Then perhaps no more than half or even less was occupied at any one time. Even this would have been a considerable area so it appears that Tell Aswad was always an extensive site in contrast with the core mound at Mureybat, for example, which was much smaller. This considerable spread of settlement may be accounted for by the absence of permanent structures rather than simply a large concentration of people. The inhabitants may have preferred to spread outwards over the natural hill on which the site stood rather than to live tightly huddled together as was usually the case on sites with mud-brick buildings where family or customary tenure of a particular building plot may have encouraged more concentrated settlement.

This complicated development of the settlement at Tell Aswad has since been confirmed by further studies of the evolution of the artifacts (de Contenson, 1976, 82). The typology of the arrowheads in phase I has now been worked out in detail (M.-C. Cauvin, 1974b, 314ff) and this permits more precise comparisons to be made with other sites. Many of the arrowheads had short tangs and pairs of notches. They were frequently retouched with a little pressure-flaking. Such arrowheads have been found in phase III at Mureybat although there they often had fewer notches and pressure-flaking was less usual. Nevertheless the two assemblages had much in common, including a similar core technique and range of retouched tools. Such typological similarity would have suggested that phase I at Tell Aswad overlapped with phase III at Mureybat and this is confirmed by the ^{14}C dates.

Saidnaya

There is one other site near Damascus at which traces of Neolithic 1 occupation have been found. This is Saidnaya which lies 23 km north of the city in a valley on the eastern side of the Anti-Lebanon. The occupation deposit here lay near the surface and was quite thin. Most of the material belonged to a Mesolithic 2 flint industry but mixed with this were pieces which were typologically a little later. There were in particular three notched arrowheads; one had a straight retouched base and the other two were tanged (van Liere, de Contenson, 1963, fig. 6, 1-3). These arrowheads can be paralleled at both Tell Aswad I and Mureybat III, indicating that Saidnaya was occupied briefly at this time. Saidnaya is thus the second site known in the Anti-Lebanon with Neolithic 1 occupation.

The slow but fundamental change from a microlithic to a full blade flint industry tool place at about the same time in Syria, Palestine and elsewhere in the Levant. Microliths were gradually phased out, rather more quickly at Jericho and Nahal Oren than at Mureybat, Nacharini and the Harifian sites. The first recognisable arrowheads were made and also certain relatively heavy flaked tools such as adzes and picks were introduced though, on the new evidence from Hayonim (Bar-Yosef, Goren, 1973, 60) these tools may already have been used in the Mesolithic at some sites; it is important to remember also that heavy flaked hammerstones and large flake scrapers were common at Abu Hureyra and in certain other Mesolithic assemblages. Almost all the other tools in the earliest post-Mesolithic assemblages were small, much smaller than those of the blade-based developed Neolithic industry of the 7th millennium and after. The same core technology was used on all Levantine sites but later double-ended blade cores were introduced at Mureybat, Jericho and Nahal Oren and the first true blade tools were made in some quantity. Similarly, towards the end of this stage squamous retouch was introduced, at least at Jericho and

Mureybat, the two sites with the most complete sequences, and Tell Aswad.

There were few other classes of artifacts at these sites but even these showed some similarities. Bone tools were quite abundant at Mureybat, Nahal Oren and Jericho and for the most part consisted of quite fine points, pins and needles. Hollow querns were also common to these three sites. Simple dishes and bowls made of stone were another regular if less common find on both sites; some of these were quite finely made with a high polish. Hollow querns were also common to these three sites.

Yet for all these general similarities between broadly contemporary assemblages from different sites in the Levant there were marked local differences. Tool types were found in different proportions from site to site while some tools such as the Harif point and the distinctive Nacharini truncated blades were found on certain sites and not on others. Arrowheads were much more numerous and varied in shape at Mureybat than at Jericho or any other site.

The other principal feature that these sites had in common was their buildings. Circular structures were common to all the open sites from Abu Salem in the Negev to Mureybat on the Euphrates. They were built of whatever materials were easily available, stone and timber at Abu Salem and Nahal Oren, mud and timber at Jericho and Mureybat. This tradition of erecting circular buildings was inherited from Mesolithic 2 and had its origins in the Mesolithic 1 circular huts at En Gev or perhaps even earlier. These structures were of much the same diameter, whatever they were built of, at most of the sites discussed: Abu Salem, Nahal Oren and Mureybat; only their internal arrangements differed somewhat. The houses at Jericho were slightly larger and in phase III at Mureybat much bigger circular structures with several compartments within were built alongside the first rectilinear buildings. Until then the building tradition seems to have been remarkably uniform throughout the Levant. The latter part of phase III at Mureybat came quite late in Neolithic 1 when a further change in building type was taking place.

There is very little evidence for burial practices from these sites but what there is does suggest a certain similarity in customs throughout the Levant. Burials within the settlement have been found at several sites, a tradition which in Palestine was derived from the Natufian but which in north Syria would appear to have been an innovation. The most distinctive feature was the separate interment of skulls after death for which there is evidence from Jericho, Nahal Oren, Mureybat and Tell Aswad I. The inhabitants of these sites, at least, had certain ideas in common concerning the treatment of the head after death which led them to bury skulls apart from the corpses to which they belonged. Other aspects of the disposal of the dead differ from site to site; at Jericho bodies were buried intact in graves while at Mureybat and Tell Aswad I there is evidence for secondary burial in which the skeleton was probably dismembered.

One other activity in which the inhabitants of many of the sites were involved was the exchange of obsidian. This began immediately after the Mesolithic and is one of the features marking the start of this new stage. All the obsidian found on Levantine sites at this early date which has been analysed came from Anatolia and the amount that reached the Levant was extremely small, a handful of pieces at a few sites only. Yet even this early it was being retouched into tools at Jericho and elsewhere so it was appreciated for its practical qualities from the beginning. This is the earliest instance of regular long distance trade known in the Levant, the only precursor being the traffic in marine shells from the Mediterranean and the Red Sea found on inland sites in earlier periods. It indicates that the Levant and Anatolia were in some sort of contact even if as yet we are unable to say anything about the cultural context in which the obsidian was being collected or quarried in Anatolia.

The Levant in this stage formed one cultural province with most contemporary sites having many cultural traits in common. For this reason Mureybat IB - III and Tell Aswad I may be included in Neolithic 1. Yet even though there are relatively few sites known of this period it is clear that there were local cultural differences that served to separate one group of sites from another. Thus one can distinguish between the Harifian sites of the Negev and the Palestinian group of Jericho, El Khiam and Nahal Oren because of differences in their flint industries. Nacharini in the Anti-Lebanon for the moment stands alone, having only certain aspects of its flint industry in common with other sites. Mureybat on the Euphrates while sharing many traits with sites further south has enough distinctive features to distinguish it from the others; when other sites of this period are found in this region they may be seen to form another cultural sub-group. Tell Aswad I is late in the Neolithic 1 sequence and the best parallel for its flint industry is Mureybat III; for the moment there is little with which to compare it with further south.

Distribution of sites

There are Neolithic 1 sites throughout the Levant in most geographic zones from Sinai to north Syria (Fig. 17). They occur in the south on the coastal plain of Palestine (Poleg 18M, Halutza dunes) which was still wider than it is today. Some are now known not far inland in the Jebel Meghara in Sinai and in the high Negev (Abu Salem and others). There is one (El Khiam) in the hills of the Judean Desert and two (Nahal Oren, Mugharet el Wad) on the fringes of Mt. Carmel. Jericho is the main settlement in the Jordan valley while there is one possible Neolithic 1 site, Beidha, in the Mountains of Edom. Further north there are two in the Anti-Lebanon (Nacharini, Saidnaya) and one in the Damascus basin (Tell Aswad). Neolithic 1 in north Syria is represented at Mureybat in the Euphrates valley.

This distribution is quite similar to that of Mesolithic 2 sites. As before it seems that the high mountains were in general avoided but otherwise sites were to be found over a wide area. Not every region was occupied in both stages. There are no Neolithic 1 sites to the east of the Jordan, on

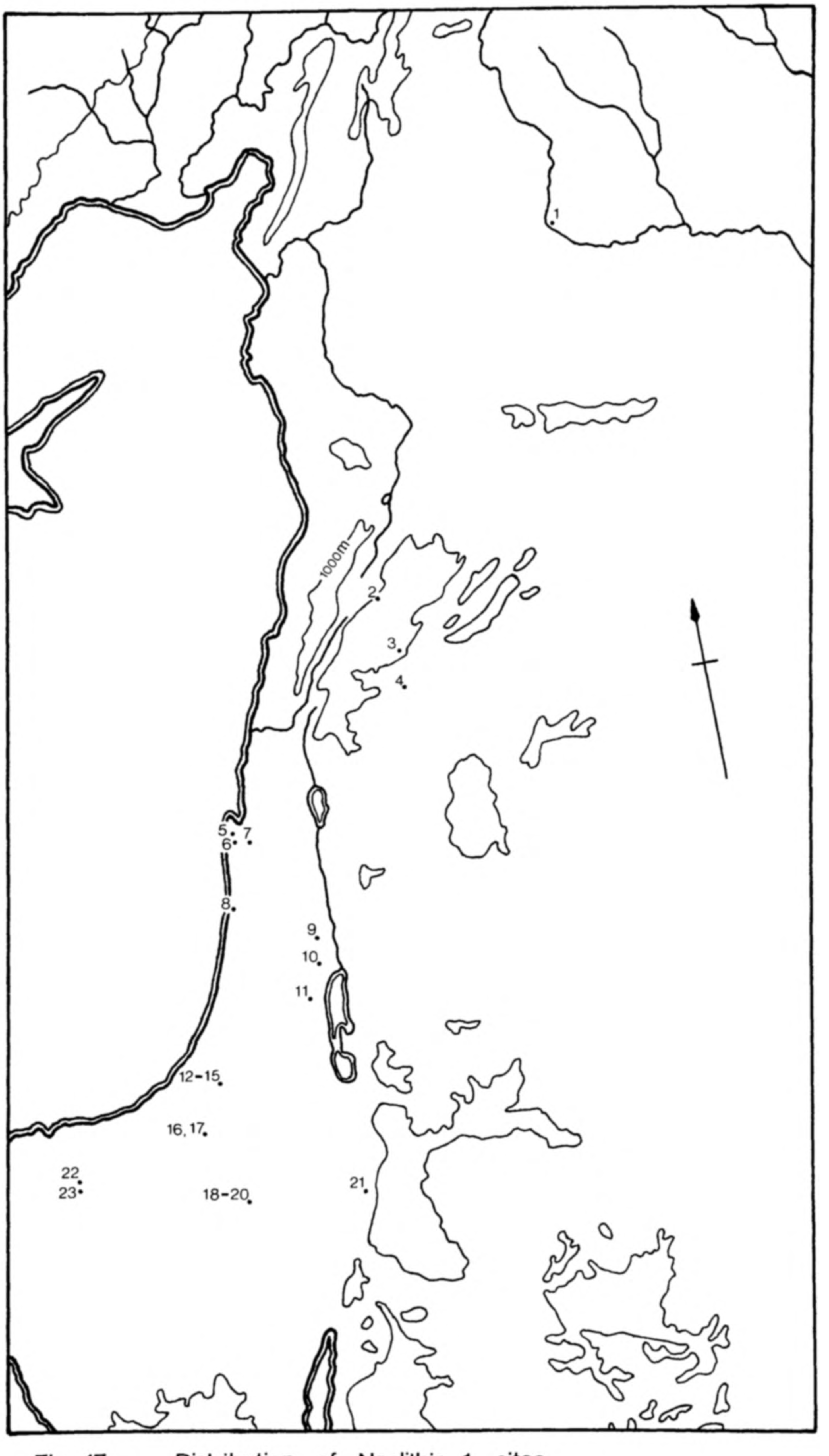


Fig. 17 Distribution of Neolithic 1 sites

scale 1:4,000,000

FIGURE 17

Distribution of Neolithic 1 sites

1 Mureybat
2 Nacharini
3 Saidnaya
4 Tell Aswad
5 Nahal Oren
6 Mugharet el Wad
7 Rakafet
8 Poleg 18M
9 Gilgal
10 Jericho
11 El Khiam
12 Halutza unnumbered
13 Halutza unnumbered
14 Halutza - Site 87
15 Halutza Dunes 4
16 Nahal Lavan 108
17 Nahal Lavan 110
18 Abu Salem - G12
19 Har Harif G8
20 Har Harif K3
21 Beidha
22 Lagama IV
23 Moshabi III

the slopes of the Mountains of Lebanon or in the Beka'a. There are also fewer Neolithic 1 sites in the hill country behind the coastal plain of the southern Levant than in Mesolithic 2. Part of the explanation for this change in the distribution pattern may simply be that Neolithic 1 sites have not been noticed in these areas although they may exist. On the other hand several of these areas have now been carefully surveyed and it is likely that a few sites would have been discovered if they were there. People may have avoided these areas in Neolithic 1 because they were less suitable for environmental or economic reasons than they had been in Mesolithic 2.

Settlement was quite widespread in the Negev and north Sinai as it had been in Mesolithic 2. The vegetation in the high Negev and Jebel Meghara was thinner than in the hills further north making the uplands more attractive for settlement. The site of Tell Aswad shows that the floor of the Damascus basin could now be occupied following the retreat of the Pleistocene lake. Mesolithic sites have not been found on the old lake floor, presumably because it was still flooded then, although it is possible that traces of occupation might have been covered by later alluvium.

I have mentioned 22 sites in the Levant that were occupied in Neolithic 1; if one includes Beidha the total is 23. Of these 18 were open sites, three, Mugharet el Wad, Nahal Oren and El Khiam, were terrace sites and two, Nacharini and Rakafet, shelters. This is a higher proportion of open to shelter sites than in Mesolithic 2 when many caves, particularly in Palestine, were still occupied.

Neolithic 1 began about 8500 B.C. and continued until about 7000 B.C., thus lasting approximately 1500 years. This is about the same length of time as the duration of Mesolithic 2 which began about 10,000 B.C. and ended with the beginning of Neolithic 1. Yet while a maximum of 23 Neolithic 1 sites are known at present over 60 Mesolithic 2 sites have been found. It may be that relatively few Neolithic 1 sites have been recognised in surveys carried out so far. There are, after all, few type-fossils in the artifact assemblages with which to distinguish Neolithic 1 from Mesolithic 2 sites. The chronology proposed here may be in error by several hundred years so that Mesolithic 2 was longer and Neolithic 1 shorter than I have suggested. Other factors might further reduce the gap between the total number of sites for each phase. Nevertheless on present evidence nearly three times the number of sites were occupied during Mesolithic 2 than in Neolithic 1 even though both stages lasted about the same length of time.

Most Neolithic 1 settlements with the exception of Mureybat and Jericho have thin occupation deposits and were probably occupied briefly or intermittently as were most Mesolithic 2 sites. Mureybat was occupied continuously throughout the stage although still without a massive deposit being accumulated. Jericho was an extraordinarily large settlement at which, although it was not occupied for the whole of Neolithic 1, a great mound of debris was built up.

Although far fewer Neolithic 1 than Mesolithic 2 settlements are known we have a much better idea of the internal chronology and cultural development of this stage. The long stratified sequences at Jericho and Mureybat, the quantity of ^{14}C determinations and the changes in typology of the artifact assemblages all can be combined so that one may place individual sites within the sequence. Thus the Harifian sites would all appear to fall early in Neolithic 1, there being no late Neolithic 1 sites known as yet in the Negev and Sinai. The occupation at Tell Aswad I, on the other hand, took place near the end of this stage.

Neolithic 1 sites vary considerably in size from sites of less than 100 sq m at one extreme to 4 ha at the other. They may be arranged in three groups according to the area they cover. The first, group A, includes sites of less than 1000 sq m. Within this group there is a clear distinction between Nahal Oren which covers approximately 650 sq m (Stekelis, Yizraely, 1963, fig. 3; Noy et al., 1973, fig. 1) and several smaller sites. I include Mugharet el Wad, Poleg 18M and Saidnaya in this sub-group as they are all probably of 200 sq m or less in this stage. One of the smallest sites is Nacharini where the area of the talus and cave together is 90 sq m. Group B consists of sites from 1000 to 8000 sq m. Among these are the Harifian sites, Abu Salem (1600 sq m) (Marks, Scott, 1976, 44), G8 (3000 sq m) and K3 (8000 sq m) (Marks et al., 1972, 81, 82), and Mureybat (a maximum of 4300 sq m). El Khiam should be included in Group B since the terrace is about 7500 sq m although the Neolithic 1 site was probably smaller than this. The two largest sites, Tell Aswad (a maximum of 2.7 ha) and Jericho (a maximum of 4 ha) comprise Group C. These are several times bigger than any of the other sites.

If we compare the areas of Neolithic 1 settlements with those of Mesolithic 2 sites we see that most Neolithic 1 sites are larger although there are fewer of them. The small sites of the sub-group within group A are similar in size to sites within the categories of small and medium Mesolithic 2 sites but the sites in group B are larger than almost all in the previous stage. Those in group C are at least four times bigger than the largest known Mesolithic 2 site. Only the sites of group A were inhabited by communities with about the same number of people as Mesolithic 2 families or composite bands. The communities living in group B sites would have been slightly bigger than those on most Mesolithic 2 large sites while the inhabitants of group C sites were clearly far more numerous than any Mesolithic 2 community.

Economy

Some evidence for economy has been recovered from recent excavations of Neolithic 1 sites although the record is still very uneven. Far more animal bones than plant remains have been found mainly because until recently there were no special methods available by which seeds could be separated from the soil. There is some indirect evidence from artifacts which contributes a little more information on the economy.

The economy of Jericho is of special interest because the settlement is so much bigger than other Neolithic 1 sites. The earliest plant remains found at the site were recovered from PPNA levels. These were two grains of emmer (*Triticum dicoccum*), six of two-row hulled barley (*Hordeum distichon*), 46 fig pips (*Ficus*) and three fragments of a legume (Hopf, 1969, 357). Wild apple or pear (*Pyrus*), pomegranate (*Punica*), fig and olive (*Olea*) charcoals have also been identified from these levels (Western, 1971, 36). It is thought that the pomegranate charcoal may have been intrusive as it is not certain that the species was present in the region at this early date.

The two species of cereals are both cultivated types so cereal agriculture was being practised at Jericho. The barley grains were smaller than those found in later phases of the Neolithic and had a fragile rachis which may indicate that the species was in the process of being domesticated, although other explanations are possible (Hopf, 1969, 358). Several questions may be asked about the cultivation of these cereals. Were the emmer and barley domesticated locally? How were they grown and what contribution did they make to the food supply?

Cultivated emmer is believed to have been developed from wild emmer (*Triticum dicoccoides*); the two types are closely related and interfertile but wild emmer has a brittle rachis (Zohary, 1969, 49). *Triticum dicoccoides* is itself thought to be a hybrid of wild einkorn (*Triticum boeoticum*) and a variety of goat-face grass (*Aegilops speltoides*) (Renfrew, 1973, 44). Wild emmer may have originated in central southern Turkey where both wild einkorn and goat-face grass grow together in the wild today. Wild emmer itself grows in only a few places in the Near East now. One area is in the Levant and comprises southern Lebanon, the Hauran, Palestine and Transjordan; another is southern Turkey and northern Iraq (Zohary, 1969, 49, n. 17). It is assumed that cultivated emmer originated in these areas (Harlan, Zohary, 1966, 1079) which would imply that the cultivated emmer grown at Jericho had been domesticated in the neighbourhood.

This is the standard explanation for the origin of cultivated emmer which is accepted by most archaeobotanists today. It assumes, however, that the distribution of wild emmer is almost the same now as when it was first domesticated because little climatic change has taken place in the Levant since then (Zohary, 1969, 59). As we have seen the most recent evidence indicates that the climate and vegetation of the Levant in the 9th millennium B.C. were significantly different from now. Wild emmer today grows on limestone and basaltic soils and is found from 100 m below to 1600 m above sea level in northern Palestine (Zohary, 1969, 52). It thus tolerates both warm and cool winters. The species is typical of the Mediterranean forest and intermediate open forest of the areas in which it occurs today. These zones were much more extensive in the 9th millennium B.C. than they are now, stretching in a wide belt from Sinai north and then east into Mesopotamia. The principal soils of this enormous area are derived from limestones and basalts so if its preferred habitat was the same then as now, another questionable assumption, it would have flourished throughout these forest zones. Domestication of wild emmer could thus have taken place anywhere in the broad forested zone west and north of the steppe of the Syrian interior.

It has frequently been remarked that wild cereals when found today often grow in dense stands from which a rich harvest may be gathered (Harlan, Zohary, 1966, 1078; Harlan, 1967, 198). These cereals are abundant now because they grow in areas that formerly were forested but from which much of the tree cover has been removed. Even though the upper Jordan valley, one of the areas cited, has been preserved from grazing for a generation the trees have not yet re-established themselves and consequently the climax vegetation typical of the region in earlier periods does not exist. At the time when cereals were domesticated the tree cover was extensive and so dense stands of wild wheat would have been found only rarely. Once wild wheats became a major source of food man would have had an incentive to clear more open ground for them, itself an agricultural technique, and also to transfer them to open country where they could grow freely. Herein lies an important reason why man may have first manipulated and then domesticated these wheats.

This discussion has been based on the assumption that <u>Triticum dicoccum</u> was derived from <u>Triticum dicoccoides</u> but this has now been questioned by

Dennell. He has argued (1973, 329ff) that since Triticum dicoccum has so far been found on several archaeological sites at an earlier date than Triticum dicoccoides the latter may be in fact a feral offshoot rather than the progenitor of cultivated emmer. Triticum dicoccum may have originated well before the 8th millennium and he cites the grains of this type found in Kebaran levels at Nahal Oren as possible support for this. These differences of opinion concerning the origin of cultivated emmer do not greatly affect its archaeological implications; however it was derived it seems that the Levant was one of the areas in which it originated.

It is thought that all cultivated barleys are derived from a single wild type, Hordeum spontaneum (Renfrew, 1973, 69). This species also grows in the Mediterranean and open forest zones today (Zohary, 1969, 53). It prefers somewhat drier conditions and is less tolerant of cold than the wild wheats so can be found encroaching on the steppe. It is found now in a great arc from the Wadi Arabah north through the Levant to the foothills of the Taurus, then east and south-east along the mountain fringe almost to the Persian Gulf. This zone would have been much broader in the 9th millennium B.C. and wild barley would consequently have been more widespread. It was probably domesticated at many places in this area including the vicinity of Jericho at about the same time.

The population of Jericho multiplied rapidly in the Proto-Neolithic and PPNA. Kenyon has suggested that between 2000 and 3000 people may have lived there during the PPNA (1969, 155), an estimate that is probably of the right order of magnitude. The population was at least semi-sedentary and so a considerable bulk of food would have been required to feed it. Pack animals had not yet been domesticated so no means of transport existed to carry heavy loads to the site from elsewhere. The inhabitants must therefore have obtained their food from the vicinity of the site. Chisholm has found that the inhabitants of agricultural settlements obtain the highest returns within a radius of 1 km from the site (1968, 66) but that at a distance of 3 or 4 km the time taken to travel to the fields seriously hinders production. Higgs and Vita-Finzi have suggested that the inhabitants of most sedentary settlements will subsist on the produce of a territory within a radius of 5 km of their hones (1972, 31). We know that the inhabitants of Jericho were planting crops from which they derived at least part of their subsistence and it follows that these crops must have been planted near the site.

The area around Jericho today is too warm and dry for cereals to grow there although even now wild barley grows in the hills immediately to the west of the site (Western, 1971, 37). This area was both cooler and moister about 8000 B.C. and so the climate would have been more favourable for early agriculture. The soil in the immediate vicinity of Jericho has been washed down by the Wadi Makkuk from the hills behind (Western, 1971, 35); it overlies the salty marls characteristic of the floor of the Jordan valley and is particularly fertile. Jericho would thus have enjoyed quite favourable natural conditions for early agriculture. Even so it is unlikely that the rainfall was quite high enough for cereal crops to grow regularly. At this time the Dead Sea was at a higher level than now and its shore lay not far south of Jericho. The proximity of this large body of water would have kept the water table in the lower Jordan valley high during this period. The Wadi Makkuk certainly would have flowed for longer each year than it does today and the great spring of Ain es-Sultan would also have had a greater discharge. There would thus have been much more surface and sub-surface water around the site than now. Kenyon has suggested that the PPNA inhabitants irrigated their crops (1970, 45) but this may not have been necessary at this stage. Emmer and barley may have been cultivated on the relatively moist land around the site at first without irrigation. Although a change in climate took place during the 7th millennium B.C. this need not have affected cultivation at Jericho during the life of the PPNA settlement.

It is not possible to describe in detail how plants were used as food at Jericho as few remains were recovered. The legume fragments may have been gathered in the wild although, given the size of the settlement, it is more likely that they were cultivated. The fig pips and charcoal indicate that fruits were gathered from the wild in the hills to the west of the site. No doubt many other species were gathered from the wild as in Mesolithic 2 and a few others cultivated (Hopf, 1969, 357) but their remains have not been found. The hollow querns from the PPNA levels would have been suitable for grinding grains and also acorns which may still have contributed to the diet. Although wild foods may have been an important supplement, particularly in what was still a rich environment, the inhabitants must have depended upon agriculture for food (Kenyon, 1969, 155). Such a large concentration of people could not have subsisted alone on the wild resources known to have been available to them.

The cereals, legumes and fruits would have provided a balanced diet but the abundant animal bones found on the site indicate that the meat was an important protein supplement. The most numerous ruminant bones in the Proto-Neolithic and PPNA levels were of gazelle, probably Gazella dorcas. This species accounted for 36.91% of the total meat available from the animal remains in the PPNA and was the principal source of meat in this period (Clutton-Brock, 1971, 48). Both males and females were represented but far more males were killed than females.

Some goat bones were found in PPNA levels but not in the Proto-Neolithic. Many of the horn cores were large and so may have belonged to Capra aegagrus; a few were large enough to have been Capra ibex nubiana (Clutton-Brock, 1971, 50ff). Some of the horn cores were much smaller and these were ascribed to young or female goats. Sheep were also present in the PPNA but in very small quantities (Clutton-Brock, Uerpmann, 1974, 273).

Large pig bones of the wild Sus scrofa were quite common in these levels (Clutton-Brock, 1971, 43). This species would have abounded in the marshy thickets along the banks of the Jordan. Some cattle bones were also found, all of Bos primigenius (Clutton-Brock, 1971, 45). A few onager (Equus hemionus), deer and antelope bones were recovered in the excavation and some of these may have belonged to the Proto-Neolithic and PPNA levels.

Carnivore bones were abundant in these Neolithic 1 levels, foxes (Vulpes vulpes) being the most common of all the mammals found (Clutton-Brock, 1969, 341). This species flourished in Palestine during the Mesolithic (Kurtén, 1965, 64) and may have been a common constituent of the fauna in the Jordan valley. Fox bones were found all over the site and so they were regularly caught. Clutton-Brock believes that they were hunted for their skins and for food which may well have been the case. Their presence at Jericho in such large numbers is striking as they are not very common on other contemporary sites. It may be that the inhabitants of Jericho specialised in the preparation of fox pelts which were then exchanged with other communities.

The remaining carnivore bones consisted of Canis sp. which may have been either dogs or wolves, almost certainly wild, and several Felidae (Clutton-Brock, 1969, 339, 343). The latter included marten (Martes martes), lynx and the small Libyan cat (Felis lybica).

There is nothing in the morphology of the bones to indicate that any of these animals was domesticated but there are indications that they were at least hunted selectively. Gazelles were killed much more frequently than other ruminants and male gazelles more often than females. Foxes, too, were trapped in great numbers compared with other species. The large population of Jericho would soon have killed off or frightened away most of the gazelles and perhaps even the foxes had they hunted these species indiscriminately. Yet there always seem to have been enough for them to take throughout the Proto-Neolithic and PPNA. It would seem probable that some sort of game conservation was practised now which may have taken the form of the protection or control of gazelle herds envisaged by Legge (1972, 123). The inhabitants of Jericho in Neolithic 1 would thus have been manipulating the gazelle more thoroughly than anyone sems to have done in the Mesolithic.

Like their Mesolithic predecessors the people of Jericho hunted the other animals in the vicinity from time to time. These were taken often enough to be an important constituent of the diet; one Bos primigenius after all would have fed many families for several days.

The economy of Jericho in the Proto-Neolithic and PPNA thus depended upon the cultivation of cereals and perhaps other crops. The vegetable diet was supplemented by collecting from the wild. Meat was obtained principally by the selective hunting or culling of gazelle herds but other species were still killed quite often for variety. The agricultural aspect of the economy ensured that the population was at least semi-sedentary but parties would still have spent time away from the settlement on hunting and collecting expeditions. These may have been family groups which would have been able to leave the settlement for a time in the winter after sowing the cereals and also in the late summer after the harvest. Nevertheless enough people probably remained at the site throughout the year for Jericho to be described as a sedentary settlement in Neolithic 1.

Jericho stands out from contemporary sites because of its great size and the tower and walls which surrounded it, yet the houses and artifacts are like those found elsewhere. The principal difference is one of scale. This may be accounted for by the situation of the site which at this period was unusually favourable. The population could have supported themselves perfectly well on the products of the economy suggested by the evidence; this economy was, after all, not very different from the Mesolithic 2 one which preceded it. There is no need, therefore, to invent a unique economy for the site as Anati has done which ignores the possibility that the environment may have been more favourable at the time the site was first occupied than it is now. He believes that the economy was based on the collection and export of salt, bitumen and sulphur (1962, 31). Salt and bitumen are widespread in the Levant and were locally exchanged but sulphur does not seem to have been used elsewhere. Jericho was not the major distribution centre of these commodities which could not have been exported in bulk anyway without pack animals.

Even fewer plant remains were found in the Neolithic 1 levels at Nahal Oren than at Jericho so although one presumes that plants were important in the diet one cannot ascertain much about how they were exploited. Emmer was present (Noy <u>et al</u>., 1973, table 6) as at Jericho so the inhabitants may well have been growing cereals. Vetch seeds were also found which is an indication that the plant diet was well-balanced.

The animal bones give a fairly clear picture of which species were exploited for food. Gazelle was the single species preferred above all others, accounting for 87.65% of the fauna (Noy <u>et al</u>., 1973, table 3). This was a slightly higher percentage than in the Natufian layers but the relative weight of meat was even greater because very few cattle and other large ruminants were killed now. A very high proportion of gazelle bones was also found in the first series of excavations (Ducos, 1968, 76) so the pattern was true for the whole site. The only other species of any importance were goat (<u>Capra aegagrus</u>, 4.95% (Legge, 1972, 121)) and pig (3.4%). Fallow deer which had been so important in earlier times now only accounted for 1.75% of the animal bones.

This pattern of animal exploitation resembles that at Jericho. Most of the meat came from gazelle at both sites and pig and goat were important supplements. Gazelle exploitation reached its peak in this phase at Nahal Oren. As in the Natufian a high percentage (51.9%) of the gazelle killed were young animals (Noy <u>et al</u>., 1973, table 5) so the herds were being culled very selectively indeed. Apparently the animal was abundant in the neighbourhood and this provided the basis for a successful killing pattern. By now their dependence on gazelle was so great that it is reasonable to presume that the inhabitants at Nahal Oren were controlling the herds in the same way that their contemporaries at Jericho appear to have done. This hypothesis is reinforced by the size and appearance of the settlement. The huts at the site were built to be occupied for several months of the year at least. The population could not have lived there regularly for as long as this without a dependable food supply. While it appears that they now grew some crops the catchment was not particularly suitable for arable farming so they may have gathered more wild plants and eaten more meat than the inhabitants of Jericho. It is possible that the population was still practising transhumance as has been suggested for the earlier phases (Noy et al., 1973, 96) in which case occupation would have been semi-sedentary rather than sedentary.

Very little more direct evidence for economy has been found on Neolithic 1 sites in the southern Levant. At El Khiam a few caprine and fox bones have been identified (Ducos, 1968, 79) which accords with what we know of the environment of the site.

Not very much is known either about the fauna on Harifian sites. Apparently a wide range of species was killed at Abu Salem; gazelle and wild goat were particularly abundant and onager was also taken. No deer bones were found but bird bones were quite common (Marks, 1975a, 358). Both terrestrial and marine molluscs were present, some of which may have been eaten. There are some similarities here with the pattern of animal exploitation at Jericho and Nahal Oren. Plant foods were presumably important on Harifian sites as elsewhere but no remains have been recovered.

Abu Salem, G8 and K3 are all on top of the Har Harif plateau, an area that was covered with Mediterranean forest at the time they were occupied. The Harifian sites in the Halutza dunes are on the much lower ground of the coastal plain in more open forest. The catchments of these two groups of sites offered complementary seasonal resources which could be most satisfactorily exploited by transhumant groups. They may have spent the winter on the coastal plain which would have been much warmer than the Har Harif. The pasture on the lowlands would have supported large herds of gazelle which may have been controlled as seems to have been the case further north. Annual food plants, either cultivated or wild, would also have been available until the end of spring. Then these groups may have moved up to the plateau where there would be some pasture through the summer for gazelle and goats. The topography of this area provided a congenial habitat for goats and we have already seen that their remains are quite numerous at Abu Salem.

Transhumance seems also to have been the pattern in the Anti-Lebanon for Nacharini can only have been occupied in the summer months. Some of the animal bones from the Neolithic 1 occupation at this site have been identified. They include gazelle, fallow deer (Dama mesopotamica), equid, cattle and sheep/goat. These species would have fed on the high pastures in the mountains and some of the herds may have been controlled. In winter the small group which inhabited the site and probably many of the wild ruminants would have moved down to the floor of the Beka'a.

Samples of plant remains and animal bones were collected at Mureybat by both van Loon and Cauvin. In van Loon's excavation flotation was used to extract seeds from two baskets full of earth from every stratum (van Loon, 1968, 280). Most of the samples came from strata of the Neolithic 1 occupation. A very mixed collection of seeds was found in each sample, reflecting the different ways in which they were processed and used on the site. Two-seeded wild-type einkorn (Triticum boeoticum var. thaoudar) was particularly common and may have been an important food plant (van Zeist, Casparie, 1968, 48). Wild-type barley (Hordeum spontaneum) did occur but in much smaller quantities (van Zeist, 1970, 174) so it is less likely that it was a major constituent of the diet. Of the legumes, small wild lentils (Lens nigricans) and bitter vetch (Vicia ervilia) were collected for food (van Zeist, 1970, 175) as they had been at Abu Hureyra in the Mesolithic. There were also a few fragments of pistachio nuts (Pistacia). Some Astragalus seeds were found but these may have been brought to the site with their parent plants for fodder. Among the other plant remains were Polygonum which may have been eaten, grasses and Chenopodiacae seeds. Charcoal from the site has also been identified. Most of it was poplar but there was some tamarisk and ash, all species which would have grown on the flood-plain of the river.

All these species except the wild-type einkorn would have certainly grown in the vicinity of Mureybat. Van Zeist has pointed out that wild-type einkorn is not found on the north Syrian plain today although it is found in southern

Turkey. He thought it could have grown around Mureybat at the time the site was occupied only if it was cooler and moister then (1968, 52). He did not believe that the climatic evidence indicated this so he concluded that the wild-type einkorn must have been harvested in the hill country about 150 km to the north. We have already seen that on the latest evidence the temperature was lower then, the rainfall was more regular and may even have been a little greater. This means that the conditions in this region were more suitable then for wild-type einkorn which anyway grows in a wide climatic range today (Zohary, 1969, 48). As the transport of large quantities of grain to the site from so far away would have been almost impossibly difficult one may reasonably presume that wild-type einkorn grew around Mureybat and that all the food plants the inhabitants used were available locally. We do not know for certain if any of these plants was being cultivated but the evidence from the Mesolithic levels at Abu Hureyra indicates that wild-type einkorn and wild-type barley had already been used for a long period of time and that the wild-type einkorn was probably already being cultivated there. Cultivated einkorn and barley are found in the aceramic Neolithic levels at Abu Hureyra no more than a millennium later than the Neolithic 1 levels at Mureybat. It seems likely, therefore, that these cereals were being cultivated by the inhabitants of Mureybat even if there is no evidence that they changed their morphology. This would only occur when certain harvesting techniques such as reaping with sickles were introduced but cereals could have been harvested from planted fields for a long period before that without any morphological change taking place (Hillman, 1975, 72).

None of the animal bones recovered at Mureybat can be ascribed to morphologically domestic types. The most numerous species found in both series of excavations were gazelle (<u>Gazella</u> sp.), aurochs (<u>Bos Primigenius</u>) and wild ass (<u>Equus Asinus palestinae</u>) (Ducos, 1975a, 193; 1972, 300; 1970, 287). It proved impossible to determine the type of gazelle. The equid bones were at first thought to be from an onager (van Loon, 1968, 279) but Ducos now believes they belong to an ass, a species that was very common in north Syria (1975b, 71). Whichever name the species is given it is likely to be the same animal as the onager or ass which has been found in some quantity at Abu Hureyra and a number of other sites in the Levant. These three species appear to have been of approximately equal importance in the diet in the early phases of occupation at Mureybat, Then in phase III most of the meat was obtained from cattle and ass and far fewer gazelle were taken. It would seem that these three species were prolific in the open park-like environs of Mureybat. Animals of different ages were killed at random, there being no strong bias towards juveniles (Ducos, 1970, 273) so it appears that they were hunted in the wild rather than herded. The fall in the number of gazelle taken in phase III may have been because they had been over-exploited without steps being taken to conserve numbers as was happening further south. Another factor may have been that cattle and ass were then considered to be more generally useful providing not only more meat, especially Bos primigenius, but also hides and other products.

Throughout Neolithic 1 at Mureybat a number of other animals were hunted, among them fallow deer (Dama mesopotamica) in some quantity, a very few red deer (Cervus elaphus) which were apparently still in the area, a few sheep (Ovis orientalis), pigs (Sus scrofa cf. libycus) and rabbits (Lepus sp.) (Ducos, 1975a, 193ff; van Loon, 1968, 279). Birds, especially pelicans, fish and shellfish (Melanopsis) were taken from the Euphrates and marshes of the valley floor. It now appears that fewer fish and shellfish were eaten in phase III than before but numerous birds were still being killed.

This pattern of exploitation is a little different from sites in Palestine. In part it reflects the different plants and animals that were available in the vicinity of Mureybat and also the more open vegetation. There is a presumption that cereals were now being deliberately planted even if they had not yet changed morphologically. All the animals eaten on the other hand were hunted or trapped. The rich grassland around the site may have maintained large herds which the relatively small population at Mureybat did not seriously diminish, except possibly those of gazelle. They may not have needed to herd these animals in the manner of their contemporaries in Palestine. Wildfowling and fishing were important supplements until quite late in the occupation of the site.

The one other Neolithic 1 site for which there is any evidence for economy is Tell Aswad. This site is in an unusual situation near lakes and marshes. No information is available yet on what plants were eaten but the area would have been quite rich in edible species which could have been collected. Some could also have been cultivated on the moist land around the site where the water table was high. Several species of animals were killed for food, among them sheep/goat, cattle, deer and an equid (de Contenson, 1972, 79). We do not know if any of the animals were herded but most were probably hunted. The bird bones and fish vertebrae found on this site indicate that the inhabitants also went wildfowling in the marshes and caught fish in the lakes.

The population of Tell Aswad lived somewhat differently from their contemporaries elsewhere. Their environment was rich in vegetation and there were abundant herds of ruminants on the floor of the Damascus basin. In addition migratory and other birds were attracted to the lakes which teemed with fish. The area probably carried a higher biomass than most other regions of the Levant which would have provided ample food for the large population of Tell Aswad. They need not have resorted to herding or deliberate cultivation to support themselves as the inhabitants of some Neolithic 1 sites were doing.

Discussion

Having considered the archaeological evidence for Neolithic 1 I now wish to examine further the way of life of the people who lived in the Levant at that time. In particular I would like to look at the changes which were taking place in economy and society and attempt to explain them. We have seen that the culture of Neolithic 1 throughout the Levant was derived directly from the Mesolithic. Neolithic 1 sites were also situated in the same general regions as Mesolithic sites. If we disregard chronological subdivisions and regional differences between sites in Neolithic 1 but look at them together we see that the pattern of settlement had nevertheless been modified. Assuming as we did when comparing Mesolithic 1 with Mesolithic 2 that the ratio of sites found to those destroyed was the same in Neolithic 1 as in Mesolithic 2, an assumption that seems reasonable given the similarities in cultural remains, we see that there were fewer Neolithic 1 sites than in the preceding stage but that most of them were larger. The number of Neolithic 1 settlements found so far is about one third that of known Mesolithic 2 sites. It would seem that many fewer sites were inhabited now but that the population of each site was much greater than before. We must remember, too, that the more mobile groups of Mesolithic 2 may have visited two or more sites in the course of a year while the more sedentary Neolithic 1 population may have remained at their settlements for much or all of the time. This in itself would account for part of the reduction in the number of sites which were used. Although considerable changes were taking place in the pattern of settlement there is no reason to suppose that the population in Neolithic 1 either increased or decreased markedly.

If we look at the distribution of sites in more detail we see that certain zones were no longer inhabited. The slopes of the Judean hills, the Transjordan uplands and the mountains of Lebanon were all avoided in Neolithic 1 although they had been occupied in the Mesolithic. Most Neolithic 1 sites were on lower ground in more open country. This noticeable modification of the Mesolithic settlement pattern can be linked to the changes in economy which were taking place. The Neolithic 1 population relied more on cereals, either wild or cultivated, and in some cases the control of herds of gazelle and other herbivores. As a truly agricultural economy developed there was a need for more open land suitable for pasture and the growing of cereals. The Mediterranean vegetation zone was still wooded so this would have required the clearance of trees even on lower ground; there are indications of such disturbance of vegetation before this in the Mesolithic layers at Abu Hureyra (Hillman, 1975, 73).

Neolithic 1 sites are situated in the Mediterranean and intermediate forest zones and also on the edge of the open steppe beyond. These environments offered a wide range of food resources and this variety is reflected in the diversified economy of Neolithic 1 sites. The economy was based on two or more of the following: agriculture, herding, collecting and hunting. As in the Mesolithic many plants and animals within the catchment of each settlement were exploited but the main difference now was that agriculture made an important contribution to the food supply at some sites. As a result Jericho seems to have been inhabited permanently. That is to say, a proportion of the population lived there all the year round although some parties engaged in herding, hunting and gathering may have spent time away from the site at certain seasons. At least two other sites, Mureybat and Tell Aswad, may also have been occupied permanently but the economy of Mureybat was based upon wild resources to a greater extent than at Jericho. Deliberate planting of wild-type cereals probably took place at Mureybat but animals were hunted there not herded. We do not know what farming techniques if any were used at Tell Aswad but the environment there was rich enough to support substantial occupation for a long period of time. The catchments of all three of these sites included much potential arable and grazing land. This was also the case at Saidnaya, Poleg 18M and the sites in the Halutza dunes so it is possible, at least, that a little agriculture was practised at these sites. In view of the scanty remains found on them it is more probable that they were attractive because the woodland was thinner in their vicinity so that these areas would have offered better grazing for herbivores and a more suitable habitat for wild cereals.

The catchments of other Neolithic 1 sites were much less suitable for agriculture. Occupation on all of these, the Harifian sites in the Har Harif and Jebel Meghara, El Khiam, Nahal Oren, Mugharet el Wad and Nacharini was semi-sedentary as if many or all of their inhabitants were practising transhumance. The settlement pattern suggests that transhumance was a more regular way of life than it had been in the Mesolithic. Although there is evidence for agriculture and the herding of goats at Nahal Oren the inhabitants of these sites seem to have relied on wild resources for much of their food, even if these were exploited intensively. These differences in the way of life are reflected in the size and aspect of Neolithic 1 settlements. At one extreme is Nacharini, a very small seasonal hunting or herdsmen's camp, and at the other Jericho, a great agglomeration of tightly packed dwellings inhabited by a population of farmers. The range of settlement types was much greater in Neolithic 1 than in the Mesolithic.

In attempting to explain these developments in economy and type of settlement it will be useful to consider the question of population growth. We have already seen that there appeared to have been a considerable increase in population during Mesolithic 2. The adoption of a more sedentary way of life would have increased the birthrate because women no longer had to carry their infants long distances when gathering food or moving camp. This eased the pressure on them to restrict the number of children born and shortened the interval between births (Lee, 1972, 338ff). The environment was also much richer in plant and animal foods than it had been during Mesolithic 1 and this increased food supply would have encouraged sedentism and a higher population. The increase in population and the formation of large concentrations of people in bigger settlements would in time have led to pressure on the food supply. This is reflected in the more intensive food procuring activities of the people of Mesolithic 2 compared with their predecessors. A point would have been reached when even these activities would have been insufficient to feed the population. It would then have been necessary to develop new ways of increasing the food supply which we see in the changes of economy in Neolithic 1. What happened was not really new but a further intensification of Mesolithic 2 practices. The agriculture of Jericho and Nahal Oren was simply a development of the manipulation of cereals that had begun earlier. Herding of gazelle at some sites is but a more regular control of a species that had been the subject of intensive, selective hunting for many centuries. The first serious killing of goats at Jericho and Nahal Oren also took place in Neolithic 1 which may have been an attempt to enlarge the basis of the food supply. Transhumance is another way of increasing the available food by exploiting the resources of two environmental zones instead of one. The evidence for more widespread transhumance in Neolithic 1 may also be a reflection of increased demand for the available resources.

The change to a more formal agricultural economy at some sites was reflected in the artifacts. The hollow querns made now on several sites would have been used for grinding cereals rather than pigments for which they were much less suitable. It should be noted too that mortars have hardly been found at all on Neolithic 1 sites. This may be because acorns were no longer eaten as a staple food, having been replaced by cereals. Acorns may anyway have been scarcer around the larger settlements because of land clearance.

The development of agriculture was associated with a greater degree of sedentism than had been customary before. Most of the population of a site would have been involved in the labour intensive activities of land preparation for sowing and the harvest. The yield of crops could have fed the inhabitants for the rest of the year making it possible for them to continue living there. Once a large group had been brought together in this way it could only be supported by the products of agriculture. Any further increase in the population would have to be sustained by more intensive farming. We have seen that the Neolithic 1 population does not seem to have increased overall, itself a sign that once the new economic arrangements were established they were sufficient to maintain the population at a new higher level. The population at Jericho did increase, however, during Neolithic 1 from the relatively modest Proto-Neolithic site to the extensive settlement of the mid-PPNA.

The economy of the settlement must have been further modified during this stage in order to feed the growing population but the evidence is too meagre for us to document it. The artifacts give a slight indication of what was happening. Sickle blades became more numerous later in the PPNA; by now these were probably being used for reaping and this increase may have been associated with a change in reaping techniques. Interestingly enough a similar increase in sickle blades occurred in phase III at Mureybat as though the same change was taking place there.

The beginning of Neolithic 1 approximately coincided with the onset of the Holocene so we should consider what part climatic and environmental changes played in the developments in economy, settlement and artifacts. Climatic change cannot be invoked as a primary cause if only because this happened about 8000 B.C. or a little after whereas Neolithic 1 seems to have begun about 8500 B.C. It may have had some effect, however, on the development of Neolithic 1. After 8000 B.C. the temperature increased and there was a slight drop in rainfall. These two factors could have brought about a slight contraction of the Mediterranean forest zone. This trend would have aided the Neolithic 1 population whose economy now depended more on cereals and herds of animals, both of which needed open country to flourish. Land cleared for crops or grazing would not have been recolonized by shrubs and trees quite so quickly now.

Although the changes in population, economy and settlement which were taking place were very important we should remember that almost all Neolithic 1 sites were in the Mediterranean and open forest zones and that none was situated far out in the steppe or desert regions. Approximately the same areas were occupied as in Mesolithic 2 so that the increase in population which had taken place then could be accommodated by exploiting the resources of the region more intensively or in a different way. It was not necessary for any group to expand into the marginal zones in order to survive.

These alterations in population, settlement and economy also affected the social system. If one examines the area of Neolithic 1 sites then the smaller ones, group A, can have been occupied by very few people. Nacharini may have been inhabited by one family and other group A sites by composite bands. Thus composite bands still existed as a form of social organization even in their economy was in certain instances somewhat different from what it had been during the Mesolithic.

Group B sites tended to be larger than even the biggest Mesolithic 2 sites so that their inhabitants were correspondingly more numerous. The grouping of bands which I suggested was a feature of the larger Mesolithic 2 settlements was taken further here. Most of these larger communities still seem to have been semi-sedentary so they may have split into their component bands and left the settlement at certain seasons.

One might next ask what were the social arrangements within Group B and C settlements? In a recent article Flannery has pointed out that most of the huts in these sites were so small that they can only have been occupied by one or two people (1972, 30ff). Any large buildings may have been communal meeting or guest houses while the smallest structures were probably used for storage and other activities, not as dwellings. The population of such settlements might have been smaller than one would suppose and certainly much less than if one assumed that every hut was occupied by a nuclear family. On ethnographic analogy polygyny may have been practised, husband and wives living in separate huts. The men at least would have been related. Life in the settlement would have been organized on a communal basis, stored food supplies being shared. Most tasks would have been performed by groups of males or females rather than families.

The communal nature of the settlement, close kinship ties and the sexual division of labour are basic patterns carried over from composite bands which may be assumed to have characterised most Neolithic 1 sites. Polygyny cannot be demonstrated as we do not yet know if the contents of huts in Neolithic 1 sites were functionally distinct (Flannery, 1972, 33). The problem of how many people occupied each hut and thus how families were organized is more complex than Flannery suggests. He relies heavily on the work of Naroll who after comparing settlements of 18 modern primitive societies calculated that each person needed about 10 sq m of floor space in a dwelling (1962, 588). This figure may be a convenient one to use but Naroll's own data show that in certain societies the norm may be several square metres more or less than this. When Naroll's mean was applied to a study of a modern Fulani village inhabited by a group organized in precisely the way Flannery envisaged it was found to underestimate quite considerably the area required by each individual (David, 1971, 119). In a study of Californian Indians it was shown that each individual may require as little as 20 sq ft of floor space (Cook, Heizer, 1968, 114) so the parameters here are uncomfortably wide. The important point to establish is whether it is reasonable to suppose each hut was occupied by one or two people at most or a family of parents and children.

The structures of the Neolithic 1 sites we are considering were clustered together to form a nucleated settlement. They differed in this respect from the extensive spread of structures in a Fulani compound or in a Tiv village, one of the examples quoted by Flannery (1972, 30). The huts were more substantial, took more time to build and would have lasted longer than these African ones. Their inhabitants may have been content with less covered space than Flannery proposed. Bearing this in mind let us look again at Neolithic 1 huts. Those 2 m in diameter or less could only have housed a single person or served as stores. Huts from 2 to 4 m in diameter (3 - 12.5 sq m floor area) could have been inhabited by one or two people. The larger ones from 4 to 6 m in diameter (12.5 - 28 sq m) are more problematical. These might still have been occupied by one or two people if they wanted the space but there was enough floor area for several people to sleep in these. The large huts certainly could have housed a nuclear family but were not big enough for an extended family, a form of social grouping which does not seem to have been characteristic of Neolithic 1 settlements.

Turning now to the settlements themselves the pattern is more varied than Flannery allows. At Nahal Oren the core of the site was a group of small huts 2 to 3 m in diameter (Fig. 12). These were surrounded by several larger huts 4 to 5 m in diameter; one excavated by the Cambridge team was also about this size (Noy et al., 1973, fig. 2b). This settlement could be interpreted in the way Flannery suggests but I think it likelier that the larger huts in the outer ring were inhabited by more than two people, perhaps a married couple and their children. This would mean that the nuclear family was already crystallizing as the fundamental social grouping. Looked at in this way the population of Nahal Oren would still have been quite small, no more than that of a composite band. The structures at Abu Salem were also of two sizes, small ones like those at Nahal Oren and larger ones 3 or 4 m in diameter. As these were smaller than the large ones at Nahal Oren they are less likely to have been occupied by families. The buildings at Mureybat fall into the same groups, the larger ones being about 4 m in diameter. There was an interesting development here in phase III when much larger circular structures 10 m in diameter (78.5 sq m) were built for the first time; these almost certainly housed complete nuclear families and provided enough space indoors for domestic and even some craft activities.

The size range of the houses at Jericho was slightly different. Most of these are from 4 to 6 m in diameter, some even more. At least one of the excavated houses had more than one room. Few if any smaller structures were found. These houses, slightly larger than was usual elsewhere, probably housed nuclear families. This would be appropriate for the larger tightly-knit community which the archaeological evidence suggests inhabited Jericho.

Nucleated villages were the characteristic settlement type of Neolithic 1. The earliest examples such as Rosh Zin, Ain Mallaha, Abu Hureyra and Mureybat were formed during Mesolithic 2. This kind of settlement has remained the dominant type in the Levant ever since. Nucleated villages have certain characteristics in common, the most important being a degree of communal economic and social organization with regular social intercourse between the inhabitants. Historically the land around nucleated villages was frequently divided up by the community so that each family had an approximately equal share. This often included plots of both relatively good and relatively poor land scattered around the environs of the village. In such nucleated villages some land was sometimes farmed communally. The inhabitants of the nucleated agricultural villages of Neolithic 1 may have apportioned land among themselves and worked it in a similar way. The concept of territoriality has always been stronger in village communities than among more mobile groups so that one would expect it to have been more developed among the inhabitants of Neolithic 1 villages than among the hunter-gatherer bands of the Mesolithic. This concept found expression in the burial of the dead within the settlement as far back as Mesolithic 1 but was given greater emphasis in the special treatment of skulls which began in Neolithic 1 (Flannery, 1972, 29).

All these features are found at Jericho to a greater degree than anywhere else. The PPNA settlement was densely settled and had a form of community organization which arranged the building of the circuit wall and tower and probably also the distribution of land. The rooms around the tower may have been communal stores. The other buildings excavated were all of much the same size and type but one would expect that there would have been public buildings such as a large communal meeting house in the unexcavated part of the site. The settlement had an unusually high population and its situation was a particularly favourable one: the combination of rich alluvial soil, abundant water and a high water table was not repeated elsewhere in the Jordan valley between Jericho and the Beth-Shan lake. These unique circumstances gave the site a special position and may have created a need for defence. Although other suggestions have been made to explain the purpose of the circuit wall (Tringham, 1972, 469) the most probable is still that it was intended to defend the settlement even if it also served to delimit the site. It should be remembered that for much of its later existence Jericho was a walled settlement and that its inhabitants would always have wished to control access to the spring.

Most if not all Neolithic 1 communities may by now have been linked by tribal affiliations. This system of social organization which, as we have seen, probably began in Mesolithic 2. may have included even the composite bands who inhabited the group A sites. The ties of kinship and lineage which united the members of a tribe would have been reinforced by the prevalence of nucleated settlements.

It is now possible to see certain tribal territories in the Neolithic 1 pattern of settlement. Tribes by definition share certain cultural attributes and occupy a particular region (Sahlins, 1968, 22). One such tribe might have been composed of the inhabitants of the Harifian sites in the Negev and northern Sinai. Another tribe might have existed in Palestine, inhabiting Jericho, El Khiam and Nahal Oren. The problem here about this postulated tribe is the diversity of terrain and environment within its territory although there were close cultural links between these sites. A third tribe might have lived in the Damascus basin, Tell Aswad being the key site here, and a fourth in the Euphrates valley, Mureybat being the representative settlement.

One further observation can be made about the social system of Neolithic 1 communities. When attempting to reconstruct prehistoric social organization it is usually assumed that flint-knapping is a male activity (Phillips, 1971, 341) and this may be used as a means of defining descent rules in a given society. If the flint industry of a site occupied for a long time shows much homogeneity in technology and the making of each tool type then it may be assumed that this tradition was handed down from father to son within the settlement. Strong homogeneity of flint working can be seen in the Neolithic 1 occupation at both Nahal Oren and Jericho. The same is true at Mureybat where the basic tradition was continued from phase to phase and where the distinctive notched arrowheads were also made in the same way over a long period of time. From this one may argue that on these sites residence and descent were organized on a patrilocal basis and the same may have been true of other Neolithic 1

Chapter 4

NEOLITHIC 2

A rapid transformation in culture took place in the Levant at the end of Neolithic 1. From this emerged a new configuration, Neolithic 2, with a distinctive pattern of settlement, buildings and range of artifacts. During Neolithic 2 an economy based on farming spread throughout the Levant. The inhabitants of many Neolithic 2 settlements now derived their subsistence from crops and herded animals but also still depended partly upon foods obtained from the wild. These economic developments were accompanied by a great increase in the number of settlements which were inhabited. This and other evidence suggests that the population grew substantially during this stage, as we shall see. Not only were there more settlements but they were also bigger than before. They included some of the largest settlements ever established during the whole Neolithic of the Levant. There were changes in the distribution of sites within the zones which had been inhabited in Neolithic 1 and an expansion of settlement into the steppe to the south and east (Fig. 18). Neolithic 2 settlements consisted of a cluster of buildings set close together thus continuing the Neolithic 1 and Mesolithic tradition but the shape of these structures was different. Most were now rectilinear and often had several rooms.

Major changes also took place in the kinds of artifacts which were used by the Neolithic 2 population and the way they were made. The chipped stone industry was based upon the production of blades which were retouched into blade tools. Among other changes in the kinds of chipped stone tools was a great increase in the number and variety of arrowheads and sickle blades on many sites. Neolithic 2 also saw a growth of crafts and greater elaboration of artifacts. The most common examples of this were stone bowls often of some beauty and objects of adornment such as stone beads and pendants.

The first section of Chapter 4 will consist of a detailed examination

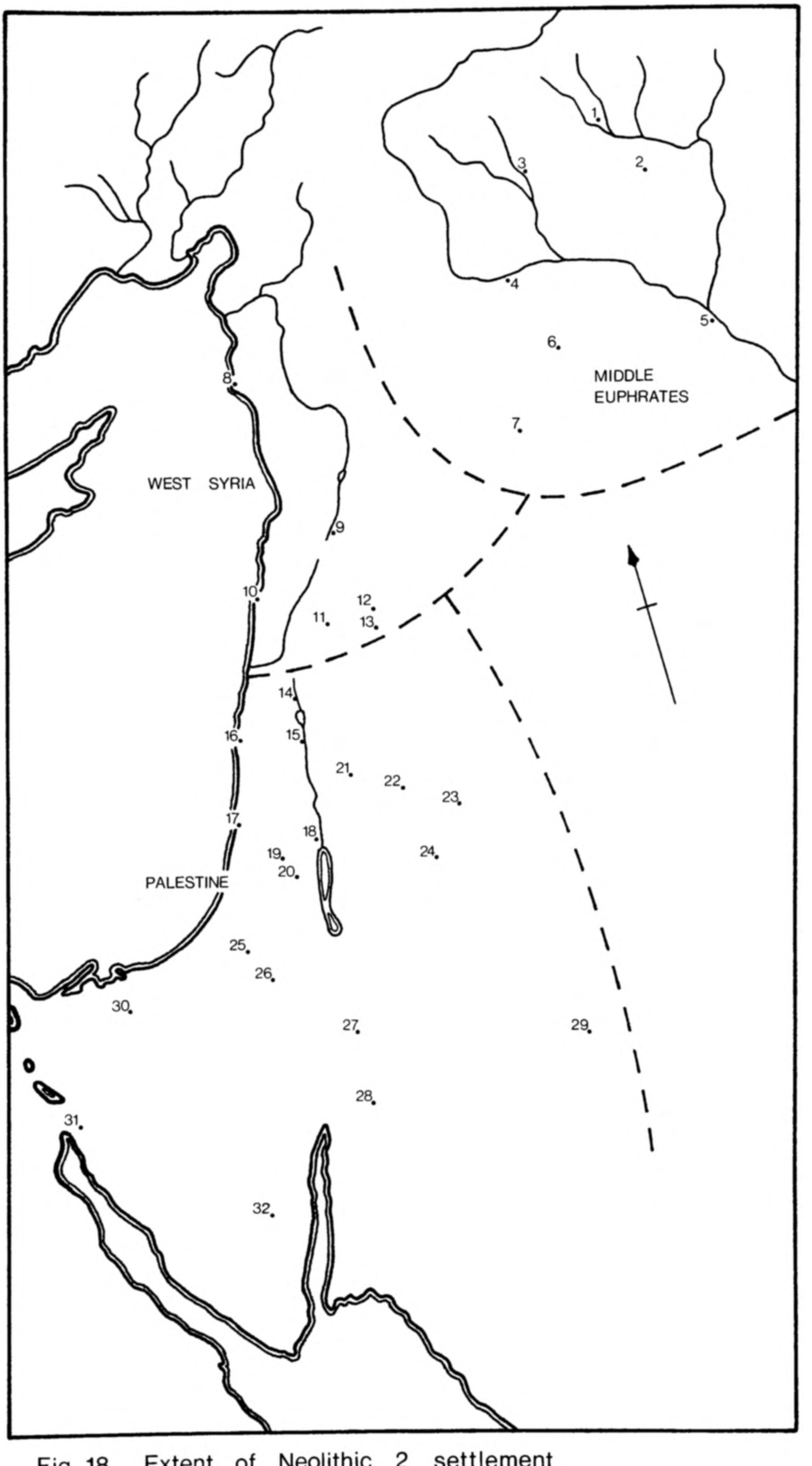


Fig. 18 Extent of Neolithic 2 settlement

scale 1:5,000,000

FIGURE 18

Extent of Neolithic 2 settlement

1 Tell Fakhariyah
2 Sheikh Abdul Aziz - Site 26, Khazne Cave I - Site 28
3 Tell Aswad (Balikh)
4 Tell Abu Hureyra
5 Buqras
6 El Kum
7 Palmyra sites
8 Ras Shamra
9 Tell Labweh
10 Tell aux Scies
11 Tell Ramad
12 Ghoraife
13 Tell Aswad
14 Beisamun
15 Munhatta
16 Nahal Oren
17 Jaffa
18 Jericho
19 Abu Gosh
20 Tahuneh
21 Abu Suwan
22 Qasr el Hallabat
23 Azrak
24 Wadi Dhobai B
25 Halutza
26 Nahal Divshon
27 Beidha
28 Ain Abu Nakheileh
29 Kilwa - Site 19
30 Jebel Meghara
31 Suez Canal
32 Wadi Sa'al

of sites inhabited during Neolithic 2 and their material remains in order to present the evidence for the changes in the way of life of the people of the Levant outlined above. In the second section I shall review the main cultural characteristics of Neolithic 2 to assess their implications and to see how they differed from Neolithic 1. I shall then discuss the distribution of Neolithic 2 sites to see how the settlement pattern was modified. The fourth section will be devoted to a consideration of the evidence for the economy of Neolithic 2 to find out in detail how it changed during this stage. In the last section I will bring some of these conclusions together to see how they affected each other. I shall then consider the evidence for changes in social organization and for contact between the people of the Levant and neighbouring regions through a growth in exchange of exotic raw materials.

Several Neolithic 1 settlements in the Levant continued to be occupied well into the next stage and an analysis of their occupation sequences shows that Neolithic 2 developed directly from Neolithic 1. The two sites in Syria with a continuous sequence are Mureybat and Tell Aswad. There are two more in Palestine, Nahal Oren and El Khiam. Jericho was abandoned during this crucial period and not reoccupied until Neolithic 2 was already established elsewhere in the region. The transition to Neolithic 2 can also be seen at Beidha to the east of the Rift valley towards the southern limit of settlement in this stage. The regional variations in culture which can be discerned in Mesolithic 2 and Neolithic 1 become much more marked in this stage (Fig. 18). For this reason I shall take each of these regions in turn, examining the key sites first and then all the others for which we have some information. The development of Neolithic 2 can be seen most clearly in the northern Levant so I shall begin there.

Middle Euphrates (Fig. 19)

Mureybat

Occupation continued into the next stage without interruption at one

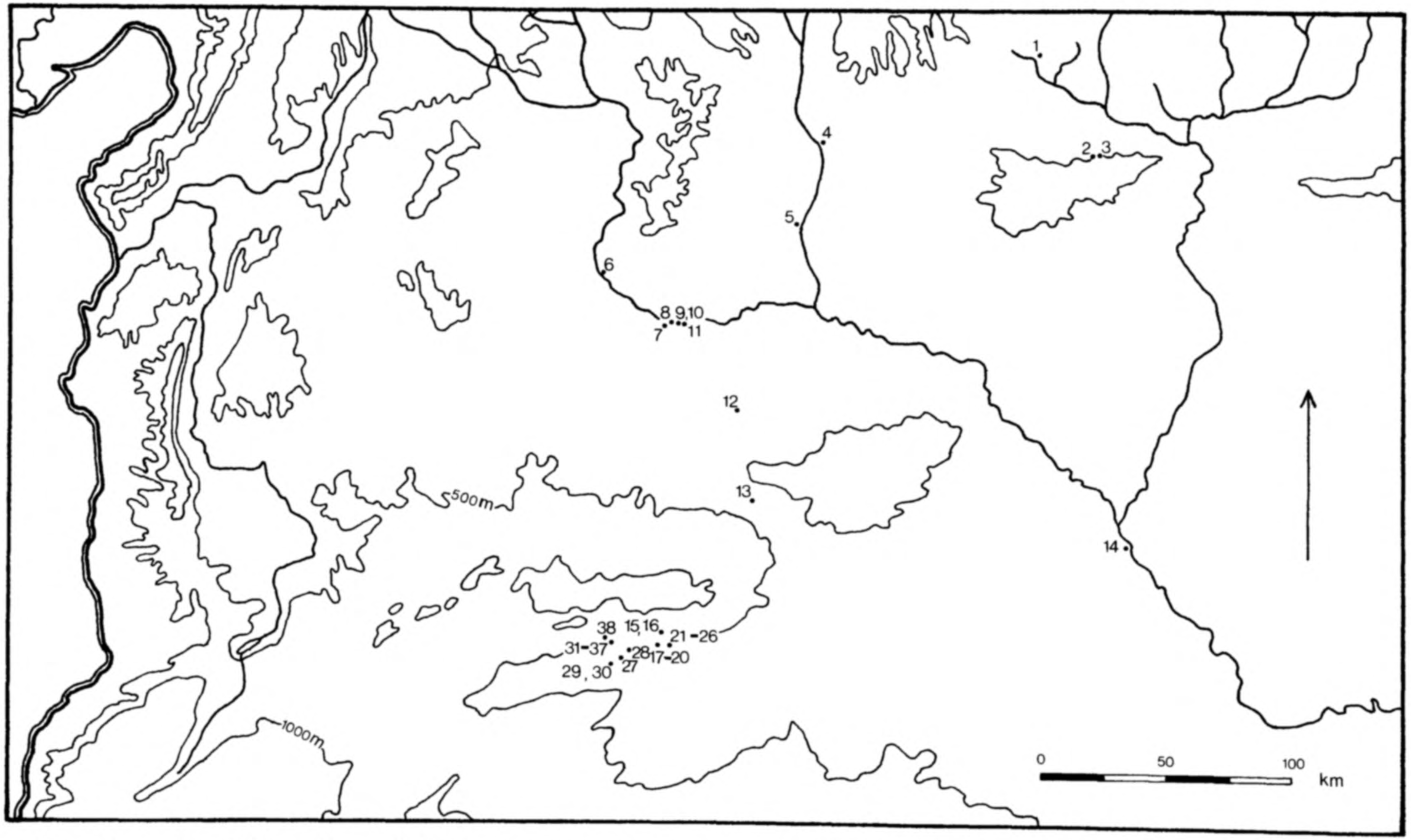


Fig. 19 Neolithic 2 Middle Euphrates sites

FIGURE 19

Neolithic 2 Middle Euphrates sites

1	Tell Fakhariyah
2	Sheikh Abdul Aziz - Site 26
3	Khazne Cave I - Site 28
4	Tell Aswad (Balikh)
5	Tell Khirbet el Bassal
6	Mureybat
7	Site III
8	Tell Abu Hureyra
9	Site I
10	Site II
11	Tell Kreyn
12	10km south of Risafe
13	El Kum
14	Buqras
15	Palmyra - Site 51
16	Palmyra - Site 52
17	Palmyra - Site 41
18	Palmyra - Site 42
19	Palmyra - Site 43
20	Palmyra - Site 48
21	Palmyra - Site 33
22	Palmyra - Site 34
23	Palmyra - Site 35
24	Palmyra - Site 36
25	Palmyra - Site 38
26	Palmyra - Duara factory site
27	Palmyra - Site 54
28	Palmyra - Site 53
29	Palmyra - Site 56
30	Palmyra - Site 60
31	Palmyra - Site 63
32	Palmyra - Site 64
33	Palmyra - Site 65
34	Palmyra - Site 66
35	Palmyra - Site 69
36	Palmyra - Site 71
37	Palmyra - Site 74
38	Palmyra - Site 77

site in the Euphrates valley, Mureybat. The latest Neolithic 1 occupation was Cauvin's phase III; this was succeeded by phase IV. A deposit with material typologically intermediate between phases III and IV was found towards the end of the excavation (M.-C. Cauvin, 1974b, n. 31) and this has provisionally been named phase IVA. Cauvin found deposits of phase IV in a sounding on the eastern slope of the central mound and has also recognized material of this phase in a collection from van Loon's sounding W15 (Cauvin, 1972, 110) made to the north of the central mound. I have seen similar artifacts mixed with material from the earlier levels in the collection from van Loon's excavation in the Aleppo Museum. On visits to the site I have also found much material of this phase on the north and north-west of the large oval platform around the central mound. It appears, therefore, that the phase IV settlement covered much of the area of the site but its remains have not been properly tested in the recent excavations. There are scatters of flints of this phase along the river bank between the ferry and the mound and also on the track up-river to the north away from the modern village. This suggests that during phase IV there was transient occupation over a much wider area than the central mound at Mureybat. Some of this abundant material from the excavations and the surface is typologically quite late, including pressure-flaked tanged arrowheads for example that elsewhere are often associated with finds of early Neolithic pottery and which may therefore be 6th millennium in date. There are also indications from strata XVIII and XIX of van Loon's excavations (van Loon, 1968, 276ff) and my own observations of the surface of the site that the mound was occupied intermittently much later from the Bronze Age to the Islamic period.

The structures in Cauvin's sounding on the eastern slope of the central mound were all rectilinear and made of mud-brick. No complete buildings were exposed. The flint industry consisted mostly of tools made on long blades struck from double-ended or keeled cores. The most abundant types were burins, end-scrapers and tanged arrowheads. The latter were usually finished with abrupt retouch but some had squamous flaking; notched arrowheads were virtually absent (M.-C. Cauvin, 1974b, n. 7).

There are no ^{14}C dates for this phase so its chronology has to be determined by comparing the remains with other sites. The nearest dated site in the Euphrates valley with comparable remains is Buqras where the aceramic levels, I and II, have similar material. The dates for all the levels at Buqras cluster around 6000 B.C. (Radiocarbon 9, 1967, 128). Similar material from Tell Aswad near the source of the Balikh is dated to the mid 7th millennium (J. Cauvin, 1974b, 203). It appears that the new cultural configuration in the Euphrates valley lasted for much of the 7th millennium. Until the chronology of the lengthy sequence at Abu Hureyra has been determined it will not be possible to date precisely the gradual typological evolution of the flint industry and other artifacts of this period. Phase IV at Mureybat should fall somewhere within the 7th millennium but for the moment we do not know exactly when it began and ended. Phase IVa must have begun about or soon after 7500 B.C. when phase III came to an end and probably continued until about 7000 B.C.

The importance of the Mureybat sequence is that in phases III and IV one can see the emergence of the new cultural configuration from Neolithic 1. The full development of the new phase has been most clearly revealed at Tell Abu Hureyra further down the Euphrates valley.

Tell Abu Hureyra[7]

Tell Abu Hureyra is situated on the right bank of the Euphrates about 36 km downstream from Mureybat. The river has cut deeply into the Syrian plateau so that the sides of the valley are formed by cliffs or hills. The floor of the valley at Abu Hureyra is about 6 km wide and a river terrace juts out into the flood-plain here. The site is situated on this projection and has a good view up and down the valley (Fig. 20). The steppe of the Syrian plateau meets the moist alluvium of the flood-plain at the edge of the valley floor and the prehistoric mound lies on the dividing line between these two environmental zones. The Euphrates is now about 1 km to the north but it

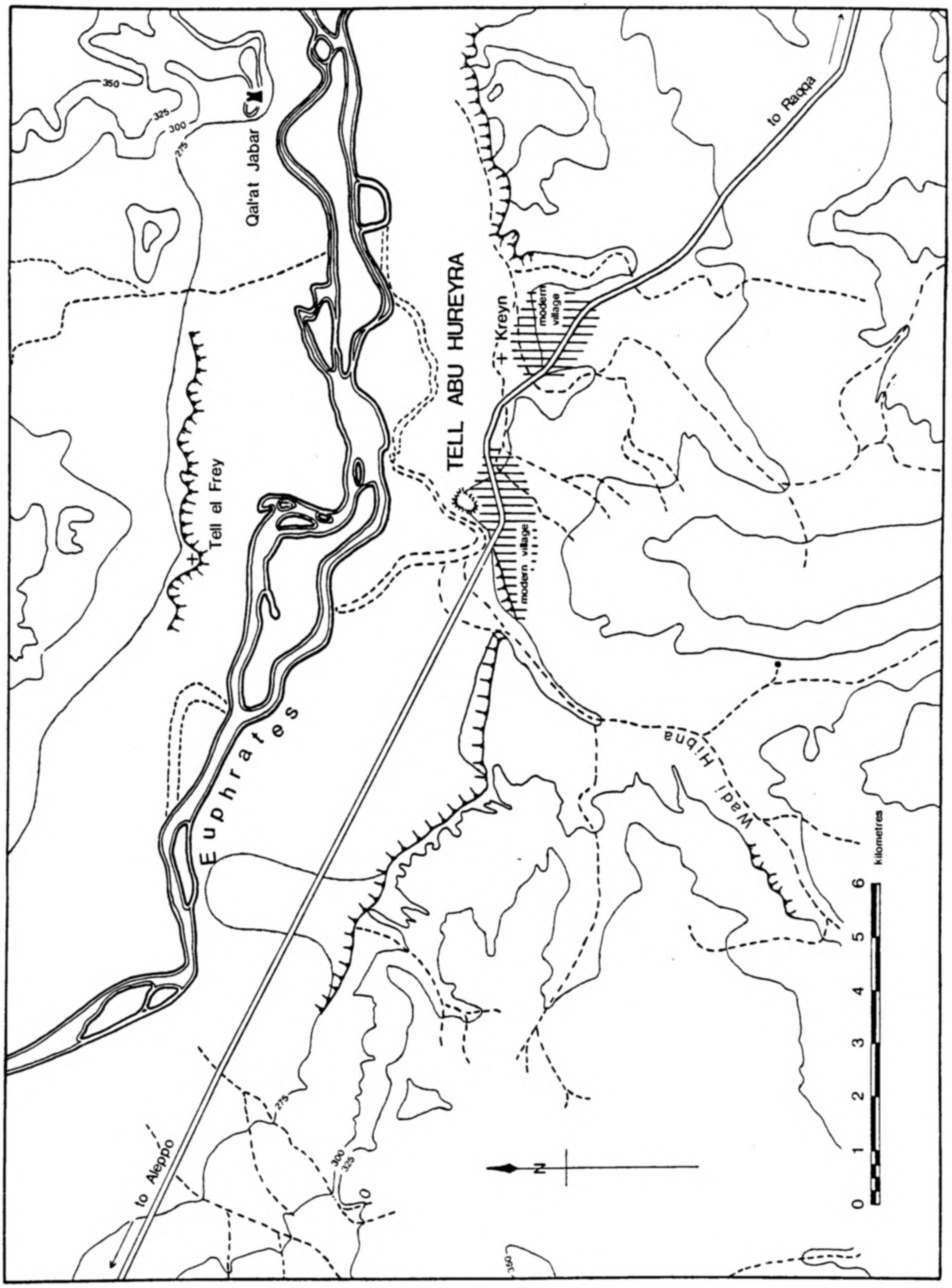


Fig. 20 Environs of Tell Abu Hureyra

probably flowed much nearer the site when it was inhabited than now and would have been the main source of water for the inhabitants. An important feature of the local topography is the Wadi Hibna which is incised into the plateau and joins the Euphrates valley 2 km west of the site.

This area receives an average of 200 m rainfall a year although there are considerable fluctuations in the actual amount of rain that falls. Dry farming is possible on the steppe in years when the rains reach at least this average figure. The water table of the flood-plain remains high for much of the year which makes it possible regularly to obtain high crop yields today even when the rains fail. The floor of the Wadi Hibna also has a high water table and is very fertile. Although the Wadi is dry for much of the year now it probably carried a perennial stream in the early Holocene. It was potentially important to inhabitants of the prehistoric settlement, therefore, because it offered additional moist alluvial land irrigated by running water.

The site which is approximately trapezoidal in plan covers 11.5 ha (28.5 acres) and is the largest known Neolithic settlement in Syria (Fig. 21). A ridge runs from north to south along the west side of the site which slopes down steeply to the flood-plain. The north side slopes more gradually down to the flood-plain while to the east and south the mound falls gently away to merge with the terrace. Almost all the debris of which the mound is composed is derived from the Neolithic settlement.

Once the Neolithic settlement was founded it was occupied continuously until it was finally abandoned. This long occupation sequence can be conveniently divided into three phases, early aceramic, later aceramic and ceramic Neolithic. The first early aceramic deposits were found at the bottom of trenches B and C in the centre of the north-south ridge. This area remained the focus of the settlement throughout its life and the greatest depth of deposit, 8 m, was found here. The early aceramic village was quite small but it rapidly expanded north and south for remains of a late stage of the phase were found in trench A and in trench E where it overlay the Mesolithic

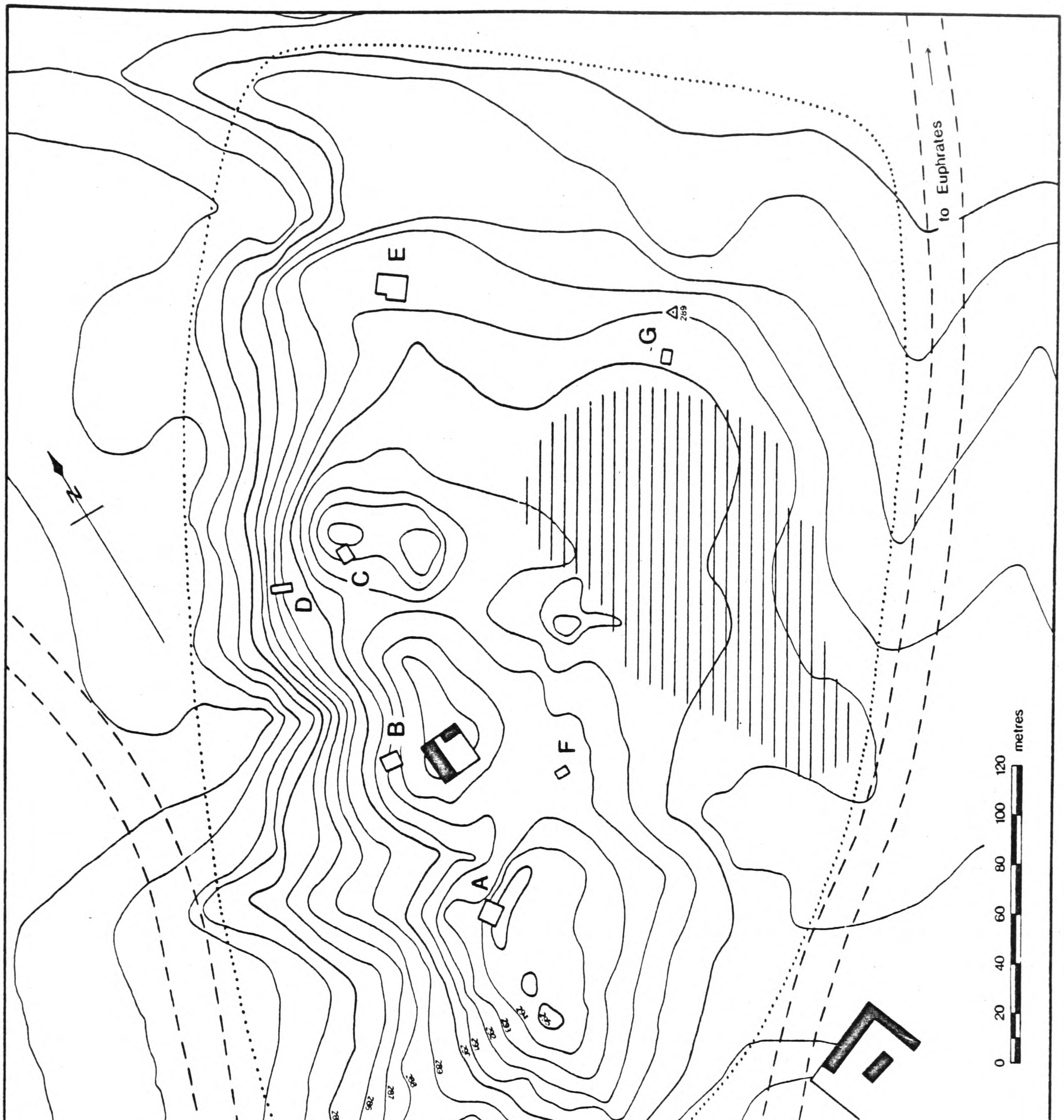


Fig. 21 Tell Abu Hureyra – contour plan

A – G excavated trenches

settlement. In the later aceramic phase the settlement grew still more until it covered the whole area of the mound. Remains of this stage make up almost all the 5 m of deposit in trenches F and G, both of which were dug to test the sequence of occupation of the rest of the mound. The settlement later contracted in size so that in the ceramic Neolithic phase it covered about half the area of the mound. Occupation was confined to the north-south ridge where the remains of this phase make up the top metre of deposit in trenches A, B, C, and E. Originally this deposit would have been considerably deeper but much has disappeared through erosion.

The buildings were of much the same type throughout the aceramic Neolithic occupation. They were rectilinear with several rooms and built of mud-brick. The rooms themselves were from 3 to 4 m long and from 1.4 to 2 m wide. One complete building excavated had five rooms and its exterior dimensions were 10.7 m by 4.5 m. The walls were usually quite thin so these buildings were probably one storey high. In one building the walls had survived intact to their original height of 1.7 m. There were several vertical post-holes set in the tops of the walls to carry either a loft or subsidiary supports for the roof. In the same building was a rectangular porthole doorway between two of the rooms with a high sill and mud-brick lintel. This type of doorway seems to have been the common form of entry to the rooms of these buildings although a few had doors at floor level.

The rooms of these buildings usually had plastered floors which were ooloured black and then burnished. A few had designs painted on them in red, one of which was recognizable as a sunburst, a blob with lines radiating from it. Some had simple trodden earth floors. The walls were covered with mud plaster which in some buildings had been whitewashed.

A few buildings had internal features made of mud-brick and plaster. There were low platforms in the corners of some rooms which may have been for sitting or sleeping on. Storage bins were found in a room of at least one building; these were made of mud-brick and lined with plaster. Niches were frequently built into walls and probably served as receptacles for household equipment. A number of buildings had a hearth in the centre of a room. This was filled with ashes but the rest of the room was often quite clean so I am inclined to think the hearths were used for warmth and light rather than for cooking. A room of one building had a clay oven in one corner which was almost certainly used for preparing food.

Most of these buildings had much the same characteristics and were probably houses. One structure in trench G had a different plan. It consisted of two rooms of the usual shape but adjoining these was a pair of narrow chambers, 0.5 and 1 m wide and at least 4 m long. This building may have been used for some other purpose. Although each house was separated from its neighbours all were built close together with only narrow lanes and courts between them. This density was so marked that we found remains of one and even two or three series of buildings in every trench we excavated. The buildings themselves were quite often clean inside with just a scatter of flint tools or other artifacts on the floors. The passageways outside were choked with organic refuse, animal bones, ashes and the remains of fires. It would appear that meat in particular was prepared outside and that domestic rubbish was allowed to accumulate between the buildings.

All these buildings faced south or south-west to catch the winter sun. They were rebuilt time after time on the same alignment in the same place. In trench B this happened seven and in trench C no less than eleven times. Two possible explanations may be offered for this practice. One is that the restrictions on space within the settlement were so great that a new building had to be constructed on the same plot as its predecessor. The other might be that families had customary rights to certain plots and chose to rebuild their dwellings on the same spot over many generations. In practice these two influences probably operated together, the result being that the same arrangement of houses was perpetuated over a long period, itself an indication of the stability of the settlement.

The ceramic Neolithic layers had weathered badly so that it was not

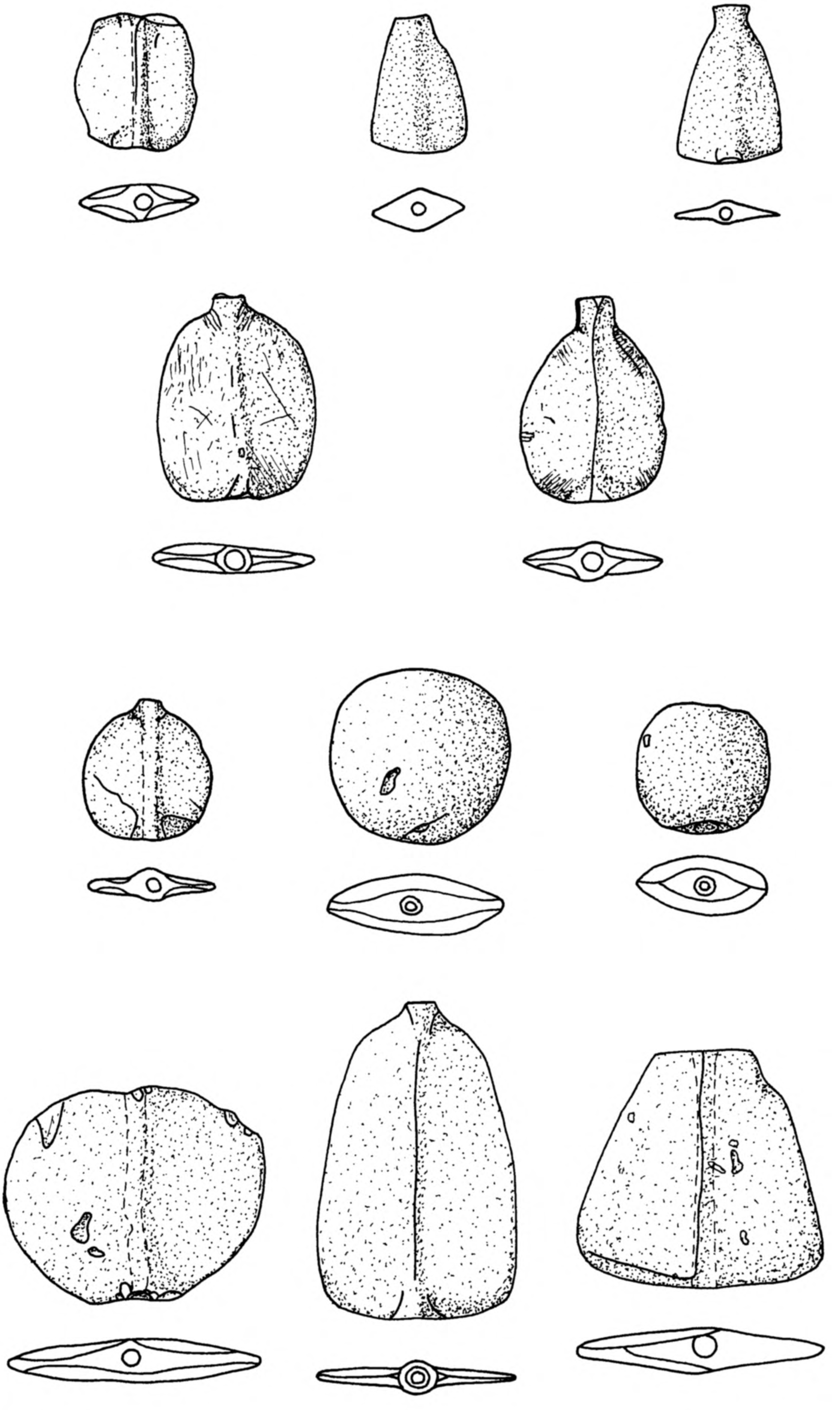


Fig. 22 Tell Abu Hureyra – butterfly beads

possible to determine the plans of any buildings. Traces of rectilinear mud-brick structures were found, enough to indicate that the same building tradition continued. A new feature characteristic of these layers was a series of shallow pits up to 2 m in diameter and 1 m deep. Some had been dug out and reused many times. Each was filled with burned debris, bones and often stones as well. They may have been roasting pits or fire hollows but their exact purpose is uncertain for the moment.

Throughout the life of the Neolithic settlement the inhabitants buried their dead in shallow pits beneath the floors of their houses or in the yards outside. Some bodies were buried singly in a crouched position though the skull was sometimes removed. A few of these had been wrapped in matting. One had a flint arrowhead lodged in the chest cavity, evidence that this individual had suffered a violent death. Other corpses were buried in groups either with or without their skulls. The skulls were deposited singly or in groups, sometimes mixed with a few other human bones. The single inhumations were best preserved because they had not been subsequently disturbed. The multiple burials were often disordered; skeletons were frequently buried incomplete and the bones were in poor condition. This was because secondary burial had taken place. The bodies seem to have been buried until the flesh had decayed and later exhumed. The skulls were often then detached and buried separately while the remaining bones were carelessly gathered up and reburied in multiple graves. Red ochre was scattered over some of the bodies and painted on several of the skulls. A few of the burials were accompanied with grave goods, one or two river pebbles, a flint tool or some beads. In one case a complete necklace of coloured stone cylindrical beads was found. One unusual type of funerary artifact was the butterfly bead (Fig. 22), almost all of which were found in graves. These were oval, triangular or trapezoidal and ground very thin. Each was bored through the middle for suspension. Most were made of serpentine although a few were cut from agate, both of which were probably obtained from the Taurus Mountains.

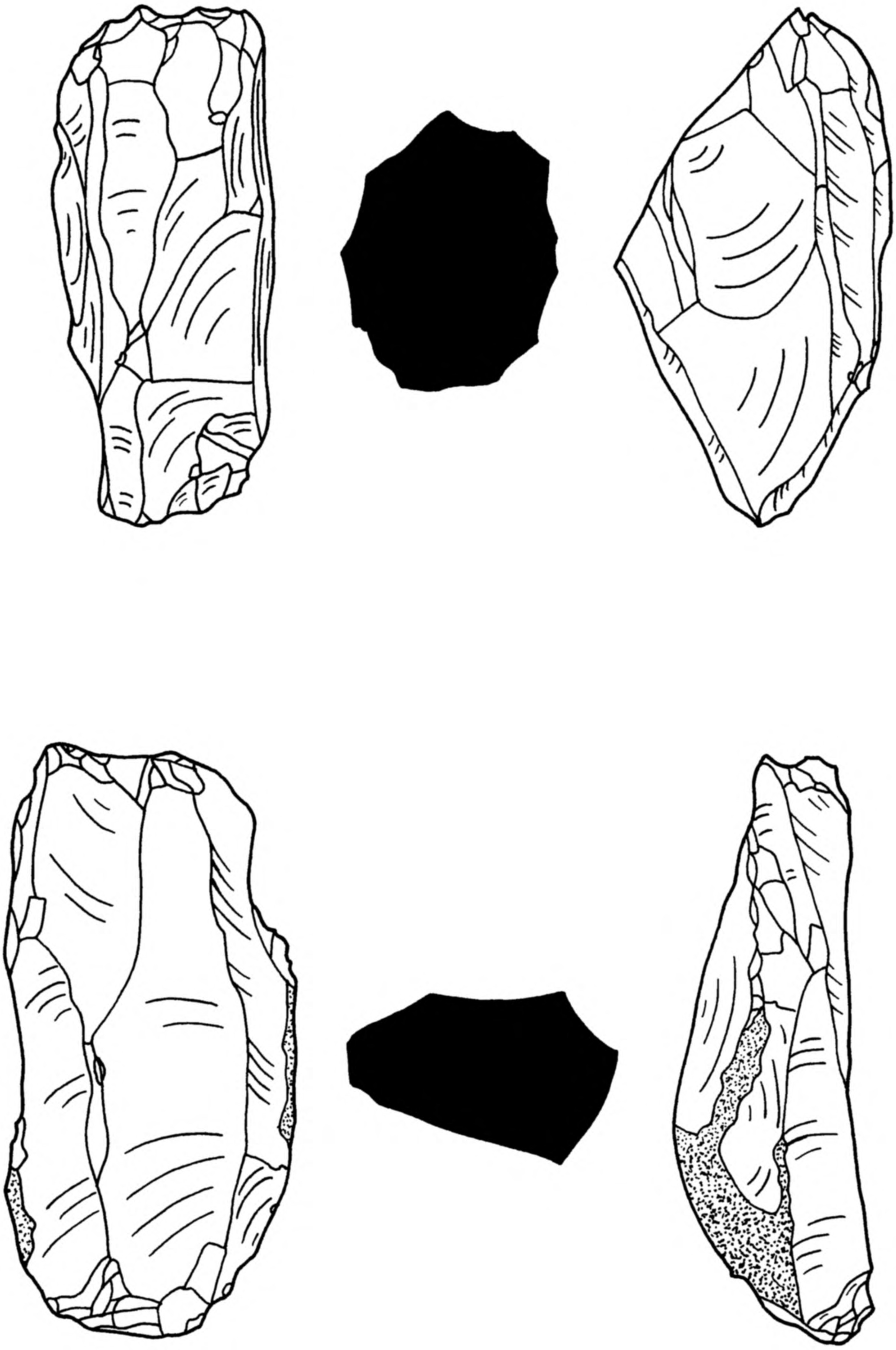


Fig. 23 Tell Abu Hureyra – double-ended flint cores

The skeletons are now being examined in the laboratory and this study promises to tell us much about the physical condition of the inhabitants. It may also be possible to deduce more precise information about the composition of families and their social arrangements. One problem in particular on which the anthropological study may throw some light is the question of family ownership of houses and their rebuilding over several generations. If burials of the descendants of a single family are found beneath successive houses that could be an indication that ownership of dwellings and the plot on which they stood was maintained within the same family from one generation to the next.

The flint industry was based upon the production of large blades from conical and double-ended cores. All the flint was obtained in the vicinity from wadi gravels, the valley slopes and outcrops in the limestone. There were some gradual alterations in the techniques of production and in the types of tools found during the life of the settlement which help to differentiate the phases. In the early aceramic the blades were long, irregular and pointed. During the next two phases most blades were struck from double-ended cores (Fig. 23) and as a result were parallel-sided and more regular.

Relatively few types of tools were made in the early aceramic; tanged arrowheads, end-scrapers and borers on blades, single-blow and angle burins together with a few flake scrapers. Massive flint tools were not found at Abu Hureyra nor are they known from any other site in the Levant occupied at this time. These tools were shaped with a little abrupt retouch, the arrowheads sometimes being retouched under the tip as well as around the tang. Arrowheads were by far the most common tool throughout the Abu Hureyra sequence (Figs. 24, 25).

Tools were retouched a little more in the later aceramic phase and squamous pressure-flaking was introduced. A greater variety of scrapers was made (Fig. 26), among them side-scrapers on flakes and blades and disc scrapers. The smaller discoids or thumbnail scrapers are quite characteristic of the

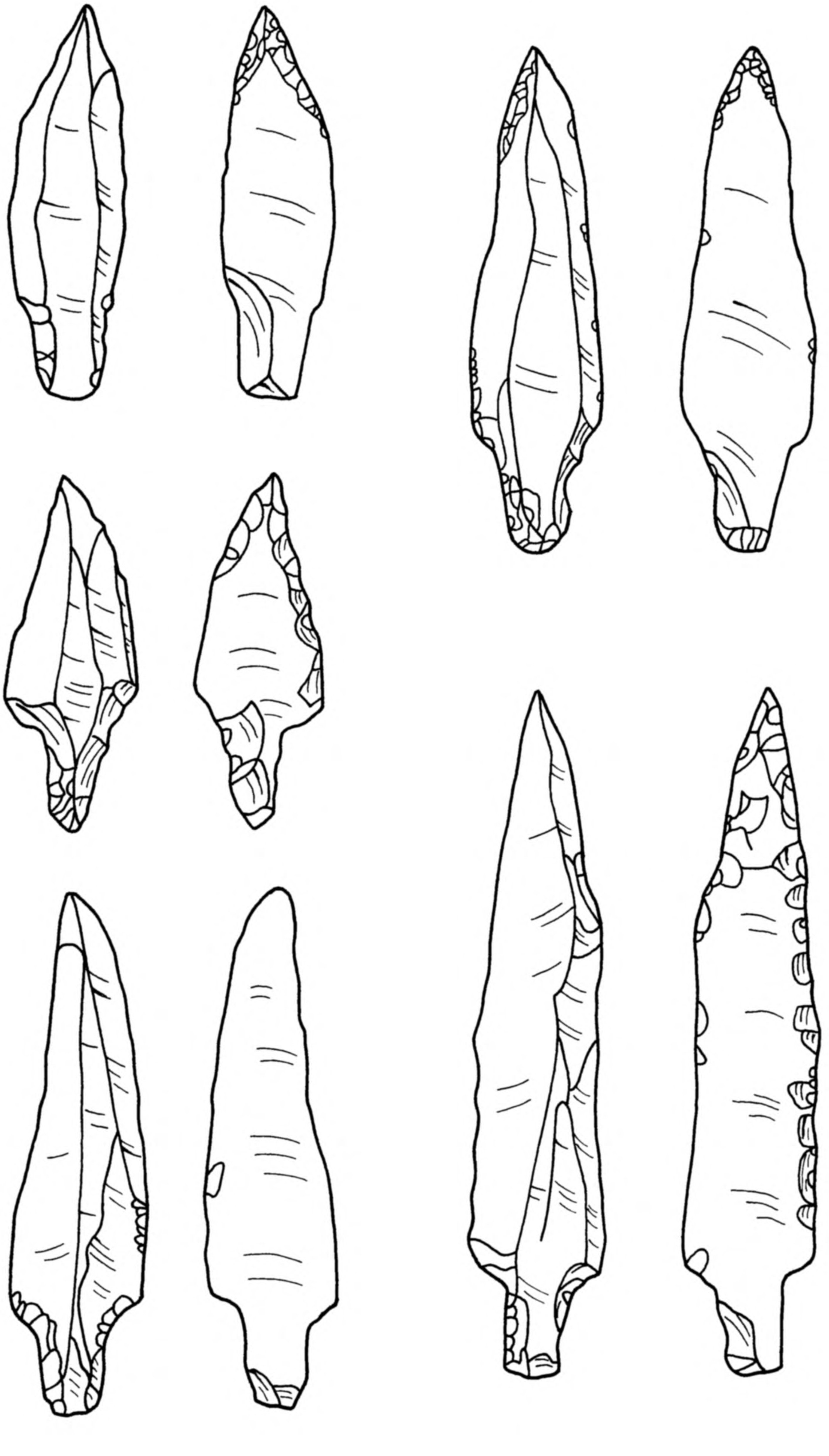
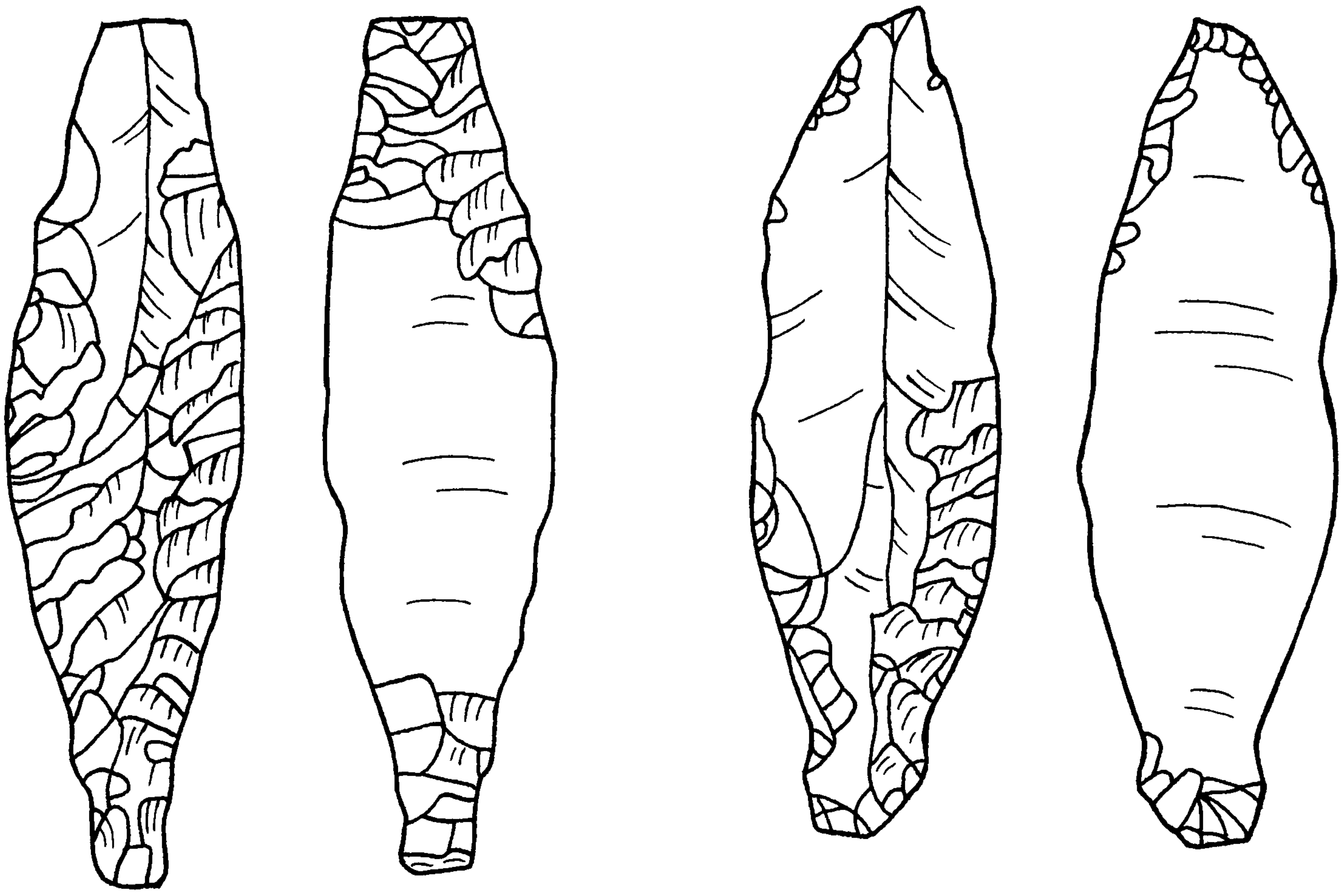
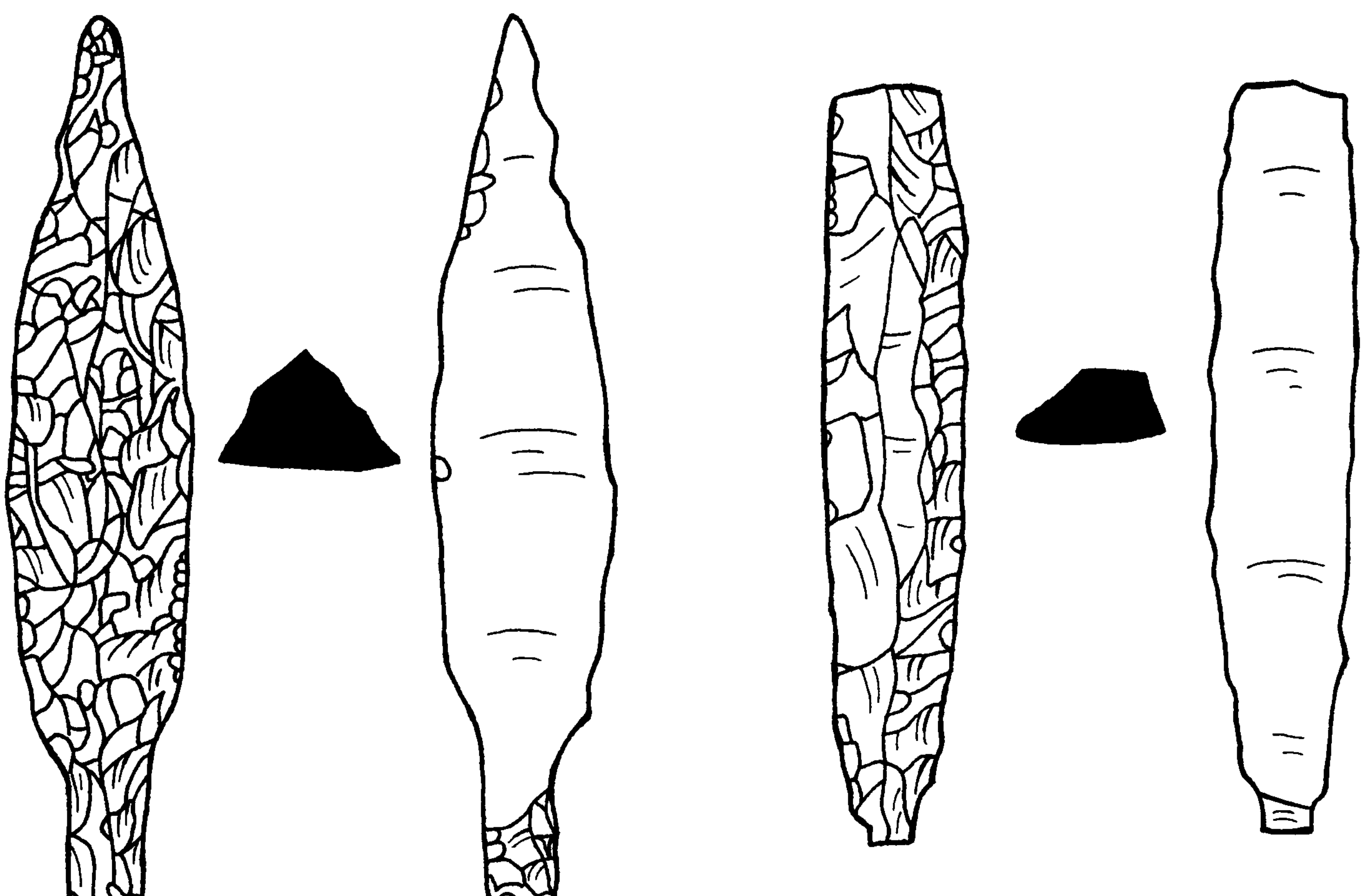


Fig. 24 Tell Abu Hureyra – flint arrowheads



AMUQ 2



AMUQ 1

Fig. 25 Tell Abu Hureyra – Amuq arrowheads

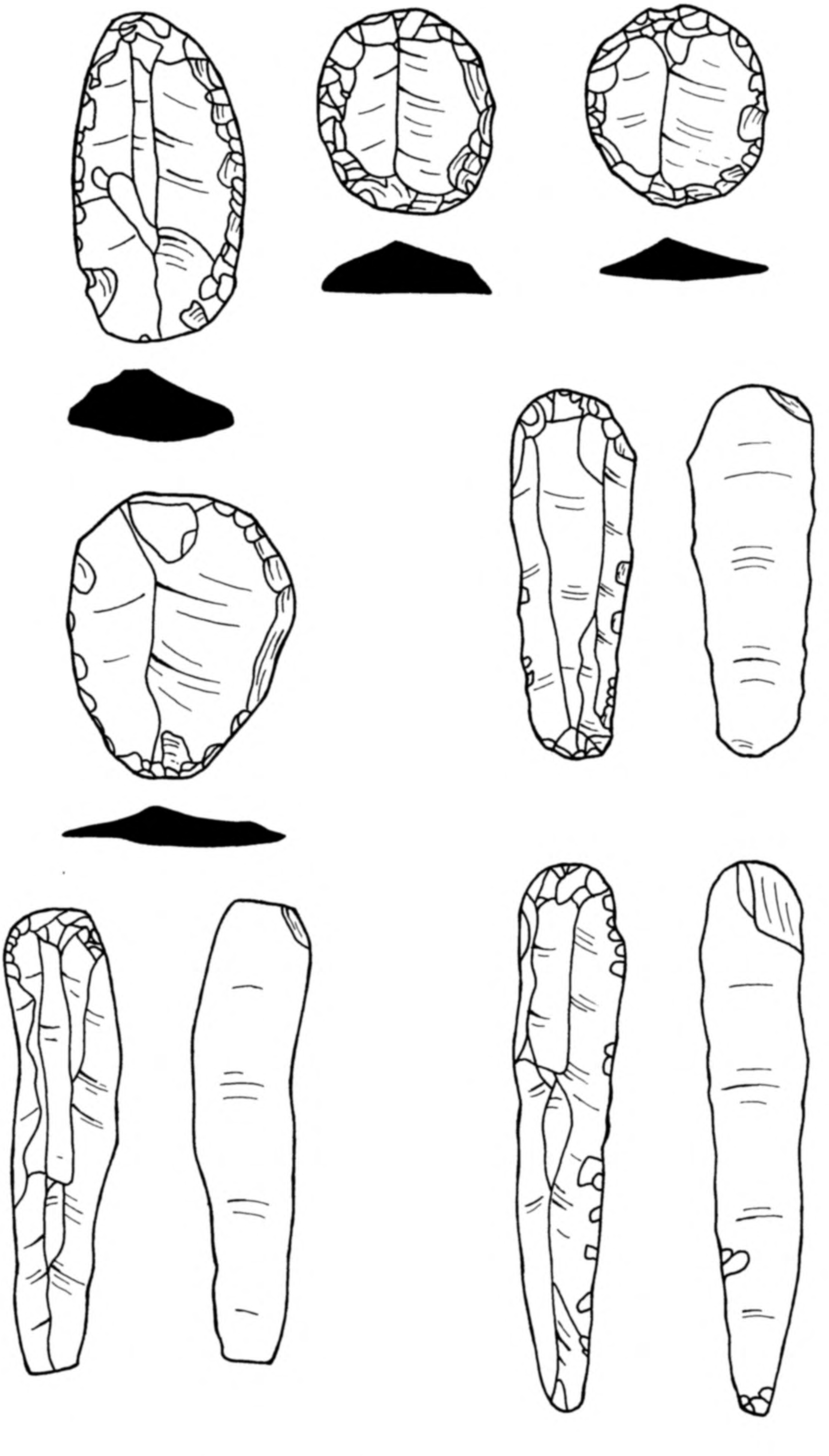


Fig. 26 Tell Abu Hureyra – flint scrapers

assemblage. The arrowheads usually had stubby straight-ended tangs. Burins were common and more varied in type (Fig. 27). A variety of awls was made on both flakes and blades. Several tools of this phase have been examined by L. Keeley for traces of microwear and this study has shown that a specific type of long borer on a blade (Fig. 28) was used as a drill or reamer to bore holes in wood. A distinctive sheen had formed on the retouch scars caused by the high speed of rotation of the tool, suggesting that it had been turned by a bow drill. The end-scrapers were shown to have been used to scrape hides. A few retouched blades with sickle gloss were found in the later aceramic phase; most of these were backed and had irregular edge retouch (Fig. 29). Microwear examination has confirmed that they were used to reap plants but we do not know if these were cereals or reeds. There is good evidence that the inhabitants grew cereals in this phase but as the few sickle blades we found would have been insufficient to harvest them they must have been collected in some other way.

There were further minor changes in the flint industry in the ceramic Neolithic phase. Squamous pressure-flaking was used more frequently particularly to retouch arrowheads. Amuq arrowheads (Cauvin, 1968, 49) retouched in this way were made for the first time (Fig. 25).

A small quantity of obsidian was used at Abu Hureyra in every Neolithic occupation phase. Most of the pieces were small, unretouched, parallel-sided blades struck from conical or cylindrical cores. A few retouched obsidian tools were found in the late aceramic and ceramic Neolithic phases, among them tanged arrowheads with squamous retouch and flake scrapers. Some waste obsidian flakes and exhausted cores were recovered so it would appear that the blades and retouched tools were made on the site. The cores themselves were not roughed out from raw blocks of obsidian at Abu Hureyra as there was insufficient waste of this kind on the site. The obsidian probably arrived in the form of partly prepared cores. Obsidian comprised 4.35% of the total chipped stone recovered from the complete Neolithic occupation sequence in

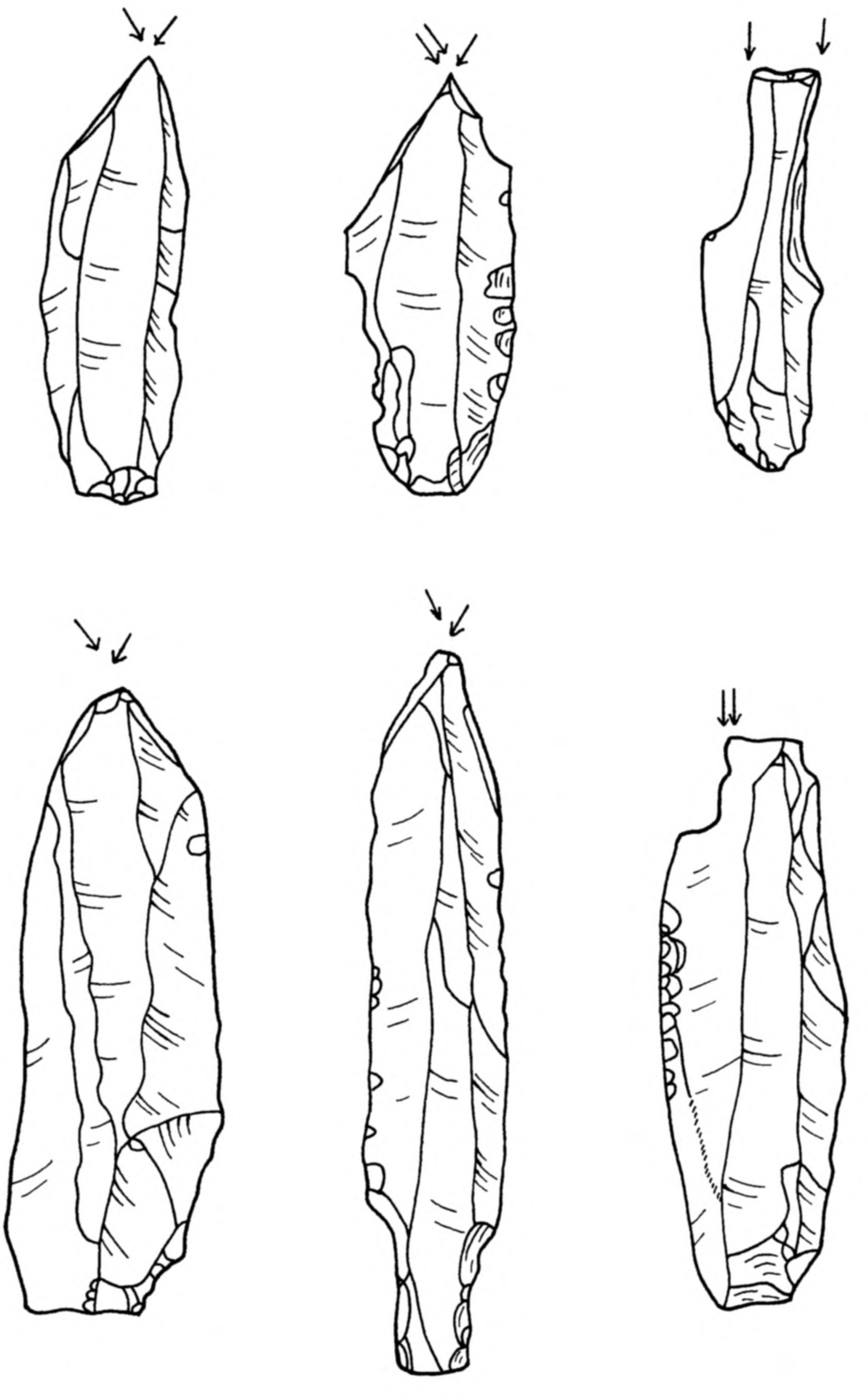


Fig. 27 Tell Abu Hureyra – flint burins

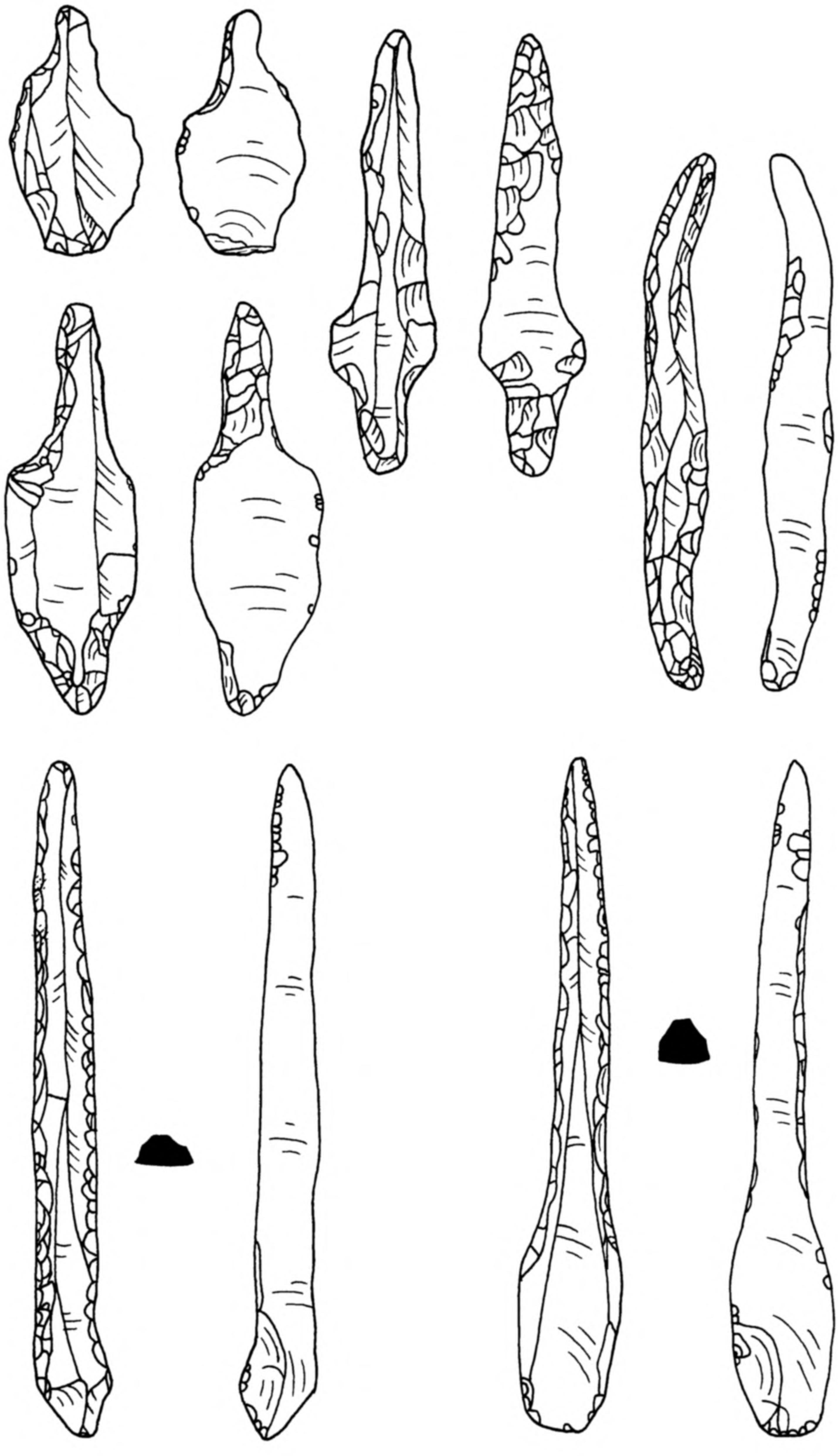


Fig. 28 Tell Abu Hureyra – flint borers

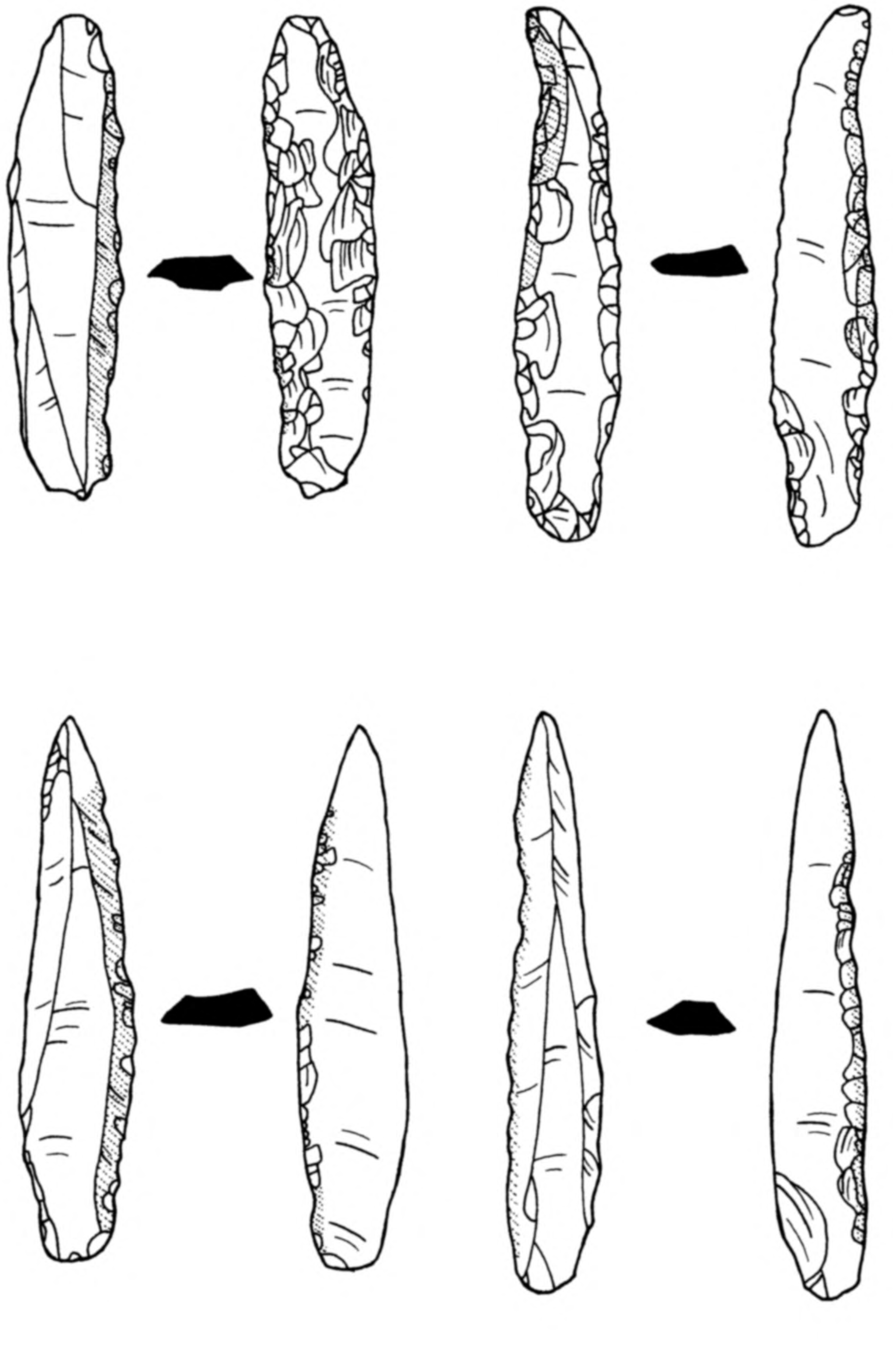


Fig. 29 Tell Abu Hureyra – flint sickle blades

trench B. Only 2.05% was used in the early aceramic phase in this trench but this increased to 5.42% in the later aceramic; in the ceramic Neolithic it fell to 4.19%. The figure for the early aceramic may not be quite representative as relatively little was excavated of the remains of this phase in trench B. Even so it tends to confirm a view I formed when the excavations were in progress that more obsidian was used as the settlement grew.

Pieces of obsidian from many sites throughout south-west Asia have been analysed in the past to determine their origins. An outline of the obsidian trade has been obtained from this work (Renfrew et al., 1968, 326ff) but many problems still remain to be resolved. The method of analysis most commonly used has been optical spectrography. In this technique much time is needed for each analysis so in order to build up a general picture of obsidian distribution a few pieces only have been examined from each site. This has created a sampling problem for we do not know if the few pieces analysed are representative of the actual obsidian distribution. One further difficulty with optical spectrography is that it is not quite sensitive enough to be able to distinguish between all the different sources of obsidian (Renfrew et al., 1968, 320).

These problems can be overcome if neutron activation analysis is used because samples may be analysed more rapidly and in greater detail with this technique than is possible with spectrography. In the new programme of obsidian analyses I am carrying out in collaboration with Bradford University we are using the neutron activation method. Large samples of obsidian from selected Neolithic sites throughout the Near East are being studied to determine the sources from which it originated. In this way we shall obtain a more precise picture of the distribution of obsidian during the Neolithic and we hope also a clearer idea of how the obsidian reached the sites on which it is found.

100 pieces of obsidian from trench B at Abu Hureyra have now been analysed as part of the this programme (McDaniels, 1976, 32). The results show that obsidian was obtained from at least six sources and that most of it

came from four of these (Table 1). Obsidian from Nemrut Dağ was favoured in the early aceramic but the proportion of obsidian from this source declined sharply later on. Relatively little obsidian was obtained at first from the 1g source which is also believed to be near Lake Van but much more was used in the later aceramic and ceramic Neolithic phases. It would thus appear that the proportions of obsidian from these two possibly neighbouring sources varied inversely. Some obsidian from the Çiftlik source was used in the early aceramic but the proportion declined in the later aceramic; it increased markedly in the ceramic Neolithic when it was the most favoured of all the sources. Abu Hureyra is equidistant from the Çiftlik and Vannic sources both about 400 km away.

We do not yet know if these results are truly representative of the use of obsidian at Abu Hureyra as the sample studied is still a small one and came from a single trench. We propose to carry out a similar series of analyses of obsidian from trench C, another trench with the full Neolithic occupation sequence, to see if it supports the results obtained from trench B. We can be certain, however, that obsidian from at least six sources was reaching Abu Hureyra and that different amounts of obsidian from these sources were used in each phase of occupation.

Bone tools were the second most common find at Abu Hureyra (Fig. 30). Those from the early aceramic were limited in type, consisting almost entirely of a range of borers. The same borers were found in the later phases but there was greater variety: some had fine, thin shafts, others more robust stubby points. Spatulae were also quite common while among the rarer items were several bone needles, bone tubes which were sectioned to make beads, a fish-hook and a hook and eye, perhaps used to secure clothing. The range is sufficiently wide to indicate that bone tools were used for many crafts and domestic tasks as well as for adornment, at least in the later phases of occupation.

Several other classes of artifacts such as pecked and polished greenstone

TABLE 1

PHASES	SOURCES						total analysed
	2b	1g	G1	G2	G3	unknown	
	%	%	%	%	%	%	
early aceramic	20	4	72	4	0	0	25
later aceramic	2.8	40	48.7	5.7	0	2.8	35
ceramic	45	32.5	5	12.5	5	0	40

TABLE 1

Percentages of obsidian in each cultural phase at Tell Abu Hureyra

Sources:

2b = Çiftlik (Renfrew _et al_, 1966, 33)

1g = presumed to be near Lake Van (Renfrew _et al_, 1966, 40)

G1 = Nemrut Dağ, source 4c (Renfrew _et al_, 1966, 34)

G2 = Bingöl, source 4c (Renfrew _et al_, 1968, 320)

G3 = believed to be in eastern Anatolia (McDaniels, 1976, 67)

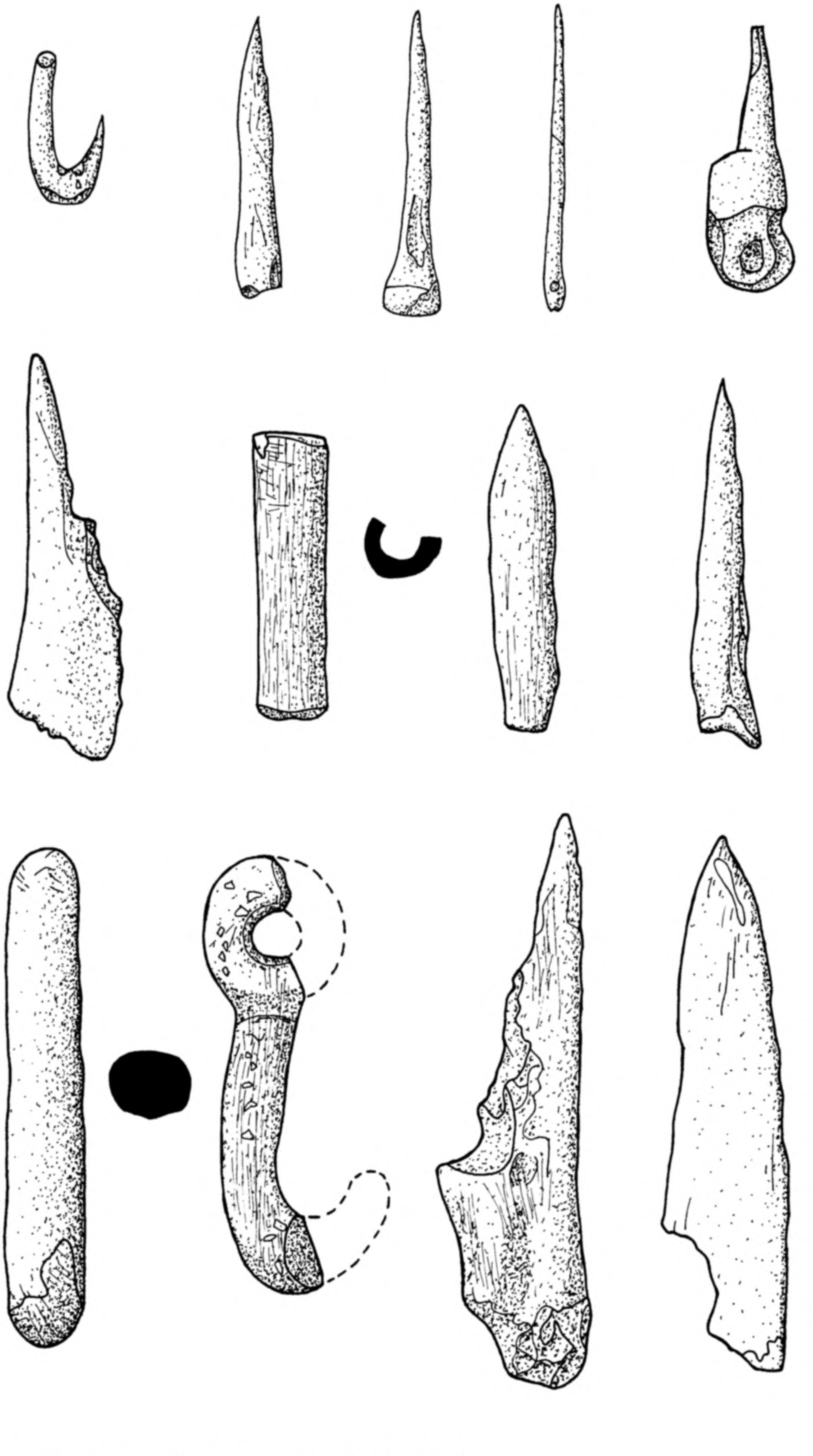


Fig. 30 Tell Abu Hureyra – bone tools

axes and chisels were found throughout the occupation sequence (Fig. 31). Most of these were made from pebbles obtained from the river gravels but a few were fashioned in jadeite, almost certainly obtained from Anatolia. They were probably used as carpentry tools. Pecked stone balls, hog-backed rubbers and saddle querns were also quite common. The rubbers and querns were made of basalt or limestone.

A much greater variety of artifacts was used in the later aceramic and ceramic Neolithic phases, one of the distinguishing features of these stages of settlement. Some of the more attractive artifacts were a series of polished stone bowls and dishes (Moore, 1975, fig. 8). Most were carved from coloured limestones or alabaster, a few from gypsum and one or two from granite and steatite. The bowls were usually hemispherical and quite small although a few had flat bottoms with flared sides. The dishes were both round and oval. These vessels were delicately finished but a series of large, rough stone bowls was also found which could have been either containers or mortars.

A number of much larger containers were made of a distinctive white plaster; these were similar to the white ware (vaisselle blanche) found on other contemporary sites in Syria and Lebanon. Several were large rectangular tubs with a hole-mouth at the top while others were circular jars. Some had been made in the rooms in which they were found and all were thick-walled and very heavy. Most of the white plaster vessels were found in the later aceramic Neolithic layers.

Decorative items such as beads and pendants were also much more common in these two phases. The variety of shapes was considerable, including cylindrical, annular, discoid and pear-drop beads made of greenstones, shell, bone, baked clay and other materials. Several other objects found in the later aceramic phase were made of baked clay such as decorated "stamp seals" and spindle whorls. A few unbaked clay anthropomorphic and animal figurines were also found. Clay was used for a number of artifacts and other structural purposes such as pit linings in the later aceramic Neolithic settlement and

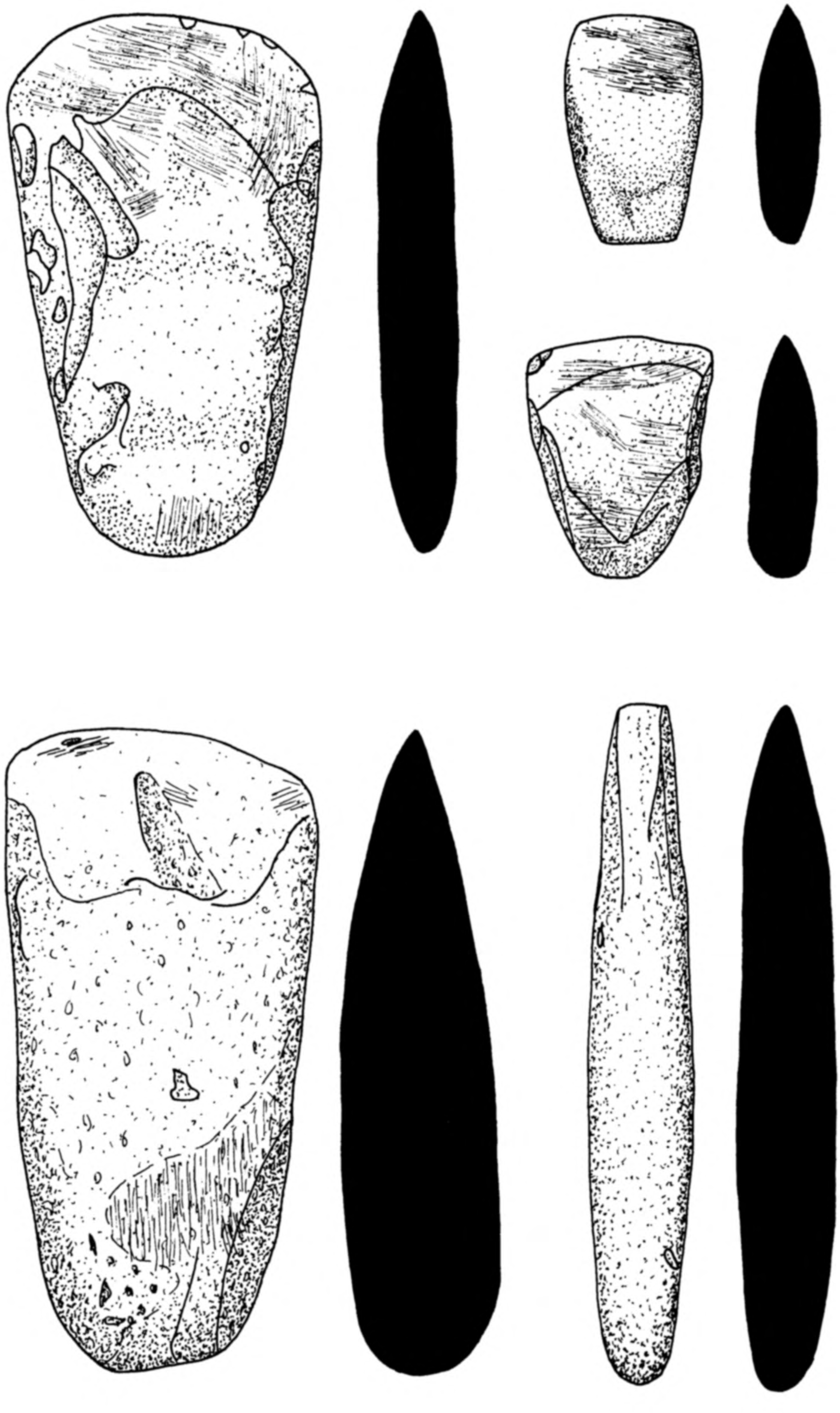


Fig. 31 Tell Abu Hureyra – polished stone axes and chisel

the inhabitants knew how to fire it well before pottery was made at the site.

Pottery itself was found in the ceramic Neolithic phase and then only in small quantities. Most of it was from simple baggy vessels with plain or collared rims. The fabric was coarse and crumbly with straw temper and the surface of the vessels was burnished. This pottery was exceedingly rough though it did resemble that very broad class of dark burnished wares found on other Syrian Neolithic sites. One or two highly burnished black or brown sherds of a ware found at Ras Shamra in Phases VB and VA and Tell Ramad III did occur at Abu Hureyra as well as others decorated with red paint.

A few strands of thread found in a clay bead indicate that spinning was practised at the site. The one other craft for which we have good evidence is basketry. A number of impressions of baskets were found in bitumen which had been used as a lining. There were also traces of matting in the soil while seeds of rushes and reeds that could have been used to make baskets and mats were recovered in flotation.

We have already noted that several raw materials used at Abu Hureyra had been imported from a considerable distance. Most of these are believed to have come from the Taurus Mountains and Anatolia 300 km to the north. The list can be extended to include a pyritic micaceous stone and malachite powder which was apparently used as a cosmetic. Several objects made of this particular stone were found, each with a polished U groove on one side and a criss-cross pattern of scratch marks on the back. They resemble certain artifacts found at Zawi Chemi Shanidar in a slightly earlier context interpreted as arrow shaft straighteners (Solecki, Solecki, 1970, 832, 839) and Mrs. Helbaek informs me that a few similar to those at Abu Hureyra have been found at Beidha.

Several other raw materials were obtained from different regions. The steatite probably came from the Zagros Mountains while a bead and other tiny pieces of turquoise may have originated in Sinai. Cowrie shells were found in every phase of the Neolithic settlement: these may have come from the Mediterranean or the warmer waters of the Persian Gulf or Red Sea. Although these links suggest contact with much of the Near East it appears that more of the exotic materials were imported from Anatolia than elsewhere. This may simply be because this was the region where such desirable materials were to be found or because there were stronger social and cultural ties between the inhabitants of Abu Hureyra and the peoples to the north than their contemporaries elsewhere and that these links were strengthened by the exchange of such materials.

These raw materials, though distinctive, were imported in small quantities. Other more common materials, basalt and certain limestones for rubbers and stone vessels, gypsum for bowls and perhaps bitumen were obtained within a radius of 60 km. The most common of all the raw materials such as flint were to be found in the vicinity of the settlement while pebbles of greenstone, granite and other attractive stones could be found in the river gravels.

No ^{14}C determinations have been made yet on the charcoal samples from Abu Hureyra and until these are available one can discuss the chronology of the site only in very general terms. Comparisons with Tell Aswad (Balikh) and Buqras would suggest that the aceramic phases should fall within the 7th millennium while the ceramic Neolithic levels would be dated about 6000 B.C. or a century or two later. The duration of the settlement can only be guessed at for the moment: the considerable occupation sequence and the evidence for gradual change in the typology of the flint industry and other artifacts suggest to me that the settlement was occupied for much longer than Buqras, for example, perhaps from the beginning of the 7th until well into the 6th millennium.

Certain classes of remains are characteristic of the aceramic Neolithic at Abu Hureyra. Rectilinear mud-brick buildings composed of several rooms with plaster floors are one example and the burial customs, including collective secondary burial associated with removal of skulls, are another. A third is the flint industry which used large blades struck from double-ended and keeled cores. These were retouched to make arrowheads, end-scrapers, burins and sickle blades. Such remains have also been found on many other contemporary settlements in the Levant; they are distinctive enough to be taken as characteristic features of this new stage following Neolithic 1 which I am calling Neolithic 2. Some other artifacts found in the more developed, later aceramic phase at Abu Hureyra are also associated with Neolithic 2 remains on many other sites. The fine stone dishes and bowls, plaster vessels and the abundant variety of bone tools may be included here. These artifacts were almost as widespread and characteristic of Neolithic 2 as the three major classes of artifacts I mentioned first.

Sites in the neighbourhood of Tell Abu Hureyra

Three small Neolithic surface sites have been discovered near Tell Abu Hureyra. One is on the right bank of the Wadi Hibna (site III) just before it opens out into the Euphrates flood-plain. The other two sites (sites I and II) are a little to the east of Abu Hureyra on the edge of the same terrace above the flood-plain. Flints collected from these three sites can be paralleled at Abu Hureyra so it looks as though they were all contemporary. These surface sites may have been small settlements related in some way to the larger centre.

One other prehistoric tell was found by van Loon (1967, 11) 3 km to the east of Abu Hureyra. This was Tell Kreyn which, like Abu Hureyra, lay on a projection of the first terrace into the flood-plain. At the northern end there was a small mound while to the south the site spread out over the surface of the terrace. The mound itself yielded a surface collection of Halaf sherds but on the terrace behind there were abundant flints which could be paralleled at Abu Hureyra. Tell Kreyn, while still quite small, seems to have been a more substantial settlement than sites I, II, and III. It was certainly occupied at the same time as Abu Hureyra then perhaps abandoned and resettled in Halaf times.

Buqras

Buqras lies on the right side of the Euphrates valley 10 km below the confluence with the Khabur. It is situated well back from the present course of the river on a slight rise above the flood-plain. A line of low hills lies to the west behind the site and beyond them the Syrian plateau. These hills are cut by several dry wadis which pass near the site on their way to join the Euphrates; water flows in them today only after severe rain storms. The area is semi-arid now, receiving an average of about 150 mm of rain a year.

The site is a little over 3 ha in area and the deposits in the centre of the mound are 5 m deep. These were tested in 1965 by two adjacent 4 m square soundings excavated to the natural subsoil (van Liere, de Contenson, 1966, 181). The sequence was divided into three phases on the evidence of the structures and artifacts found. Several of the excavated buildings had been burned or otherwise destroyed but there was nothing to suggest that these were more than localised events. The settlement appears to have been occupied continuously until its final abandonment.

The buildings at Buqras were rectilinear in plan throughout the sequence but the soundings were too small for any complete plans to be recovered. All the buildings were oriented north-west south-east as at Abu Hureyra. The area exposed of level I at the bottom of the trenches was particularly restricted so the nature of the structures found within it is uncertain. Parts of two buildings were found superimposed in this level (van Liere, de Contenson, 1966, 182); several walls of each were exposed which were believed to have been constructed of pisé. These walls were quite straight and the photographs suggest that they were well-made (van Liere, de Contenson, 1966, fig. 10a); it may be that they were in fact built of mud-bricks, as were the later structures at Buqras and all the buildings at Abu Hureyra but that this was not noticed when the site was excavated. The lower structure had a hearth in the corner of a room and areas of plaster floors. The upper one consisted of at least one room entered by a door with a raised sill; traces of a woven mat were found on the floor.

Level II consisted of a complex of structures which was remodelled four times (van Liere, de Contenson, 1966, 183ff). Each was composed of several walls and blocks or pillars of mud-brick associated with bins and hearths. The blocks were usually attached to other walls and so may have strengthened the buildings of which they were part. A number of floors were found in this level, two of them plastered. In level III several more mud-brick walls were found and a hearth. There was a bin in the angle of two of the walls. Although very little of the site was exposed in the excavations we know that the settlement at least in its later stages was closely built up with mud-brick buildings. The tops of the walls of these buildings could be seen all over the surface of the site after rain.

Most of the chipped stone tools were made of a fine-grained dark grey or brown flint found in the wadi gravels or on the surface in the vicinity of the site.[8] The industry was based upon the production of long parallel-sided blades struck from double-ended and keeled or occasionally pyramidal cores. The most numerous tool types were burins and end-scrapers on blades. Arrowheads, though quite common, were much less abundant than at Abu Hureyra. There were sickle blades in the assemblage but they were rare as at Abu Hureyra. The other flint tool types were flake scrapers, often discoid, and borers. Heavy flake tools were absent. The arrowheads were tanged with a little retouch under the tip and along part of the edge (van Liere, de Contenson, 1963, fig. XIII, 8-17). Most tools were retouched abruptly but pressure-flaking was used on some of the arrowheads throughout the sequence, an example being an Amuq point from layer 7. The same tools were represented throughout the sequence although the proportions varied from layer to layer. The industry closely resembles that of the later aceramic and ceramic Neolithic at Abu Hureyra both in technique and in the types of tool which were made. The main difference is in the proportions of the tool types, burins and end-scrapers being much more common at Buqras.

One remarkable feature of Buqras was the high proportion of obsidian in the chipped stone industry. It formed 32.3% in level I, 25.7% in level II and 27.9% in level III, an average of about 29% (Renfrew et al., 1966, 59). Six pieces from level I have been analysed and all came from eastern Anatolia, two from the 4c source which could be either Bingöl or Nemrut Dağ, and four from 1g (Renfrew et al., 1968, 325). It is not known what proportion of the obsidian if any came from central Anatolia.

The eastern Anatolian obsidian sources lie about 440 km north of Buqras. The route is direct up the Khabur across the heights behind Mardin and on to the upper Tigris basin. Perhaps this ease of communication was one of the reasons why Buqras received so much obsidian. Abu Hureyra is only 40 km further away from these sources as the crow flies but received much less obsidian, partly perhaps because the easiest route to the sources up the Euphrates was much longer.

Much of the obsidian used at Buqras consisted of small retouched blades struck from conical cores. Cores were found in the excavation suggesting that the material was being worked on the site. Several obsidian tools were also recovered, among them burins, borers, disc scrapers and even one microlithic lunate (van Liere, de Contenson, 1966, 186).

The remainder of the artifact industry was quite rich, particularly in bone tools. These were numerous and consisted of borers of different sizes, hafts for other tools, needles and spatulae, some with a high polish. Saddle querns and rubbers of basalt and limestone were quite common; there were also a few basalt pestles and a mortar. The materials for these tools could have been obtained in the locality.

A distinctive group of common finds were the fragments of polished limestone, alabaster and gypsum stone bowls and dishes. Some were hemispherical in shape, others were wide, flat-bottomed vessels; one even had a carinated profile (van Liere, de Contenson, 1963, fig. XIII, 2). All the materials for these would have been available in the neighbourhood.

Cylindrical or discoid beads and other objects of adornment were another numerous class of finds. The beads were made of bone, shell, greenstones from the Euphrates gravels, carnelian imported perhaps from some distance away and dentalium from the Mediterranean. An alabaster bracelet fragment and pendant were also found on the surface (van Liere, de Contenson, 1966, 186).

Much less common but quite distinctive were several stone stamp seals with incised chevron and rectangular patterns (van Liere, de Contenson, 1963, fig. XIII, 6; 1966, fig. 8, 19, 28). One was made of alabaster and another of jadeite from Anatolia. Two axes, one polished all over and the other, of greenstone, pecked and polished, were found but they were apparently rare tools at Buqras, at least in the area excavated. Baked clay figurines were also uncommon, as at Abu Hureyra, only a few anthropomorphic and animal examples being found.

One piece of a white plaster vessel was picked up from the surface of the site and another was found in the excavation (van Liere, de Contenson, 1966, 185). The fragment from the surface came from a vessel which had been made on a mat for it retained the pattern of the criss-cross weave on its base.

Pottery was used for the first time at Buqras in level III. This seems to have been quite rare at the site as only 14 sherds were found. The sherds belonged to a small upright bowl, cylindrical vessels with flat bases and other rounded bowls. The fabrics were varied, several thin sherds being tempered with straw and others with quartz sand filler; there were also coarse straw-tempered sherds. Several sherds had a bright red painted surface and were highly burnished while a number of the plain sherds were also burnished, though not so thoroughly. One sherd had a triangle painted on it.

The same great variety of artifacts was found both at Buqras and in the aceramic and ceramic Neolithic levels at Abu Hureyra. Occupation at both sites concluded with a short phase during which pottery came into use. The pottery was quite varied in form and decoration at both sites. The vessels seem to have been made in much the same way: they had a soft fabric tempered with straw which was burnished or in a few instances painted. Buqras enjoyed even closer contacts with Anatolia than did Abu Hureyra on the evidence of the obsidian and other raw materials were also received from that direction.

The artifacts at Buqras were all quite similar throughout the sequence which would indicate that the site was not inhabited for long. The ^{14}C determinations bear this out as they are clustered together. One from the bottom of level I is 6190 ± 60 B.C. GrN-4818 and another from the top of the level is 6290 ± 100 B.C. GrN-4852. The date for level II is 6010 ± 55 B.C. GrN-4819 and for level III 5990 ± 60 B.C. GrN-4820 (Radiocarbon 9, 1967, 128). While not quite all in order, they form a tight acceptable series from which one might estimate that the site was founded about 6300 B.C. and abandoned about 5900 B.C. or a little after.

Tell Aswad (Balikh)

Tell Aswad lies on a tributary of the Balikh about 22 km south of Tell Abyad in the Syrian Jezireh. The site is roughly oval in shape with two high points at either end. It was discovered by Mallowan who excavated on the higher summit in 1938. He found traces of Halaf occupation but surmised that much of the mound consisted of Neolithic remains (Mallowan, 1946, 126).

The site was reinvestigated by Cauvin in 1970 who excavated a step trench from top to bottom of the higher summit on its northern side. The lower summit has never been examined and its relationship to the rest of the site is unknown. Cauvin divided his sequence into eight levels numbered from top to bottom. Levels I to VI contained remains of mud-brick buildings, a lime plaster floor, flints and other artifacts but were devoid of pottery (Cauvin, Cauvin, 1972, 88). Levels VII and VIII at the bottom yielded only a few bricks and fragments of plaster but abundant artifacts including many sherds of pottery. About half the sherds had a red or brown surface and were burnished; these had either grit or straw filler (Cauvin, Cauvin, 1972, 86ff). The remaining sherds were from much coarser straw-tempered vessels with little surface treatment. A few sherds only had red painted decoration. Most of the pots were hole-mouth vessels and several had strap handles, knobs or lugs for carrying.

The chipped stone industry was of much the same character throughout the sequence. The tools were made on blades and flakes struck from pebble cores. The principal types were tanged arrowheads with a little abrupt retouch, burins, end-scrapers on blades, disc scrapers and sickle blades with some borers. The sickle blades were short truncated blades for the most part which are believed to have been hafted so that they formed a jagged cutting edge (Cauvin, 1973, fig. 3). They were quite numerous in every level. Obsidian was present throughout.

Among the other artifacts were numerous fragments of small polished limestone and alabaster bowls. The remaining finds included a few baked clay anthropomorphic and animal figurines, some bone points, basalt grinders, three butterfly beads and several other items of adornment.

Three carbon 14 determinations have been made on samples obtained in the recent excavations. They are: for level VIII 6500 ± 120 B.C. Mc-864, level VI 10,550 ± 160 B.C. Mc-607 and level III 6700 ± 120 B.C. Mc-865 (J. Cauvin, 1974b, 203).

Cauvin has concluded on the evidence presented above that Tell Aswad was first occupied in the middle of the 7th millennium by a group making pottery. They were the first people in Syria to use pottery regularly as all other finds of early pottery are dated several centuries later. Although people with the same material culture continued to occupy the site for a considerable time pottery was not used in the later stages of the settlement (J. Cauvin, 1974b, 203). This explanation, if correct, would fit the observed facts but it seems so improbable that another hypothesis may be preferred.

Let us first consider the cultural parallels for the Tell Aswad material. The flint industry, stone bowls and other distinctive artifacts such as the butterfly beads closely resemble those from the later aceramic and ceramic Neolithic at Abu Hureyra and Buqras. The only significant difference is that the sickle blades at Tell Aswad are of a different type and more common than at the two other sites. Even the Tell Aswad pottery, though much more abundant than that from the top levels at Abu Hureyra and Buqras, encompasses the same range of wares and decoration. One may conclude that the Tell Aswad material is sufficiently like that on the Euphrates sites to be included in Neolithic 2 of the Levant. It is thus all the more strange that a sequence repeated at Abu Hureyra and Buqras of an aceramic and then ceramic Neolithic with otherwise much the same material inventory should be reversed at Tell Aswad. The stratigraphy at Tell Aswad was determined from a step trench rather than a deep sounding carried to bedrock at the centre of the site. It is perfectly possible that when the settlement was founded pottery was not made but subsequently the focus of the settlement shifted north at about the time pottery began to be used. The true stratigraphic relationship between an earlier settlement with a considerable depth of deposit and a later extension at a lower elevation might be missed in a step trench excavated across such occupation deposits. The Halaf remains on top of the old heart of the site could be unrelated to the earlier occupation. At this point we may look once more at the ^{14}C dates. On Cauvin's reading of the stratigraphy the dates for level VIII and level III are inverted, the earlier level being dated later. If on the other hand my suggestion were correct the dates would be in the right order, so lending weight to the argument. The problem cannot be resolved satisfactorily without further excavations but it would seem more likely that Tell Aswad was first occupied by a group which did not use pottery and that they adopted the craft later rather than the reverse explanation put forward by Cauvin.

One difficulty remains with the Tell Aswad sequence and that concerns the ^{14}C determinations. Two of the dates fall within the first half of the 7th millennium so one might assume that the site was occupied then. The typology of the artifacts links the site closely with Buqras which is itself dated about 6000 B.C. It is difficult to believe that Tell Aswad was really occupied that early as it would be typologically more advanced by several centuries than not only Buqras but also a number of other dated sites in the Levant. As one of the determinations is altogether much too early (Mc-607) it may be that the other dates are also incorrect.

Cauvin found one other site in the Balikh valley with remains similar to those from Tell Aswad. The site is Tell Khirbet el Bassal which lies on the Karamuk, a tributary which flows parallel with the Balikh on the west. It has not been excavated but Halaf sherds were found near the summit and flint and obsidian artifacts lower down together with fragments of stone bowls comparable with those at Buqras (Cauvin, 1970, 287).

Tell Fakhariyah

Neolithic artifacts were found in unusual circumstances at Tell Fakhariyah, a large Iron Age and Classical site which lies just to the south of Ras el Ain beside one of the sources of the Khabur. The artifacts were all flint and obsidian tools though there is a possibility that some ground and polished stone axes might also be of the same age (Braidwood, 1958, 55). About 1,000 flint and 200 obsidian pieces were saved from soundings IV, VI and IX. They seem to have been embodied in the mud-bricks of the buildings on the site. It is thought that the mud for the bricks must have been obtained from a prehistoric deposit either on the tell itself or in the vicinity.

The flint and obsidian tools belonged to a single industry with a variety of tool types (Braidwood, 1958, 53ff). The flint tools were mostly made on long regular blades, some parallel sided and some pointed. No cores were saved but the scars on the tools indicate that the blades were struck from double-ended cores.

The arrowheads were as much as 8 or 9 cm long. They were tanged with some abrupt retouch around the tang and under the tip. Some sickle blades had a little irregular retouch along the cutting edge but others had none at all nor were they retouched along the back or at the ends. End-scrapers on blades were numerous and burins were also quite common. The latter consisted of single-blow and angle burins for the most part and quite a number were made on broken tanged arrowheads. Borers were also made on blades, the long points being shaped with abrupt retouch. The only flake tools were a few disc scrapers made on quite thick flakes. Almost all of these tools were retouched abruptly, pressure-flaking being very rare. The obsidian tools were mostly blades and blade segments, a number of which were retouched along one edge. Some blades were thicker with abrupt retouch on both sides to make borers or reamers.

This assemblage is similar to the flint industry in the aceramic Neolithic levels at Abu Hureyra. The range of tool types. the way they are made and even certain details such as the reuse of broken arrowheads as burins are all the same. The principal difference would appear to be that obsidian was used more commonly in the Tell Fakhariyah assemblage, doubtless because the site was nearer the Vannic obsidian sources.

The parallels with the Abu Hureyra flint industry are so close that one may reasonably conclude that the site from which the Tell Fakhariyah material came was inhabited about the same time, that is in Neolithic 2 during the 7th millennium. The rarity of pressure-flaking in the retouch reinforces the suggestion that the assemblage is earlier than the ceramic Neolithic at Abu Hureyra and Buqras III. Tell Fakhariyah is the furthest to the north-east of all the known sites with a Neolithic 2 assemblage: indeed it lies well beyond the Levant proper. The significance of Tell Fakhariyah and Tell Aswad is that they show that there were sites on both the Balikh and Khabur inhabited during the 7th millennium by groups whose cultural equipment was the same as other Neolithic 2 communities living along the Euphrates.

<u>Jebel Abdul Aziz</u>

Eight prehistoric sites were discovered along the north scarp of the Jebel Abdul Aziz by a Japanese team in 1967. All were described as "Post-Palaeolithic" (Suzuki, Kobori, 1970, 34ff) but only two are definitely Neolithic. These are an open site <u>Sheikh Abdul Aziz (site 26)</u> and a shelter

Khazne Cave I (site 28). The flint tools collected from site 26 and the terrace in front of site 28 included end-scrapers, flake scrapers and retouched blades (Suzuki, Kobori, 1970, fig. 47). None of the tools is sufficiently diagnostic for one to be certain in which stage of the Neolithic the sites were occupied but from the appearance of the blades which broadly resemble material from Abu Hureyra it is more likely to have been during Neolithic 2 than later. Both sites are small and their nature is uncertain.

El Kum

The site of El Kum is near a well and modern village of the same name which lie on the track from Sukhne to Risafe in the pass between the Jebels Abu Rujmein and Bishri. It was first visited by Laurisson Ward in 1938 who made a collection of flints and plaster vessel fragments which is now in the Peabody Museum at Harvard. He also discovered another surface Neolithic site, almost certainly occupied in Neolithic 2, 10 km south of Risafe. El Kum was rediscovered by Dr. and Mrs. Buccellati who surveyed the area in 1966 (1967, 305) and found many other prehistoric sites in the pass.

The site is a large mound about 25 m high. A brief excavation was carried out there in 1967 in which it was discovered that the bottom 10.35 m of deposit consisted of aceramic Neolithic with a further 4.85 m of ceramic Neolithic above (Dornemann, 1969, 68); remains of a later period of occupation were found in the top layers of the mound. The structures in the aceramic levels consisted of clay walls and mud plaster floors with fragments of red burnished plaster that could have been either from floors or walls. Two superimposed rectilinear clay-walled buildings were found in the ceramic levels; each had several rooms with white plastered floors and walls. An unusual feature of the upper building was that it contained a staircase connecting rooms on different levels.

The flint industry was composed of blade and flake tools.[9] The blades were large, parallel-sided ones struck off double-ended hog-backed and keeled cores. There were some tanged arrowheads with a little, abrupt retouch or pressure-flaking on a few pieces. Burins on blades were much more common, consisting for the most part of angle burins. Backed blades with abrupt retouch were also quite numerous. Sickle blades and end-scrapers on blades were present in small quantities. There were also many flake scrapers made on quite thin flakes which were then retouched around the edge. The industry seems to have changed very little throughout the long period in which the site appears to have been occupied.

Polished fragments of limestone and alabaster bowls were quite abundant in the Neolithic levels. The vessels were hemispherical in shape, ranging in size from small cups to larger dessert bowls. Bone points and spatulae were also found throughout. Then there were a variety of other artifacts such as a polished stone chisel, a stone weight and other holed stones, a baked clay stamp seal and beads.

The two other major classes of finds were fragments of plaster vessels and potsherds. Both appear only to have been found in the ceramic Neolithic levels although it is possible that plaster vessels were used earlier and not recovered in the small area excavated. Many pieces of plaster vessels were collected, more than at any other excavated Levantine site. Most of these vessels were large, open, quite deep circular jars with flat bases. A few were more squat and hemispherical, one or two were rectangular and there was a large flat platter. The walls were usually thick and made of several layers of plaster. Often a thin layer of plaster had been carefully applied to the surface perhaps to make the vessels impervious to moisture. Many of the vessels retained impressions of matting on their bases and coiled baskets on their sides. From this one can see that these vessels were often made inside a large basket of coiled straw or rushes which gave support until the plaster had set. This is also excellent evidence for use of basketry and matting at the site.

Pottery was abundant in the ceramic Neolithic layers. The ware had a buff finish with much straw temper although a few vessels had a flint chip and grit filler. Many of the sherds were undecorated but some had been painted red all over. A proportion of both the plain and red painted vessels had then been burnished.

El Kum is a large site with a very substantial depth of deposit built up from the collapse of the buildings of what appears to have been a concentrated settlement. Not enough is known about the site to say much about how its inhabitants lived but it is clear that their buildings and artifacts were broadly similar to those on the sites we have already discussed. The closest parellels for the flint industry are to be found at Abu Hureyra and Buqras although the proportion of tools found differed from both these sites and flake tools seem to have been more common at El Kum than elsewhere. The use of stone bowls and white plaster vessels also links El Kum with the Euphrates sites. Aceramic El Kum should thus be contemporary with the later aceramic Neolithic at Abu Hureyra and Buqras I and II. The ceramic Neolithic layers are probably of the same date as Buqras III and the ceramic Neolithic at Abu Hureyra but occupation at El Kum seems to have continued later than at the other two sites. The aceramic Neolithic at El Kum falls within Neolithic 2 in the Levant but with the introduction of pottery occupation at the site entered a new phase.

Palmyra region

Many prehistoric sites have been discovered in recent years around Palmyra by the Japanese survey team. 46 of these were found in 1967 and all were ascribed to the "Post-Palaeolithic" although it was recognised that some also had earlier remains (Suzuki, Kobori, 1970, 36). The published material from 23 of these sites includes flints which are certainly Neolithic and it may be that some of the other sites also have indications of Neolithic occupation.

21 of the sites were rock shelters with a terrace in front and two were open stations. Some were found on the southern slopes of Jebel ed-Duara and along the Wadi el Ahmar (sites 33, 34, 35, 36, 38, 41, 42, 43, 48, 51, 52) to the north-east of Palmyra. Four were discovered immediately to the north and

north-west of the oasis (sites 53, 54, 56, 60) and the remainder on the slopes of the Jebel el Abyad further to the north-west (sites 63, 64, 65, 66, 69, 71, 74, 77).

The chipped stone assemblages from all these sites belong to the same industry. There were double-ended and keeled cores (Suzuki, Kobori, fig. 52, 4; Suzuki, Akazawa, 1971, figs. 2, 3) with characteristic crested blades and flakes (Suzuki, Kobori, 1970, fig. 49, 12, 14); Suzuki, Akazawa, 1971, fig. 11). The ventral surfaces of the blades and blade tools had scars from other blades struck off both ends of the parent cores, another typical feature. Among the tools there were tanged arrowheads, burins on blades and scrapers on flakes and blades (Suzuki, Kobori, 1970, figs. 48, 6-9; 49, 1-11; 50, 1-12) but of these only the arrowheads and the blades on which some of the tools were made are really diagnostic.

These artifacts are all characteristic of Neolithic 2 assemblages elsewhere in Syria. The shape of the arrowheads and the squared-off tangs of some of them in particular are paralleled closely in the aceramic levels at Abu Hureyra which indicates that this groups of sites, like El Kum, may be grouped with those on the Euphrates on typology and technology.

Since these sites were discovered a large manufacturing station has been found by the Japanese on the salt flats in front of Duara cave which they are excavating. Strewn on the surface were large quantities of double-ended cores, waste and blades of a Neolithic 2 industry. I have found other flints of the same industry in the classical ruins at Palmyra, particularly on the northern side beyond the city wall of Justinian, enough to indicate that there were other Neolithic 2 stations in this area.

The evidence which has been accumulated is sufficient to show that the Palmyra area was occupied by a number of groups during Neolithic 2. The sites are not very large so none of the groups can have been anything like as numerous as the community which inhabited El Kum.

The 38 sites discussed so far range from small surface stations to large tells. They are all situated well inland on the plateau of central and northern Syria. Within this region they occupy diverse zones: the Palmyra hills, the Euphrates valley, the Balikh and headwaters of the Khabur, yet their material remains are sufficiently similar for one to conclude that they were occupied in Neolithic 2 by people who shared a common culture. If one compares the remains from these sites with contemporary settlements elsewhere in the Levant one finds, however, that they have some distinctive features which mark them out as a regional group of sites within Neolithic 2. It is best to identify these features on excavated settlements with the longest well-stratified sequence of occupation, Abu Hureyra and Buqras, and then look for them on the other sites.

This regional variation can be seen most clearly in the flint industry at Abu Hureyra and Buqras. The techniques of blade production here were exactly the same at other contemporary sites throughout the Levant but the tools made from these blades were distinctive. The principal types were arrowheads, burins and end-scrapers; sickle blades, though more numerous at Buqras than Abu Hureyra, were still relatively rare compared with other Levantine Neolithic 2 sites. These tools were usually shaped with a minimum of abrupt retouch. Squamous pressure-flaking was never a common technique in the Neolithic 2 levels at either site. On sites in the southern Levant and in the Damascus basin it was used much more frequently than on the Euphrates sites. The arrowheads at Abu Hureyra and Buqras were all tanged as they were often elsewhere but certain types were typical of the Euphrates sites. Most of the arrowheads had a tang which was clearly separated from the rest of the blade by a pair of shoulders; the tangs were also often stubby and squared off, another characteristic trait rarely found elsewhere. None of the arrowheads on these sites had notches. Some flake scrapers were found but otherwise almost no other flake tools nor core tools either although these were found in some numbers on Levantine sites nearer the coast.

When the stratified assemblages from Abu Hureyra and Buqras are compared with material from the other 36 sites it can be seen that all share these specific characteristics of their flint industries. This is as true of the surface material from the sites around Palmyra and Tell Fakhariyah as of the other excavated sites, Tell Aswad (Balikh) and El Kum. These sites thus form a regional cultural group within Neolithic 2 in the Levant. All the sites except those around Palmyra and El Kum are within the Middle Euphrates drainage system which gives them a certain geographical unity; they may thus all be called the Middle Euphrates group of sites to distinguish them from the other regional groupings to which I shall now turn.

West Syria

A second regional group of sites is to be found in West Syria (Fig. 32). This comprises sites in the Damascus basin, Lebanon and on the coast of Syria. There are three in the Damascus basin. One of these, Tell Aswad, was occupied continuously from the latter part of Neolithic 1 until well into Neolithic 2, as we have seen. This is the only site discovered in the region so far that has a continuous sequence from one stage to the next and, since it provides this link, I shall consider it first.

Tell Aswad

The transition from phase I to phase II at Tell Aswad took place about 6900 B.C. or a little later. Aswad II is dated by several determinations, three of them from a series in the west trench: 6770 ± 75 B.C. GrN-6677, 6700 ± 55 B.C. GrN-6676, 6610 ± 110 B.C. GIF-2373, and one from just below the surface of the east trench, 6590 ± 110 B.C. GIF-2369 (de Contenson, 1973a, 254). This is a consistent series of dates which places the second phase of occupation at Tell Aswad firmly in the first half of the 7th millennium B.C. The site appears to have been deserted about 6500 B.C.

The flint industry of Aswad II was based on the production of blades as in Aswad I. Most of these were struck off prismatic and pyramidal cores so

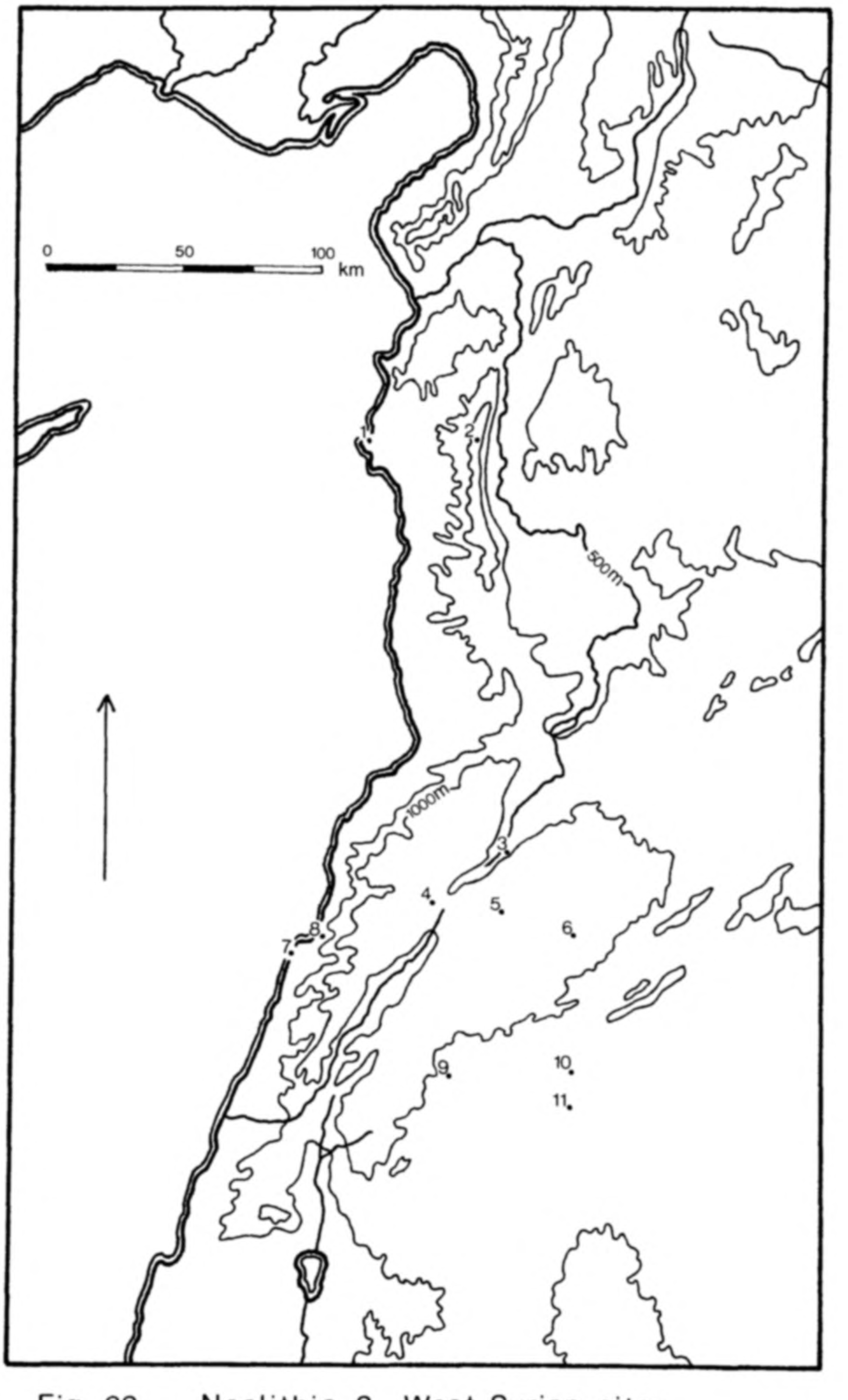


Fig. 32 Neolithic 2 West Syrian sites

FIGURE 32

Neolithic 2 West Syrian sites

1 Ras Shamra
2 Slenfe
3 Tell Labweh
4 Saaideh
5 Nacharini
6 Mugharet el Abde
7 Tell aux Scies
8 Dik el Mehdi II
9 Tell Ramad
10 Ghoraife
11 Tell Aswad

they tended to have converging sides; relatively few came from bipolar cores in contrast with the Euphrates sites. The latter are, of course, for the most part later in date. A wide range of tools was made on these blades, retouched blades or knives being particularly common. Sickle blades were also numerous (de Contenson, 1972, 77); these had finely serrated or nibbled cutting edges though some were denticulated. A few had retouch along the back and there were also some segmented sickle blades.

The third most common class of tools in Aswad II was the arrowheads. Most of them were tanged in this phase, the tang being defined by a curved narrowing of the blade rather than a sharp shoulder. Some of these were retouched abruptly but most had pressure-flaked tangs, in contrast with the Euphrates sites where most tangs were abruptly retouched. Retouch was confined to the tang and tip on most of the Aswad II arrowheads. Notched arrowheads with a short tang which had been so common in Aswad I were still present but in much diminished quantity. The remaining tools consisted of notched and denticulated blades and flakes, burins on blades, borers of various sizes and end-scrapers on blades. Flake tools were relatively scarce but among these a series of quite thick disc scrapers seem to have been characteristic. Some chisels were flaked in flint and a few had polished edges. A number of flaked and polished axes were also made from a variety of stones.

About 1% of the chipped stone artifacts at Tell Aswad were of obsidian. 54 pieces of obsidian, 20% of the total, have been analysed from phases I and II in the west trench as part of the Bradford programme. The analyses suggest that the proportions of obsidian from different sources were about the same in both phases. Three sources were being exploited, Çiftlik (46.3%), 1g (11.1%) and Nemrut Dağ (42.6%). From this one may conclude that central and eastern Anatolian obsidian was being used in about equal amounts even though the Vannic sources are about 200 km further away by land than Çiftlik. One cannot be sure that the obsidian analyses from the west trench are representative of the whole site so it will be necessary to analyse obsidian from the east trench to see if these results are corroborated.

The other artifacts from Aswad II were varied but not very numerous. The bone tools consisted of borers, needles, spatulae and a few hafts. There were also some fragments of polished stone bowls. Articles of adornment were, however, quite common. They consisted of beads and pendants made in a wide range of materials: limestone, carnelian, steatite, shell, bone, turquoise and even obsidian. The exotic stones in this list, like those at Abu Hureyra, would have been imported from Anatolia, the Zagros and Sinai.

Baked clay objects were very common throughout the sequence. A number of these were simply lumps or balls of clay and others were shaped like pawns. Many animal figurines were made, often with a marked dorsal ridge and all were modelled with assurance. Some were recognisable as cattle, pigs and small horned ruminants (de Contenson, 1972, 78). The remainder were anthropomorphic figurines, mostly of seated women. The figurines were made to appear plump but there was much variation in shape. Some were quite schematic with stmup bodies and rod heads and hardly any delineation of the limbs.

Tell Ramad

Tell Ramad was discovered by two French customs officials before the Second World War. One of them, M. Compant, and an army officer, Lieutenant Potut, collected material from the site on several occasions (Potut, 1937, 130). The site was visited in 1939 by Laurisson Ward who collected more material from the surface which is now in the Peabody Museum. Tell Ramad remained known to at least one scholar (Nasrallah, 1965, 51) but had otherwise been generally forgotten until rediscovered by van Liere and de Contenson (1963, 179).

The site is situated 20 km south-west of Damascus at the foot of Mt. Hermon. It lies on a high undulating plateau at an elevation of 830 m at the edge of the Wadi Sherkass which flows into the Damascus basin. The mound is approximately rectangular in shape and about 2 ha in area (de Contenson, van Liere, 1964, pl. X). There are two high points on the western side with a wide almost level bench to the east. The northern side slopes steeply down into the wadi.

Eight seasons of excavation have taken place at Tell Ramad since 1963. The full sequence of occupation was determined from three trenches excavated in the first season; since then these trenches have been extended to obtain as broad an exposure as possible of the layout of the settlement. The occupation layers which are about 5 m thick have been divided into three phases; Levels I and II making up the bulk of the site are aceramic Neolithic (de Contenson, 1971, 279ff) and Level III is ceramic Neolithic. Another later phase of occupation has been postulated on the evidence of sherds found on the surface but any occupation layers of this phase have eroded away.

Level I was about 2 m thick on the east side but only 0.7 m deep on the west of the site (de Contenson, van Liere, 1966, 171). It would appear from this that when the site was first settled the eastern sector was occupied more intensively but that almost the whole area of the site was inhabited. The most conspicuous features of this phase were a number of oval pits from 3 to 4 m in diameter lined with clay (de Contenson, 1967, 19). These pits contained hearths, ovens and other depressions which suggest that they may have served as working hollows or even dwellings. In the same deposit there were also rectangular bins made of clay which may have been for storage (de Contenson, 1969a, 17), a number of lime plastered surfaces and other floors.

The deposits and structures of Level II were quite different from those in Level I yet there is nothing to suggest that there was a break in occupation between the two phases. Level II was from 2.35 to 4.3 m thick (de Contenson, van Liere, 1966, 169) and extended over the whole site. This deposit which is exposed over much of the surface of the mound, was very ashy, a feature from which its Arabic name was derived. The structures in this level had a single rectangular room built of mud-bricks on a stone foundation (de Contenson, 1969a, 28). The corners were rounded which avoided the structural problem of joining two brick walls at a right angle. The buildings varied in size, one being 7 by 5.5 m and another 9 by 4.5 m, but most had plaster floors. These structures which are quite uniform, have been found across the site and it is probable that they were dwellings. Outside these buildings were several pits which contained carbonised seeds (de Contenson, 1967, 19) indicating that food was probably stored in them. Hearths, ovens and prepared working surfaces could all be traced outside the buildings (de Contenson, 1970, 77) which were separated by narrow lanes and courts.

Burial customs were the same in Levels I and II. Human remains were buried in shallow graves inside buildings sometimes beneath the floors and also outside. A few crouched burials were found intact (de Contenson, van Liere, 1966, 170; de Contenson, 1967, 20) but most corpses appear to have been deposited incomplete in communal graves. The latter frequently lacked skulls and other parts of the skeleton indicating that secondary burial had taken place. Very few grave goods were deposited with these skeletons. Several groups of skulls were found which had been buried separately from the corpses to which they belonged (de Contenson, van Liere, 1964, 111; de Contenson, 1967, 20; 1969a. 27). Single skulls and other human remains occurred throughout the deposits. The lower part of the face and chin of some of these skulls had been covered with plaster which had the effect of partly restoring the appearance of the face. The plaster and the remainder of the skull was frequently decorated with red ochre. Both male and female skulls were treated in this way (Ferembach, 1969, 67ff).

Associated with one of these groups of skulls were the remains of two clay figures. Both were seated and the better preserved one which was about 25 cm high had at least one arm akimbo (de Contenson, 1967, 21). It is thought that these figures, the more complete of which was headless, may have served as stands on which the plastered skulls were mounted.

The flint industry of Levels I and II at Tell Ramad[10] was composed principally of blade tools. The blades were struck from pyramidal and double-ended cores, a few of which were keeled. Some of the tools in both phases were made on bladelets (de Contenson, van Liere, 1966, 170; de Contenson, 1970, 33), a feature quite absent on the Euphrates sites.

The principal classes of tools were sickle blades and arrowheads. The sickle blades were of two types, blades with sickle gloss but little or no retouch and segmented blades (de Contenson, van Liere, 1964, 114). The segmented sickle blades had finely denticulated edges and were frequently retouched around the sides to reduce their thickness. In Level II some of these had coarse denticulation.

There were also two groups of arrowheads, one notched and one with long tangs. The notched arrowheads had pairs of notches along the blade and a pair at the base to define a short tang. This type though found in both levels was not so common in Level II (de Contenson, 1971, 283). The other arrowheads had a long tang sometimes defined by shoulders. Many of these arrowheads and some of the sickle blades were retouched with squamous pressure-flaking.

The other blade tools consisted of types found on many other Neolithic 2 sites, retouched blades, borers and burins. End-scrapers on blades were uncommon but flake scrapers, principally discoids and end-scrapers, were numerous.

Another important and characteristic group of tools was the flaked axes. Most were small and quite thin with a polished cutting edge but a few had a tranchet edge. Their shapes were very varied; some were ovoid, others trapezoidal or semicircular with a straight edge. A few axes and adzes were much larger than these small woodworking tools. All such axes both large and small were almost entirely absent on the Euphrates.

Obsidian formed approximately 1% of the chipped stone industry at Tell Ramad. Most of it was in the form of small blade segments although a few retouched tools and worked-out cores were found, sufficient to indicate that some of it was finished on the site. Five pieces have been analysed by optical spectrography three of which came from Çiftlik and two from group 4c in eastern Anatolia (Renfrew et al., 1966, 46). A sixth piece analysed by neutron activation also came from group 4c (Wright, Gordus, 1969, 83). Renfrew look at 40 pieces visually and concluded from this that only 10% of the obsidian in fact came from the Lake Van area, presumably because this proportion was green in colour. Recent work has thrown doubt upon this observation because some grey obsidian has now been shown to come from the Van region as well. At Tell Aswad and Ghoraife, another site in the Damascus basin, where larger samples have been analysed a much higher proportion of the obsidian came from Lake Van and it would be surprising if the pattern at Ramad was very different because the sites are so close together, their sequences overlap and their material culture has much in common.

The remaining artifacts from Levels I and II were varied in type as we have noted on other Neolithic 2 sites. White ware was a characteristic feature of Level II but was not found in Level I. The forms were either cylindrical vessels with a flat bottom or bowls with a ring base (de Contenson, van Liere, 1966, 169). Some of the vessels were burnished and painted with a red line around the rim and body.

Pieces of white ware and the plaster floors have been analysed to determine their composition and how they were made. The analyses have shown conclusively that both materials were calcium carbonate (Balfet et al., 1969, 191; Gourdin, Kingery, 1975, 147) but there is some doubt about how they were manufactured. Balfet and her collaborators think that limestone was baked on the site in pits to obtain the lime. They have analysed the soil of Ramad II and found it to be full of ashes, crushed limestone and traces of grass. They believe the grass played a part in the actual fashioning of the lime plaster. One huge pit was found on the site which could well have been used for this purpose (de Contenson, 1969b, 32). Gourdin and Kingery point out, however, that limestone has to be baked at a very high temperature to obtain lime (1975, 149). As very large quantities of lime were used for floors on these Neolithic sites they believe that this could only have been regularly made in kilns. No kilns have been found on these sites but as Gourdin and Kingery remind us limeburning is an unpleasant business and such kilns might well have been sited beyond the confines of the settlement. The question is unresolved but it does seem that some lime could be obtained from pit fires and it also seems probable that the ashy soil at Ramad is partly the result of this. Kilns may have been used at other sites at this time although there is no good evidence for them until much later. However the lime was obtained, it was then used as a plaster to build up the white ware vessels. Balfet believes that a pozzolanic reaction took place in which the plaster set like cement. Gourdin and Kingery cast some doubt on this but do not offer a clear explanation of how they think the vessels were made.

The heavy stone tools were of the same type in both levels (de Contenson, van Liere, 1964, 114, 117). Most of them were made of basalt which was easily obtainable on the Golan plateau. They included pestles and stone balls together with open ended stepped querns and rubbers. Small polished bowls in alabaster and limestone were also made but only in Level I apparently (de Contenson, van Liere, 1964, 115).

Bone tools were common finds in both levels and particularly abundant in Level II. The usual types in Level I were borers and spatulae while in Level II there were also needles, beads and hafts (de Contenson, van Liere, 1964, 114, 117).

Clay figurines were another very common find particularly in Level II. Most were sun dried but a few appear to have been baked. They usually portrayed animals and humans although there were plenty of pawn-like figurines and other abstract shapes. Cattle, caprines, equids and pigs could be recognised among the many animal figurines (de Contenson, 1971, 281).

The other artifacts were also quite varied. Among them were stone spindle whorls which supplement our knowledge of the range of crafts practised by the inhabitants. The objects of adornment included cylindrical beads of bone and different stones and other beads made of shell, obsidian, carnelian and steatite (de Contenson, 1970, 33); the three latter materials were probably imported from Anatolia or the Zagros. There was also at least one butterfly bead of the same shape as those at Abu Hureyra (de Contenson, van Liere, 1966, fig. 2a, 4). Pendants were less common but they included examples in shell and also one carved on bone which was an accomplished rendering of the head of a ruminant (de Contenson, 1970, pl. 16).

An unusual find from Level I was a copper pendant. The pendant had been bored through so that it could be threaded on a string. Traces of the vegetable fibre yarn by which it had been suspended could be seen in the hole (France-Lanord, de Contenson, 1973, 111). The pendant was made of native copper which it is believed may have come from southern Turkey. It might equally have been derived from Edom or Sinai where there were also copper deposits.

The chronology of the sequence at Tell Ramad has been quite well established by a series of six ^{14}C determinations. The dates for Level I are 6250 ± 80 B.C. GrN-4428 and 6140 ± 50 B.C. GrN-4821 (Radiocarbon 9, 1967, 129), which suggest that the site may have been first occupied in the second half of the 7th millennium, perhaps about 6300 B.C. There are three determinations for Level II: 5970 ± 50 B.C. GrN-4427, 5950 ± 50 B.C. GrN-4822 and 6260 ± 50 B.C. GrN-4426. The first two fit the sequence very well but the last one which was obtained from a sample taken near the surface appears to be aberrant or may have been determined on old wood charcoal. If one considers only the first two determinations it would appear that Level II began about 6000 B.C. but we do not know for certain when the change from Level II to Level III took place.

Ghoraife

Ghoraife, like Tell Aswad, is situated on the floor of the Damascus basin about 22 km due east of Damascus. It is now 8 km west of the present Ataibe lake but would have been much nearer the shore at the time it was occupied. A small sounding 2 m square excavated here in 1974 showed that there was 7.5 m of deposit on the site. There was no indication within the sounding of mud-brick or stone buildings but there were pieces of clay incorporating impressions of reeds (de Contenson, 1976, 80) which were presumably the remains of mud and reed huts of the kind thought to have been used at Tell Aswad. The deposit in the sounding consisted of layers of mud, ashes and burned earth. These layers may have been the washed out remains of such structures and the occupation floors associated with them. There were also a number of large pits in the lower layers. The deposit has been divided into two phases based more upon alterations in the typology of the artifacts than any marked change in the stratigraphy for the deposits seem to have been of much the same kind from bottom to top and there was no discernible break in the occupation sequence.

Phase I at the bottom was characterised by a chipped stone industry which used large blades struck from double-ended cores some of which were keeled. 41% of the retouched tools were finely-denticulated sickle blades, 25% of other retouched blades and only 14.5% arrowheads. These had a long tang and were retouched abruptly. The other tools included a few burins and disc scrapers on flakes. A little obsidian was also used but otherwise there were few ground stone tools or bone artifacts.

The rest of the deposit has been designated Phase II (de Contenson, 1976, 81). The flint industry was much less abundant and appears to have changed quite markedly, although this may partly be the result of condensing complex data for a preliminary note. Most of the tools were still made on blades but these were struck from prismatic and pyramidal cores derived from tabular flint. Arrowheads now formed 31.8% of the retouched tools, retouched blades 30% as before but sickle blades only 15%. Burins and discoids were still used in small quantities. Some of the tools were now retouched by squamous pressure-flaking. A few flaked axes with polished edges were made for the first time and there were more basalt and limestone tools. Bone tools of several types were numerous now.

About 2% of the total chipped stone at Ghoraife was of obsidian and 24 pieces of this, 20% of the total, have been analysed in the Bradford programme. Obsidian was being used from the same three sources as at Tell Aswad, that is Çiftlik, 1g and Nemrut Dağ, though 1g obsidian was found only in Phase II; as the quantities analysed were quite small this may not be significant. Taking Phases I and II together obsidian from these three sources was present in roughly equal amounts, Çiftlik 33%, 1g 29% and Nemrut Dağ 38% which on present evidence would indicate a strong preference for obsidian from eastern Anatolia. The sample analysed from Ghoraife is still too small for one to be sure if the proportions of obsidian from the different sources have been correctly determined. Even so the results from Ghoraife and Tell Aswad together indicate that Vannic obsidian was used at least as much as obsidian from Çiftlik, a conclusion that greatly weakens the earlier hypothesis that most obsidian used in the Levant at this period was obtained from the Aksaray region (Renfrew <u>et al</u>., 1968, 326).

Five ^{14}C determinations have been obtained for these levels and, like those for Tell Aswad and Tell Ramad, they form a consistent series. Those for Phase I are 6760 ± 190 B.C. GIF-3376, 6530 ± 190 B.C. GIF-3375 and 6450 ± 190 B.C. GIF-3374, all in stratigraphic order. The two dates from Phase II are 6200 ± 190 B.C. GIF-3372 and 4990 ± 190 B.C. GIF-3371, the second of which appears to be too late for its archaeological context. There was much surface disturbance at the site and it is believed that this may have contaminated the sample. From these dates one would estimate that Ghoraife was settled about 6800 or 6900 B.C. and that the transition from Phase I to Phase II took place about 6300 B.C. The site was deserted perhaps about 6000 B.C. although this figure is uncertain. From the chronology above it is clear that Phase I at Ghoraife was contemporary with Tell Aswad II and Phase II with Tell Ramad I. The site thus overlapped chronologically the other two

Damascus basin sites but, surprisingly for a site so close to the others, there appear to have been marked differences between the flint assemblages of Ghoraife and the other sites, at least on the information available so far.

The Ghoraife industry throughout was based on blade production as at the other sites but in Phase I the cores were double-ended whereas in Aswad II they were usually prismatic or pyramidal. The main tool types were used in similar proportions, sickle blades being much more common than arrowheads for example, which implies that much the same activities were being practised at these two sites which occupied the same environment. Even so there were considerable differences between the arrowheads because squamous pressure-flaking was used commonly at Tell Aswad but not at Ghoraife. Such differences in technique between two neighbouring contemporary sites are unusual since elsewhere in the Levant at this time basic techniques of flint production were the same on sites over a wide area as we have seen in the Euphrates region.

Ghoraife II and Ramad I had more in common in their flint industries although these two sites were in different environments, one on a high plateau and the other in a lake basin. The core techniques were quite similar although double-ended cores were more common at Ramad. Pressure-flaking seems to have been used to about the same extent at both sites. Arrowheads were more frequent at Ghoraife than at Ramad but as the setting of the two sites was different this probably reflects differences in subsistence. Ramad had some segmented sickle blades by this time, a type apparently absent at Ghoraife. Flaked and polished axes were used at both sites. Interestingly enough, the bone industry was also quite rich at both of these sites although far fewer bone tools were found in Ghoraife I.

What this all suggests is that although there are general resemblances between the artifacts from these three sites there are quite specific differences in the details of their material remains. These must partly reflect differences in subsistence activities but the variation in basic techniques of flint production may have more to do with the relations between the inhabitants of these sites in the phases when they were occupied at the same time.

These three sites share certain general characteristics with the Euphrates valley sites. The buildings at Ramad are rectilinear even if built differently. White ware is found on sites in both regions towards the end of this stage. The burial rites are generally quite similar although at Ramad the plastered skulls were treated differently from the usual practice on the Euphrates sites. Much the same range of exotic materials was being received at all these sites and in the three sites where large samples of obsidian have been analysed obsidian was being obtained from the same sources, from Lake Van as much as or more than Çiftlik. The general features of the flint industries, the use of large blades and the widespread introduction of double-ended cores, are also common to both areas. This list of common features together with the chronological evidence is enough to establish that the sites in the Damascus basin, Aswad II, Tell Ramad I and II and Ghoraife, not only belong to Neolithic 2 of the Levant but share many fundamental aspects of their culture with the Euphrates sites.

That having been established, it is also apparent that the Damascus basin sites form a distinct group and, whatever the differences between them, have certain things in common which distinguish them from the Euphrates sites. As is usually the case this can best be seen in the flint assemblages. To begin with there is greater variation in core technique in the Damascus basin towards the end of Neolithic 2, that is at Ghoraife II and Ramad I. Pressure-flaking is also used much more commonly there than on the Euphrates, particularly for retouching arrowheads. Sickle blades are more abundant on all the Damascus basin sites and the segmented sickle blades at Tell Ramad are quite different from the few sickle blades known in the Euphrates area. Flaked and polished axes are a type absent on the Euphrates but abundant in the Damascus basin in late Neolithic 2, an important indicator of a variation in response to a different environment. The buildings of Ramad II, despite their use of mud-brick and plaster floors, are of a different plan from those at Abu Hureyra and elsewhere on the Euphrates. Then again one might note the very large number of human, animal and abstract clay figurines found at both Tell Aswad and Tell Ramad which are a very rare find on the Euphrates sites.

I will now consider the other Neolithic 2 sites in Syria and Lebanon to see if they belong within the West Syrian group.

Tell Labweh

The modern village of Labweh is in the Beka'a 26 km north-east of Baalbek. There are two Neolithic sites here, one just to the north of the village which has not been excavated and another to the south which is the site with which we are concerned. Tell Labweh stands on a low hill at the side of the valley where the land rises up towards the Anti-Lebanon Mountains. It overlooks springs which are one of the sources of the Orontes. The site is spread over a wide area but the deposits are only about 4 m deep. The surface has been much disturbed by agricultural terraces and a new road has been dug through the mound cutting it in two.

Kirkbride has made two soundings in the site to obtain the sequence of occupation. Trench A was not excavated to bedrock but the lowest levels reached were devoid of structures. Above them were two superimposed rectangular buildings with several rooms (Kirkbride, 1969, 46). The lower courses of the walls were built of stone but it is thought that the upper parts would have been made of mud-brick. The floors of these buildings were surfaced with white burnished plaster and red burnished plaster floors could be seen in the section beside the new road. Several secondary burials were found in these structures.

The first metre of deposit above the subsoil in Trench B contained no structures (Kirkbride, 1969, 48). Higher up there were traces of floors which may have belonged to buildings but the rest of the deposit was cut by a series of large pits which were filled with stones and fine black soil.

The flint industry[11] at Labweh was fairly homogeneous but there were indications that some of the tool forms changed during the life of the site.

Flint blades were struck off double-ended and pyramidal cores with crested blades as a by-product. The sickle blades in the lower levels had finely denticulated edge retouch with backing and were often retouched transversely at the ends. In the upper levels most of the sickle blades were segmented with coarse denticulation (Kirkbride, 1969, 50). Many of the arrowheads had pressure-flaked tangs which were formed by a slight narrowing of the blade but a fragment of at least one notched arrowhead was found on the site. These were the main diagnostic tools but many other types were found such as angle and dihedral burins, stubby awls and a variety of flake scrapers. Obsidian was used throughout the sequence. Flaked and polished stone axes were numerous and there were two small ones made from imported stones which had been polished all over. Bone tools were quite abundant and included borers, pins and spatulae.

All levels except those at the bottom of Trench B contained much white plaster ware. The most common shape of vessel was a flared bowl with a high flared ring base. Two types of heavier vessel were also found, both of them deep cylindrical jars with flat bases quite like those from Tell Ramad. One had a plain rim and the other one an everted lip which included a ledge inside for a lid. A little pottery was found in the upper building in Trench A and in the pits near the surface in Trench B. Pottery was absent in the lower levels at the site although in view of the small area dug Kirkbride does not rule out the possibility that these apparently aceramic levels might yield pottery in more extensive excavations (1969, 48).

Three charcoal samples from the bottom of Trench B have been ^{14}C dated, the average of the result being a figure of 5950 B.C. K-1428, 1429, 1430 (Kirkbride, 1969, 50).

The buildings at Labweh, many of the artifacts and the form of the burials bear a general resemblance to remains on some of the Neolithic 2 sites I have considered so far. The parallels with Level II at Tell Ramad are particularly close as Kirkbride has pointed out (1969, 51). The buildings were constructed in the same way with stone footings and plaster floors although those at Ramad had only one room and at Labweh several. The flint industry is similar in both core technique and the range of tools made. There is a particularly close resemblance between the sickle blades and arrowheads at Labweh and those at Ramad II. An abundance of white plaster vessels is another trait common to both. Furthermore, the dates are in close agreement. These parallels are sufficiently close to indicate that the lower levels at Labweh were occupied in Neolithic 2, albeit at the very end of this stage. The cores, after all, already show that shift away from the double-ended type which is a characteristic of the next stage of the Levantine Neolithic and there still remains the possibility, although I think it unlikely, that pottery might be found in the lowest levels. Labweh, then, was first occupied at the very end of Neolithic 2 by people whose material culture was akin to that of Tell Ramad on the other side of the Anti-Lebanon range. The parallels are so close that Labweh may reasonably be included in the same regional group as the sites in the Damascus basin.

Tell aux Scies, Dik el Mehdi II, Saaideh

Several surface sites in Lebanon should now be considered. Two of them, Tell aux Scies and Dik el Mehdi II are near the coast. Tell aux Scies is in the dunes just south of Beirut and the main collections from it were made by Bergy in 1932. The site is now buried beneath rubbish dumps (Copeland, Wescombe, 1965, 131). Bergy also collected material from Dik el Mehdi II, a site in the hills immediately behind Antelias a little north of Beirut (Copeland, Wescombe, 1965, 83). These finds were deposited in the Université Saint-Joseph and have since been discussed by Cauvin (1968, 220ff).

The material which I have studied from both sites was quite homogeneous although there were intrusive elements. Tell aux Scies had some pyramidal cores and a number of double-ended ones, mostly of the keeled variety. Associated with these were many crested blades. Many of the tools were made on blades from these double-ended cores. Among them was a group of sickle blades from which the site took its name. These had nibbled or finely-denticulated cutting edges but very few were backed or truncated. The arrowheads fell into two groups. One consisted of arrowheads with a short straight or hollow-based tang. The tang was defined by a pair of notches and there were pairs of notches along the blade. These arrowheads may also have had a little light edge retouch. The others had long tangs without shoulders and were retouched with squamous pressure-flaking. The remaining blade tools from Tell aux Scies consisted of angle and dihedral burins, some borers, end-scrapers and retouched blades.

There were a number of flake scrapers which should probably be grouped with the blade tools and also several axes and adzes or chisels. The axes were flaked with a polished cutting edge and were oval or trapezoidal in shape; one was polished all over and had straight sides. The adzes or chisels were smaller and were flaked but not polished. There were also a few small flaked picks.

The collection from Dik el Mehdi II was smaller but many of the same artifacts were represented. The cores and associated waste products were similar as were the burins, borers and scrapers. There were also a side-notched arrowhead, one or two trapezoidal axes or adzes and several core choppers.

Cauvin has pointed out that there are many similarities between these two assemblages and the material found at Tell Ramad in Level I (1968, 227). They have the same techniques of blade production and many of the same distinctive tool types such as notched arrowheads, long sickle blades and flaked and polished axes. It would seem, therefore, that Tell aux Scies and Dik el Mehdi belong within the same regional cultural grouping as Tell Ramad I and that these sites were occupied at about the same time.

One other site must be mentioned here and that is Saaideh in the Beka'a. Several years ago a Neolithic flint assemblage was found 3.2 m below the present ground surface in an irrigation sump a little to the west of the village at Saaideh (Hours, 1969, 32). The flints all belonged to the same industry and among them were four double-ended keeled cores with the appropriate blades. A number of these had been retouched with a finely denticulated edge and used as sickle blades. The rest of the tools consisted of end-scrapers on blades, burins and a large borer; there was also a fragment of obsidian.

This assemblage, though much sparser than that from Tell aux Scies and Dik el Mehdi II, has the same characteristics as Hours has observed (1969, 36). It is thus another Neolithic 2 site and was probably occupied in the second half of the 7th millennium. The site was located quite by chance because it was so deeply buried. No other Neolithic 2 sites have been discovered in the Beka'a but this is probably because they too are covered by soil which has washed off the surrounding mountains onto the valley floor.

The closest cultural parallels for Labweh and the three unexcavated sites are with Tell Ramad in Levels I and II and the other Damascus basin sites. All four belong within the West Syrian group.

Several other Neolithic 2 sites in Lebanon and Syria should now be mentioned.

Nacharini

There was some Neolithic 2 material in the top layer at Nacharini. This consisted of pressure-flaked tanged arrowheads associated with retouched blades and other tools, enough to indicate that the site was occupied intermittently in Neolithic 2 and possibly a little later. The finds are sufficiently like those at Tell Ramad II for the site to be included in the West Syrian Group.

Mugharet el Abde

A mixed assemblage of material was collected from the surface of this site which is near Yabrud. Among the tools were some segmented blades and a notched arrowhead which can be paralleled at Tell Ramad in levels I and II (Nasrallah, 1951, 94ff) so this site may also have been occupied in Neolithic 2.

The Hauran

One surface station in the Hauran has yielded a collection of 13 blades (de Contenson, 1969c, 64). They were all large and unretouched with narrow rounded bulbar ends characteristic of platform preparation on double-ended cores. They may tentatively be attributed to a Neolithic 2 site although the exact location of their findspot is not known. There is insufficient evidence to assign the site to any regional group.

Ras Shamra

The great mound of Ras Shamra was first occupied in the Neolithic and remains of this earliest settlement have been found on the natural subsoil at the bottom of several soundings made beneath the temple acropolis at the north-east corner of the site and under the Palace garden in the north-west sector (Schaeffer, 1962, 151). The full extent of the settlement is not known as no deep soundings have been made in the southern half of the mound but on the evidence of the trenches excavated so far it may have been about 8 ha in area. It was thus one of the largest Neolithic sites in Syria although we do not know if this whole area was occupied at the same time in the early phases. The Neolithic settlement stretched along the southern bank of the Nahr el Fidd which reaches the sea 1 km west of the site at Minet el Beidha.

This first settlement belongs to Phase VC or the Early Neolithic (Néolithique Ancien) in the Ras Shamra sequence and is distinguished from all later phases by an absence of pottery (Schaeffer, 1962, 153). Stone structures were found in one of the soundings (Kuschke, 1962, 261) and traces of surfaces with refuse of human occupation in the others (de Contenson, 1962, 509) but the trenches were too restricted in area to give us an idea of the layout of the settlement. An enigmatic stone structure was found in 1933 at the bottom of the first soundings to be excavated. It consisted of a sloping ramp of stones apparently forming a glacis (Schaeffer, 1962, 157). The same structure was found a little further to the east and Schaeffer was inclined to believe it was a defensive perimeter wall. The shape of the ramp makes this unlikely but the true nature of the feature is unclear for many of the stones may simply have fallen down the slope. A more probable explanation is that the structure was a terrace wall for it faces the river and would have supported the layers behind. This suggestion was advanced by Schaeffer himself at first and then rejected in favour of the idea of a defensive glacis on analogy with the PPNA perimeter wall at Jericho (Schaeffer, 1962, 158).

Enough is known about the artifacts of this phase to determine the cultural affinities of the settlement but not to give us a detailed picture of how the inhabitants lived. The flint industry[12] was based upon blade production although flake tools made up a significant proportion of the assemblage. The blades were struck off conical cores for the most part while some of the flakes came from discoid cores. Many of the sickle blades were segmented (de Contenson, 1962, 509) and almost all had a finely denticulated cutting edge. At least one notched arrowhead was found in the sounding west of the Temple of Baal but most of them were tanged. The tang was defined by a narrowing of the blade rather than with true shoulders and the tools were retouched with pressure-flaking. The other blade tools consisted of burins, borers and end-scrapers. Most of the flake tools were scrapers and some of these were quite large. A little obsidian was used in this phase although in what amounts is not known. Two of the pieces analysed came from Çiftlik and one from the unidentified 3d source which may be in eastern Anatolia (Renfrew et al., 1966, 65, 33).

Several other classes of artifacts were found but none in any great quantity. There were a few small polished axes (Schaeffer, 1962, fig. 3) and fragments of basalt and limestone bowls, some of which were polished. Several querns were found and some smaller objects carved in limestone (de Contenson, 1962, 509). At least one piece of white ware was recovered from this phase in the sounding west of the Temple of Baal and also a carnelian bead. Bone tools seem to have been scarce but among them were borers and handles for other tools. Two anthropomorphic figurines were also found, one of baked clay and one of limestone (Schaeffer, 1962, fig. 1A).

Three charcoal samples have been analysed for ^{14}C giving dates of 6416 ± 101 B.C. P-460, 6192 ± 100 B.C. P-459 (Radiocarbon 5, 1963, 83) and 7080 ± 400 B.C. Gsy-102 (Radiocarbon 8, 1966, 138). The Philadelphia dates accord well with material of similar character that has been dated elsewhere but the Gif-sur-Yvette determination would seem to be too early.

The finds from Ras Shamra, though scanty, all belong in a Neolithic 2 context. This conclusion based on an examination of the artifacts is reinforced by the stratigraphic and chronological evidence. The sequence at Ras Shamra was continuous throughout Phase V and the VC levels were stratified directly below those containing material of the next cultural stage. The ^{14}C determinations place the occupation in the second half of the 7th millennium.

Although the flint industry, white ware and other artifacts are all characteristic of late Neolithic 2 in the Levant, the regional cultural affinities of the settlement at Ras Shamra are less clear. The core technique and typology of the sickle blades and arrowheads are different from the usual forms found on Euphrates sites ruling out any close connection there. A much better comparison can be made with the finds from Tell Ramad I and II, particularly between the flint assemblages, so that Ras Shamra may reasonably be included in the West Syrian group of sites. Yet even so certain differences remain. These are partly the result of the use of different local raw materials for the flint artifacts and other tools and also because Ras Shamra is separated from the Damascus basin and Lebanese sites by a considerable distance. One suspects that as in later phases its closest cultural affinities would be with sites in the Amuq basin if any of this stage had been found there.

Slenfe

Several keeled cores were found on a surface station at Slenfe in the Jebel Alawiye (Cauvin, 1968, 227). This would suggest that the site was occupied in Neolithic 2 but nothing else is known about it. The site is high up in the mountains and so was probably used for one or two particular activities such as hunting or flint tool preparation.

Palestine

The densest concentration of Neolithic 2 sites known in the Levant is in Palestine and the adjacent regions of Transjordan, the Negev and northern Sinai (Fig. 33). This is because since the First World War more excavations and surveys of prehistoric sites have been carried out in this region than anywhere else in the Near East. These endeavours have yielded a rich harvest of archaeological information particularly about Neolithic 2 sites but the very abundance of the remains has raised problems of interpretation because until recently it has not been possible to relate cultural and economic developments in this region to the Levant as a whole. The main example of this has been the various explanations that have been put forward to explain the origins of Neolithic 2 in Palestine.

Before considering general questions of this kind I will review the discoveries made at the principal excavated sites. It will be best to consider Jericho first because this site has yielded the amplest well stratified remains for Neolithic 2 as it did for Neolithic 1.

Jericho

The PPNA settlement at Jericho was abandoned about 7700 B.C. as we have already seen. The site remained unoccupied for several centuries and then a new settlement, designated Pre-Pottery Neolithic B (PPNB) (Kenyon, 1960, 91), was founded on top of the weathered surface of the mound. The reasons why the site was deserted for so long are not known but probably depend on local factors which affected Jericho alone. There are no indications of such a break in occupation at this time at sites further north such as Tell Aswad and Mureybat nor at the two sites in Palestine with stratified Neolithic 1 and 2 deposits, Nahal Oren and El Khiam.

The new settlement was at least as large as the PPNA one for remains of it were found in Trenches I (D, F), II and III (Kenyon, 1960, 91) and sites E and M (Kenyon, 1955, 109). The settlement may have been even larger for in Trenches II and III it extended beyond the limits of the Middle Bronze Age

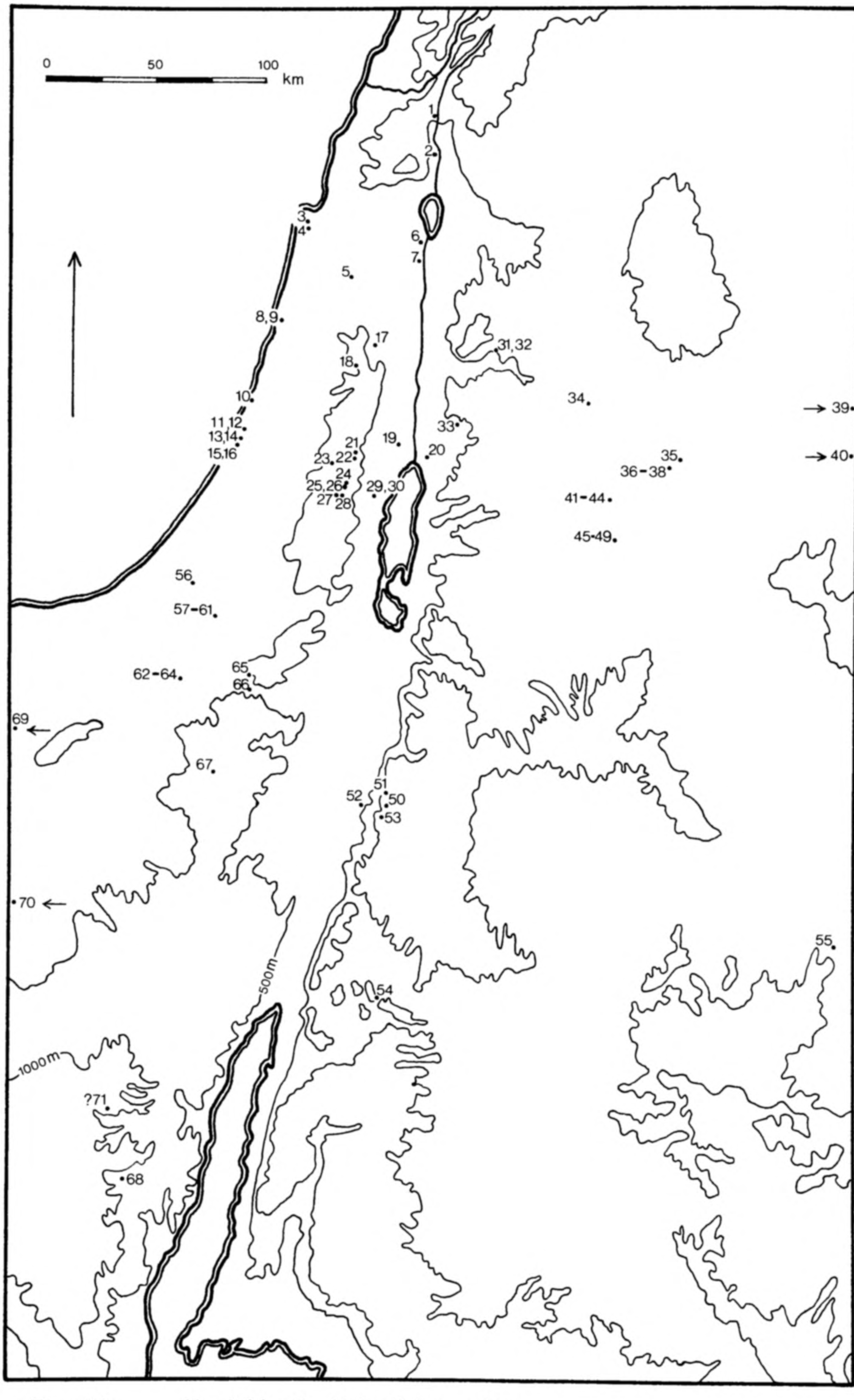


Fig. 33 Neolithic 2 Palestinian sites

FIGURE 33

Neolithic 2 Palestinian sites

1	Kfar Giladi Quarry	36	Site 212
2	Beisamun	37	Site 213
3	Iraq el Barud	38	Qasr el Uweinid
4	Nahal Oren	39	Site 243
5	Megiddo	40	Site 220
6	Sheikh Ali	41	Kharaneh IV
7	Munhatta	42	Kharaneh - Site 1
8	26	43	Kharaneh - Site 2
9	26A	44	Kharaneh - Site 3
10	Jaffa	45	Wadi Dhobai A
11	70	46	Wadi Dhobai B
12	71	47	Wadi Dhobai C
13	64	48	Wadi Dhobai D
14	64A	49	Wadi Dhobai E1
15	62/0	50	Beidha
16	62/1	51	Shaqaret M'siad
17	Tell el Far'ah	52	Bir et-Taiyiba
18	Rafidiyeh	53	Adh Dhaman
19	Jericho	54	Ain Abu Nakheileh
20	Teleilat Ghassul	55	Kilwa - Site 19
21	Tell en-Nasbeh	56	Wadi Ghazzeh - Site D2
22	Tell el Ful	57	Halutza Dunes
23	Abu Gosh	58	Halutza - Site 83
24	Mar Elias	59	Halutza - Site 86
25	Tantur	60	Halutza - Site 87
26	Beit Tamir	61	Halutza - Site 89
27	Etam	62	Nizzana unnumbered
28	Tahuneh	63	Nizzana unnumbered
29	El Khiam	64	Nizzana unnumbered
30	Wadi Khareitun	65	Nahal Boqer
31	Abu Suwan	66	Nahal Divshon
32	Middle Field	67	Har Harif G2
33	Jisr Shueib	68	Wadi Sa'al
34	Qasr el Hallabat	69	Jebel Meghara
35	Azraq	70	Suez Canal
		71	Jebel el Egma

town wall which had cut into PPNB levels (Kenyon, 1960, 91).

The buildings of the PPNB settlement were rectilinear and built of mud-bricks sometimes on stone foundations. The bricks were parallel-sided with rounded ends and had deep thumb prints in them to act as keys for mud mortar. No buildings were fully exposed so it is not known what their complete plan was but a good idea of the arrangement of some of them was obtained. They consisted of a number of rooms arranged around a courtyard. The main rooms were very large, two examples being 6.5 by 4 m and 7 by 3 m each (Kenyon, 1957b, 53), and were subdivided by partition walls with two or three openings in each framed with wooden posts. These spacious rooms were accompanied by much smaller chambers and storage bins. The floors of the rooms were covered with plaster painted red or cream and then burnished. Recent analyses have confirmed that the plaster was made of lime (Frierman, 1971, 215; Gourdin, Kingery, 1975, 147). Some floors were covered with reeds or circular rush mats (Kenyon, 1957b, 56).

The courtyards had clay floors which were covered with ashes from numerous fires (Kenyon, 1957b, 54). They formed the core of each building complex but it is not certain if the rooms around them belonged to one or more buildings. These complexes were frequently rebuilt on a slightly different alignment, one of them in site E no less than 14 times. They apparently had a single storey and the same type was found all over the mound. It is probable that they were family houses.

One building similar in other respects to these houses had an unusual feature. A rectangular room had been separated off and a niche cut in an end wall. Nearby a chipped-out pillar of volcanic stone was found which fitted into the niche (Kenyon, 1957b, 58ff). Kenyon has suggested that the room was a shrine but there is no clear indication of what purpose it served.

The overall plan of another building was different from the usual houses even if details of its construction were the same as in the other buildings. It consisted of a series of rooms with curvilinear walls which surrounded a rectangular plastered space 6 m long and at least 4 m wide (Kenyon, 1954, 51). This area was believed to be a central room. In the centre of the floor of this room lay a sunken basin plastered like the floor which had apparently been used as a hearth. This building was different from the houses; Kenyon thought it may have been a temple but it could equally well have served as a communal building.

The houses of the early PPNB settlement were built down the side of the mound on the evidence from Trench I (Kenyon, 1970, 54). Some were rebuilt ten times before there was any change. Then a wall was built near the top of the slope. The ground in front was levelled off and the debris piled up behind the wall so that it formed a terrace. Houses were then built on top of the terrace behind the wall. The line of this wall was irregular and since it has only been found in Trench I and Site M it is not known if it encircled the site. The ground in front of it sloped very gently so it may have been simply a terrace wall rather than a defensive work as Kenyon has suggested. It may be that the settlement contracted on this side and that the wall was built to strengthen the upper part of the settlement as more debris accumulated. Eventually this terrace wall partly collapsed and a replacement was built further to the west (Kenyon, 1970, 55). It is thought that yet another wall may ultimately have been built even further out as the settlement expanded still more.

The dead of the PPNB settlement were buried beneath the floors of the houses or in the fill of abandoned buildings. The graves frequently contained collective burials in which many of the skeletons were disordered (Kenyon, 1954, 48). Some bones were articulated but others were not and many of the corpses lacked skulls. A cache of seven skulls was found beneath the floor of a room and two more under another floor in the same house (Kenyon, 1957b, 62ff). The jaws had been removed from all but one of them and the face and base of the skull covered with plaster. One had bands of paint on the top of the skull. The features were modelled naturalistically with shells for eyes to give the skulls the appearance of live human beings. One other plastered skull was found at the north end of the mound (Kenyon, 1970, 53) making a total of ten altogether. Five of these skulls have recently been examined and were shown to be adult males (Strouhal, 1973, 244).

The practice of separating skulls from corpses and reburying the disordered skeletal remains in collective graves was widespread in the Levant in Neolithic 2. Restoring the faces of these skulls with plaster was a more localised custom found only at Jericho, Tell Ramad and, as we shall see, Beisamun. One other aspect of the treatment of detached skulls at Jericho differed from the practice on West Syrian and Euphrates sites such as Tell Ramad and Abu Hureyra. Apart from the ten plastered examples hardly any detached skulls were found buried in the excavated parts of the settlement which suggests that they had been gathered together and deposited in one or two special locations.

The flint raw material for the PPNB chipped stone industry was quite as varied as in the Proto-Neolithic/PPNA. Some of it was buff, brown or grey and of obvious local derivation. A proportion, however, was fine-grained, often veined and more lightly coloured in pink, even purple or a honey brown. We have already noted that this colourful flint was used at Jericho and at Nahal Oren in Neolithic 1 but in Neolithic 2 large blade tools, particularly arrowheads, were made of this material at these and a number of other sites in Palestine and southern Syria such as Munhatta and Tell Ramad. The sources of the brightly coloured flint have not been determined but it has tentatively been suggested that one may lie in the hills that form the south-east extension of Mt. Carmel between the coastal plain and the Plain of Esdraelon (Noy et al., 1973, 86).

Although the sources of this flint have not been located with certainty the idea has been put forward that this raw material formed an object of trade or exchange (Mellaart, 1975, 65), an hypothesis which might be questioned if only because the material is heavy and since so much has been found on archaeological sites it is difficult to see how it might have been transported before beasts of burden were domesticated. It is noticeable that this special flint was preferred for the larger blade tools, many of which were retouched with pressure-flaking, and this functional distinction in the use of raw material may point to another explanation. Bordes and Crabtree have found that long blades may be pressure-flaked more readily when the flint has been heated (Crabtree, Butler, 1964, 1; Bordes, 1969, 197). This process can alter the appearance of the flint by turning it pink or other colours and may also make the surface of struck pieces shiny and smooth, all of which can be seen on the distinctive Neolithic 2 flint. This suggests that the material is medium-grained flint of the usual kind found in beds in the limestone of Palestine and southern Syria or as nodules in wadis which has been collected and then heated to make it easier to work. This would also explain why no sources of this material have been identified with certainty.

Most of the flint tools in the PPNB at Jericho were made on blades struck off double-ended cores of which some were keeled. The basic core technique was thus exactly the same as on most Neolithic 2 sites in the West Syrian and Middle Euphrates groups.

Some of the most common tool types were the arrowheads. Almost all were tanged but some had pairs of side notches as well, quite like examples on West Syrian sites. Another group had long tangs with pronounced wings or barbs formed by deep notches on either side of the tang. These appear to have been a specifically Palestinian type. A third group had tangs defined by shoulders or a simple narrowing of the blade at the tang end. These types were common on West Syrian sites and were found on other sites throughout the Levant. The tangs of most of the arrowheads were heavily retouched with pressure-flaking but although some also had pressure-flaking on the rest of the blade most were only lightly retouched at the tip.

The other main class of tool was the sickle blades. These had nibbled or finely-denticulated cutting edges but were usually not otherwise retouched. Dihedral and angle burins on blades were fairly common. Borers on blades were also made but these were quite rare.

Scrapers of all types were uncommon especially when compared with sites further north. Some discoids were made on core tablets but there were few other flake scrapers or end-scrapers on blades. Core tools were also exceedingly scarce. There were no large core tools at all and only one or two small flaked axes with a tranchet cutting edge. Small greenstone axes were found which, like these flaked flint ones, may have been used for woodworking.

About 1% of the chipped stone industry at Jericho was of obsidian (Renfrew et al., 1966, 61). Two pieces analysed by Renfrew and his colleagues were found to be from the Çiftlik source (Renfrew et al., 1966, table 1) as was a third piece recently analysed in the Bradford programme. One other piece analysed at Bradford was of green obsidian but it could not be ascribed to any known source. It did not, however, come from Çiftlik so we now know that obsidian from at least two sources was reaching PPNB Jericho.

The ground stone tools at Jericho were numerous and varied. The most characteristic objects were the open-mouthed querns (Kenyon, 1957b, 57), some of which were stepped, a type which has since been found at Munhatta and Tell Ramad. Plano-convex rubbers were used with these querns to grind grain. Hammerstones, stone balls and stone polishers were all made and also pestles which are rare on other Neolithic 2 sites. Dishes and bowls were carved from a local soft limestone and some were then given a fine polish. Among the other stone tools were spindle whorls and weights which may have been used in simple looms. Bone tools such as borers and spatulae were made but these were less abundant than in the PPNA at Jericho and also less common than on most West Syrian and Middle Euphrates Neolithic 2 sites.

One of the more unusual groups of finds from PPNB Jericho was a series of stylised anthropomorphic plaster figures. Fragments of several of these were found in Square DII (Kenyon, 1960, 92). One which could be reconstructed from the waist up was almost life-sized and had a rectangular head but no indication of facial features. It was decorated with red, brown and cream paint. Two groups of three plaster figures were found by Garstang (1935, 166) in Neolithic levels at the northern end of the site but their precise stratigraphic position was uncertain. It now seems likely that they can be associated with the figures found in Kenyon's excavations and so dated to the PPNB phase of occupation. The groups each consisted of a life-sized man and a smaller woman and child. Garstang was able to recover only one head of these figures which was thin and spade-shaped like those found by Kenyon but its face was naturistically modelled as were the other plaster fragments which could be identified, with eyes made of shells. The face was made more life-like still with painted lines to represent hair on the forehead and a beard.

The modelling of these figures with plaster, shells and paint reminds one of the way the plastered skulls were made but there is no indication that the two were used together like the plaster figures and plastered skulls at Tell Ramad. For the moment the function of the Jericho plaster figures remains obscure.

Clay was used to make human and animal figurines (Kenyon, 1957b, 59ff), finds which are common to most excavated Neolithic 2 sites. There were also objects of adornment such as shell and malachite beads; the raw material for the latter was probably brought up from the Wadi Arabah. Turquoise was imported from Sinai and cowrie shells from the Mediterranean or Red Sea. A little oval piece of bone carved to resemble a human face with two holes for eyes may have been a bead or button.

The ^{14}C determinations for PPNB Jericho are even more difficult to interpret than those for the preceding phases. Six have been made altogether and of these two from the British Museum and three from the Philadelphia laboratories probably give results approaching the true age of the samples. Unfortunately when considered together they are contradictory. The British Museum determinations of 7220 ± 200 B.C. BM-115 (Radiocarbon 5, 1963, 107) and 6760 ± 150 B.C. BM-253 (Radiocarbon 11, 1969, 291) are thought to date the middle of the PPNB phase. Yet two of the Philadelphia dates which should date early PPNB levels are 6660 ± 75 B.C. P-380 and 6708 ± 101 B.C. P-381 (Radiocarbon 5, 1963, 84). It seems that once again the Philadelphia determinations are several centuries later than those from the British Museum. One other sample stratified above P-380 in Site E gave a date of 7006 ± 103 B.C. P-382 (Radiocarbon 5, 1963, 84) which only adds to the confusion. It is not possible from these dates to make an accurate estimate of when PPNB Jericho was resettled or when it was abandoned although given the clustering of the determinations it is probable that the total duration of the phase may have been nearer a half than a whole millennium. One might guess that the PPNB settlement began about 7000 B.C. and lasted until 6500 B.C. or a little after but this estimate could be in error by several centuries. One inference from this would be that Jericho was deserted for about half a millennium between PPNA and PPNB. PPNB Jericho was apparently abandoned well before the end of the 7th millennium and was not resettled until much later.

Jericho was occupied during Neolithic 2 and the general character of the remains on the site link it culturally with Neolithic 2 sites in the West Syrian and Middle Euphrates groups. There are the rectilinear mud-brick buildings and plaster floors, a basically similar flint industry though with some typological differences and the Neolithic 2 burial customs though again with certain local special features. These broad similarities place PPNB Jericho firmly within Neolithic 2 of the Levant but the particular local differences we have noted mean that Jericho must be regarded as a site within a third regional cultural grouping. This third regional group consists of sites in Palestine.

Nahal Oren

The upper layer at Nahal Oren, layer I, was also occupied in Neolithic 2. This layer covered only the centre and upper parts of the site (Stekelis, Yizraely, 1963, 2; Noy et al., 1973, 78) and was much disturbed. Nothing was found to indicate that the site had been abandoned between layers II and I so it is thought that the site continued to be occupied without a break.

Layer I varied from 0.5 to 1.5 m in depth which may indicate that the site was occupied for a short period or that occupation was intermittent as I have suggested for the earlier layers.

Two stone-walled structures were excavated on the site but it is likely that others existed which have since been destroyed. One was a large building paved with flat stones (Stekelis, Yizraely, 1963, 2). This contained a small inner chamber defined by another stone wall. The structure found in the recent excavations had been built at the top of the site on a specially levelled surface. This building which is thought to have been a house was approximately rectangular in shape and had a clay floor. At a later stage this building was reused as a burial place. A rough curved stone wall was erected inside which marked off part of the room. Within the chamber formed by the wall four bodies, three adults and a child, were buried in a crouched position and covered with stones (Noy et al., 1973, 79ff). The skulls of the child and one of the adults were missing although the mandibles had been left in place. The skeletons were preserved almost intact so they could not have been much disturbed when the skulls were removed. The two which retained their skulls were each buried with a shell bead and polished pebble. In addition one had a bifacially retouched flint knife in a bone handle and the other a bone spatula. Fragments of a fifth burial were found in the same building on the other side of the curved wall but this had been badly damaged by subsequent disturbance. It had a dentalium bracelet around one wrist.

The flint tools were made of the same varied raw material obtained in the vicinity as in the earlier layers. A very little obsidian was used as in layers III and II but the sources from which it was obtained are not known. Many of the larger tools at Nahal Oren were made on blades struck from double-ended cores but there was a significant proportion of small artifacts made on little blades and flakes derived from prismatic cores. This is partly because much of the available flint was in the form of small nodules but it probably also represents some continuity in tradition from layer II.

The two main classes of flint artifacts were tanged arrowheads and sickle blades. Some of the arrowheads had pairs of notches along the blade while others were winged or had clearly defined shoulders. The notched arrowheads had relatively little retouch but some of the others were extensively retouched with pressure-flaking. This range of types closely resembles the arrowheads from PPNB Jericho.

The sickle blades were usually quite long with a little nibbled or finely denticulated retouch. These are similar to the Neolithic 2 sickle blades at Jericho and on West Syrian sites. There were a few angle and dihedral burins, abruptly retouched borers on blades and scrapers on blades and flakes but all these types were relatively scarce. As in the levels below there was much admixture of artifacts from earlier phases.

Flint, basalt and limestone axes and adzes were quite common at Nahal Oren. The flint axes were of two types, small ones flaked all over with a tranchet edge and larger flaked axes with a rounded polished cutting edge. The other stone axes were finished by flaking, pecking and polishing. Some nephrite objects were found in the earlier excavations (Stekelis, Yizraely, 1963, 2) which may have been axes.

The querns in layer I at Nahal Oren were different from the hollow querns of layers IV to II as they were stepped with an open end (Stekelis, Yizraely, 1963, 4). They were thus like the querns at PPNB Jericho and Tell Ramad. These were accompanied by limestone and basalt plano-convex rubbers. Limestone bowls and dishes were very common at Nahal Oren.

The usual range of bone points and spatulae was used at Nahal Oren I and these tools were a little larger and more robust than those from earlier layers. One unusual find was an equid phalange with a vertical hole drilled in the top and pairs of holes on either side of the articulation; it has been suggested that this may have been the body of a doll.[6] Many tiny beads were found in the flotation residue of the recent excavation. Some were little shell discs and others sections of dentalium (Noy <u>et al</u>., 1973, 88). Cylindrical bone and stone beads were also made.

No ^{14}C determinations have been obtained for Nahal Oren I so the date of the occupation can only be established by typological comparisons with other sites. The general character of the remains places Nahal Oren I firmly within Neolithic 2 in the Levant and therefore within the 7th millennium. The characteristics of the flint industry and the typology of the arrowheads in particular are so like PPNB Jericho that it is reasonable to suppose that both sites were occupied about the same time. This would mean that Nahal Oren I was probably inhabited in the early or middle 7th millennium B.C.

El Khiam

El Khiam is the third site in Palestine at which Neolithic 2 remains have been found stratified over Neolithic 1 occupation. This material was recovered from the topmost level, level A, in Neuville's excavations. This level was subdivided into three, A1 which was a surface deposit containing mixed Neolithic 2, Chalcolithic, Byzantine and Islamic artifacts, and A2 and A3 which were Neolithic 2 deposits although they also contained some material from earlier levels (Perrot, 1951, 166, 174). These levels corresponded to Echegeray's levels 2 (Prototahunian) and 1 (Tahunian) which was subdivided into 1a and 1b (Echegeray, 1966, 71, 83). The only structures in these deposits were a straight stone wall and some hearths found by Echegeray in level 1b (Echegeray, 1966, pls. II, III).

The raw material for the flint tools was obtained locally as in earlier levels. A very little obsidian was imported in the form of blades. One piece from level 6 analysed by neutron activation proved to be from a source in the Acigöl region (Wright, Gordus, 1969, 81). Most of the tools were made on blades but these were struck off pyramidal cores and so were relatively small. Arrowheads were one of the most numerous classes of tools and there were several types of these (Perrot, 1951, figs. 71, 10-24; 72). Most were tanged although there were a few pressure-flaked leaf-shaped points. Some of the tanged arrowheads had pairs of notches along the blade while most of the others had wings or sharply-defined shoulders. These types of arrowheads were found both at Nahal Oren I and PPNB Jericho but the El Khiam examples were frequently extensively retouched with pressure-flaking.

Burins were very common in these levels at El Khiam, the principal types being angle and dihedral burins. End-scrapers on blades were also numerous but outnumbered by small flake disc scrapers (Perrot, 1951, 171). Other types such as sickle blades were less frequent. These were backed irregular blades of which only a few had any edge retouch. This type is different from those found on other Palestinian and West Syrian sites partly because a different core technique was used. The scarcity of sickle blades may reflect the unsuitability of the environment for agriculture.

Some larger flint tools were found, among them flaked tranchet axes, chisels and picks. There were also a very few flaked and polished axes.

Ground stone tools were abundant. Most of these were made of local limestone but a few were of basalt probably obtained from northern Palestine or Transjordan. These included pestles and mortars as well as rubbers and querns. There were one or two decorated stone objects and also fragments of a few limestone bowls. No mention was made of other finds in the reports so it does not seem likely that many bone tools or decorative items were found.

This whole deposit at El Khiam was no more than 1.5 m deep although one should remember that some of the original material would have washed down the slope of the terrace. The site was probably occupied intermittently in Neolithic 2 like Nahal Oren though there are indications that El Khiam continued to be used for a longer period. If one considers the typology of the arrowheads in level A then it is clear that they include both notched arrowheads recalling those of Neolithic 1 and heavily pressure-flaked examples which in Syria where the deposits are well-dated would be late 7th or even 6th millennium in date. Throughout the Levant there was a tendency for pressure-flaking to be used more extensively towards the end of Neolithic 2 and into the 6th millennium. While this cannot be taken as a precise chronological indicator the presence of many heavily pressure-flaked arrowheads at El Khiam does suggest that the site continued to be visited after occupation at Nahal Oren I and PPNB Jericho had ceased.

Wadi Khareitun

Neuville excavated another site on the slope directly across the Wadi Khareitun from El Khiam. The sequence here was the same as at El Khiam and included some Neolithic 2 occupation (Perrot, 1951, 174).

Munhatta

Munhatta lies on the west side of the Jordan valley about 11 km south of the Sea of Galilee. It is situated on a high terrace at the point where the Wadi Bireh opens out into the Jordan valley. The depth of deposit on the site amounts to some 3 m (Perrot, 1964, 325) which has been divided into six archaeological layers, levels 6 to 3 which are Neolithic 2 in character and levels 2 and 1 which belong to the Late Neolithic (Moore, 1973, 36) and Chalcolithic respectively. Erosion of the site has always been severe and in consequence none of the buildings is preserved very high.

Level 6 consisted of the remains of the earliest settlement founded on the natural subsoil. There were earth floors laid on beds of stones, probably the floors of dwellings (Perrot, 1966c, 271), hearths and much occupation debris.

The first structure found in level 5 was a long wall which ran across the site from east to west (Perrot, 1964, 325). The foundations were built of large stones and the superstructure of mud-bricks. To the south of this wall there was a paved area and also a floor with a number of hearths (Perrot, 1967, 267). A large platform was also found made of five large basalt slabs with channels cut in them. Associated with this structure was a large trough with a pebble floor. The purpose of these structures is unknown but one would suppose that they were used for some craft process.

The buildings in level 4 had a single rectangular room with a plaster floor which in some instances was polished. These rooms had walls at least 4 m long made of mud-brick reinforced with stone footings along the outer edge (Perrot, 1966b, 52). The north wall of each room had a plastered niche (Perrot, 1965, 249) like that found in one of the buildings at Jericho but without the upright stone. These buildings were separated by narrow passages and courts in which were found hearths and the vestiges of stone structures which may have had a domestic function.

A number of plaster floors were also found in level 3, presumably the remains of single-roomed structures similar to those in level 4. These were accompanied by buildings of a different kind and of uncertain purpose. One of these buildings had a large circular court paved with stones which may have been partially roofed (Perrot, 1964, 327). It was surrounded by a ring of chambers each about 3 by 5 or 6 m in size. Traces of another apparently similar structure were found a little to the west (Perrot, 1965, 249) and a third in the northern part of the site (Perrot, 1966c, 269).

The plaster floor buildings of level 4 contained hearths and benches which gave them the appearance of dwellings, an interpretation strengthened by the fact that they were the only numerous and substantial structures found in this level. Their presumed successors in level 3, the plaster floors, were also quite common. This makes it likely that the large, unusual circular buildings had another, perhaps communal function.

The inhabitants of Munhatta 3 abandoned the site and in the subsequent weathering its remains were gradually hidden beneath a layer of sandy soil (Perrot, 1966c, 269). The site had all but disappeared when it was resettled much later on (Perrot, 1966b, 49), an indication of the long period which elapsed between Munhatta 3 and 2.

Most of the flint tools at Munhatta were made on blades struck from keeled and other double-ended cores (Perrot, 1966b, 53, fig. 3, 10). The most numerous group was the arrowheads all of which had pronounced tangs. The principal types had wings or sharp shoulders and some even had pairs of barbs on the tang itself (Perrot, 1966b, fig. 4, 9, 10). Some arrowheads were leaf or diamond-shaped without shoulders but relatively few were notched. These tools were usually retouched by pressure-flaking which was often quite extensive.

Sickle blades were also very common and these had finely-denticulated cutting edges with little other retouch. The remaining tools were much less abundant but they included the same types found on other Palestinian Neolithic 2 sites: end-scrapers on blades and flakes, dihedral and angle burins and borers. Large flaked tools were not apparently found in any numbers at Munhatta as they were at Jericho. Very little obsidian was found at Munhatta. A piece found in level 6 came from source 1e-f near Acigöl (Wright, Gordus, 1969, 81), the same area as the piece analysed from El Khiam. Obsidian from this area is very rare on Neolithic 2 sites in the Levant as much of the Cappadocian obsidian which was used came from Çiftlik.

Ground stone tools were particularly abundant at Munhatta. There were the same stepped and open-ended querns as at Jericho and elsewhere together with rubbers, grooved stones, polishers, pestles and mortars made of basalt or limestone (Perrot, 1966b, 58). Fragments of stone dishes and bowls were also found but the only objects of adornment were a few discoid and cylindrical greenstone beads. Bone tools were recovered at Munhatta but these have not been discussed in any of the reports which have appeared so far and I have not examined them.

Clay figurines of humans and animals were another very common find at Munhatta. Many of the anthropomorphic figurines were of similar shape and somewhat different from those found on other sites. Each was made of a clay sausage flattened at one end to make a base. The other end was pinched flat and little pieces of clay were applied to form the eyes and nose. Both males and females were represented. The animals were usually horned quadrupeds, some of which had a marked dorsal ridge. Some were obviously cattle and others may have been pigs or sheep and goats. Pawns and other abstract shapes were quite common as at Ramad.

Two ^{14}C determinations were obtained from soil samples in an attempt to date the Neolithic 2 occupation. These gave results of 5420 ± 400 B.C. M-1792 and 7210 ± 500 B.C. M-1793 (Radiocarbon 12, 1970, 178, 179). These dates have large stated errors because of the unsatisfactory nature of the material dated and do not agree with each other. They give us no more than a very general idea of the age of the deposits.

One can obtain a more precise idea of the time when the site was occupied from typological comparisons of the artifacts found there. The material is all Neolithic 2 in character which may be equated in general terms with PPNB Jericho yet there are certain aspects of the Munhatta flint industry which are distinctive. The arrowhead types are quite elaborate compared with those at Jericho and Beidha VI to I and have much more pressure-flaking than on these two dated sites. Thus although the occupation at Munhatta may have overlapped with the sequences at Jericho and Beidha it probably continued into late Neolithic 2. This would mean that the site was occupied in the middle or late 7th millennium B.C.

Relationships between Palestinian, West Syrian and Middle Euphrates sites in Neolithic 2

The Neolithic 2 sites in Palestine which I have discussed are closely related culturally to Jericho and may be dated by the PPNB Jericho Carbon 14 determinations. Thus all of them appear to have been occupied during the 7th millennium which makes them broadly contemporary with the Neolithic 2 West Syrian and Middle Euphrates sites. The Palestinian Neolithic 2 sites and those further north share certain general cultural traits like the rectilinear buildings with plaster floors and burial customs which embrace single inhumations, secondary collective burial and special treatment of skulls. Their flint industries are based on the same core techniques and the same range of tool types is found on most Neolithic 2 sites, tanged arrowheads everywhere, sickle blades in abundance on Palestinian and West Syrian sites, end-scrapers, angle and dihedral burins, borers, and flaked and polished axes and adzes on some sites. Ground stone rubbers and querns are ubiquitous as are fine stone bowls and dishes.

The Palestinian sites thus form part of a single Levantine cultural entity in Neolithic 2 yet in their material remains they show considerable individuality. The plans of the buildings at Jericho, Nahal Oren and Munhatta are different from those at Tell Ramad and Abu Hureyra for example. There are certain variations in burial rites on the Palestinian sites, not least the practice of modelling faces on skulls of the deceased which seems to have been confined to sites in Palestine and Tell Ramad only a little to the north-east. The flint industries of the Palestinian sites have their own idiosyncracies, one of which is the making of tanged and winged arrowheads, a type rare anywhere else. Tranchet axes are another Palestinian type rarely found on sites further north. The stepped, open-ended querns are found on most Palestinian sites but only at Tell Ramad to the north. On the other hand the white plaster ware which is so common on later Neolithic 2 West Syrian and Middle Euphrates sites is not found in Palestine, unless a report of a few fragments being found at Munhatta is corroborated. These cultural differences are sufficiently marked for us to place the Palestinian sites in a third regional group within Neolithic 2 of the Levant.

Although the Palestinian sites form a distinct regional group some of their characteristic cultural traits are found at Tell Ramad and other sites in the West Syrian group. These two regional groups have particularly close cultural links and form almost a cultural continuum along the coast and immediate hinterland of the Levant.

When Kenyon excavated Jericho it became apparent that there was a long gap in occupation between the PPNA and PPNB settlements. The material remains of the PPNB settlement also appeared to be quite different from those of the PPNA. Jericho was the only site in Palestine which provided a long and well-defined Neolithic sequence. All the other sites were either settlements occupied for much shorter lengths of time or surface stations and none of them had as full an artifact inventory as Jericho. Their cultural and chronological position could only be fixed by the Jericho sequence. None of them appeared to provide a link between the PPNA and PPNB at Jericho so it was thought that the PPNB was a culture that had originated elsewhere and been introduced into Palestine by immigrant groups. When excavations began at Hacilar and Çatal Hüyük in Anatolia archaeologists noted that PPNB Jericho had certain general traits in common with these sites. It was then suggested that some unknown culture in Syria provided a link between the Anatolian and Palestinian sites and that the PPNB in Palestine was introduced from there (de Vaux, 1966, 13; Kenyon, 1969, 159).

Since then many Neolithic sites have been found in Syria and some of them have been excavated. The Neolithic sequence is fairly clear now, at least in the Damascus basin and along the Euphrates. These two regions enjoyed an unbroken local development of culture within the wider Levantine province throughout Neolithic 1 and 2. It can now be seen that the PPNB at Jericho was distinct from Neolithic 2 further north and could not have developed from it for both crystallized about the same time.

Jericho is still the type-site for the Neolithic in Palestine but more is now known about other sites in the region. Although there was a long gap in occupation at Jericho between PPNA and PPNB there was no such sharp break in the sequences at Nahal Oren and El Khiam. When the material from these two sites is considered and also that from Jericho now that the study of it is far advanced we can see that there was considerable continuity of culture from Neolithic 1 to 2 within Palestine. Some characteristics of the Neolithic 2 chipped stone industry in Palestine had already been developed at these sites in Neolithic 1. Double-ended cores were used at both Nahal Oren and Jericho in Neolithic 1 and a number of true blade tools had been made on the products of these cores. Squamous pressure-flaking was also used at these two sites. Flaked tranchet axes were first made in Neolithic 1 although they are usually thought of as typical of Neolithic 2 in Palestine. Many of the ground stone tools and stone vessels were similar in Neolithic 1 and 2 as were the bone tools. The typical burial customs of Neolithic 2 were also developed earlier for at both Jericho and Nahal Oren skulls were removed from skeletons in Neolithic 1.

The most striking difference between PPNA and PPNB at Jericho was the plan of the buildings. This is still true but there is no longer any need to look further than the southern Levant for the origins of the new rectilinear style of construction. At both Nahal Oren and Beidha there was a swift change from circular to rectangular structures and the change was equally rapid at Mureybat in the north even if at each site the change happened at a different time. It seems that the alteration in building plan took place on Palestinian sites during the centuries when Jericho was unoccupied and that when the site was resettled about 7000 B.C. the inhabitants built their houses in the then current rectilinear style. The gap in the sequence at Jericho is still marked but there is no reason to suppose that all cultural development ceased in Palestine during this period. Quite the reverse seems to have occurred: the culture of Neolithic 1 in Palestine was transformed into that of Neolithic 2 within the region as was happening further north. Palestine continued to be occupied during the transition even if most of the known sites were inhabited for such short periods that long cultural sequences are rarely found.

I will now briefly review the evidence for Neolithic 2 occupation at other sites in Palestine. The sites are many but most of them are only known from surface survey. Intense exploration of this region is continuing and new sites are being discovered every year but information about these discoveries is disseminated slowly. Other sites were discovered long ago and remain unpublished, their surface collections dispersed. Some of these have doubtless been forgotten. Since our information about these sites is so uneven I shall not attempt to mention every one discovered but simply those in each area for which information is readily available in the published sources and in unpublished museum collections which I have examined.

Mt. Carmel

Iraq el Barud (Sefunim)

Iraq el Barud is a cave which lies above the Wadi Sefunim on the west side of Mt. Carmel about 10 km south of Haifa. The site has yielded an incomplete sequence of remains from the Palaeolithic to the Neolithic with some more recent debris on top. Layers III and IV contained an aceramic Neolithic flint industry (Ronen, 1973, 60) which included blades struck off double-ended cores, sickle blades and tanged arrowheads, all typically Neolithic 2 in character which should be 7th millennium in date. A hearth was found in the level beneath, Layer V, from which samples of ash were taken for ^{14}C dating. The determinations were 5780 ± 115 B.C. Hv-2597 and 7445 ± 130 B.C. Hv-3368 (Ronen, 1973, 62). These determinations are so at variance with each other that neither can be accepted as truly dating the layer in which they were found so it seems wisest to adhere to a 7th millennium date for Layers IV and III based on typological comparisons.

Megiddo

When Area BB on the north-east side of the mound at Megiddo was excavated to bedrock a cave was found which was filled with occupation debris. The floor of this cave, designated feature 4067, was 3m by 5m in size and the levels within it were called Stratum -XX (Loud, 1948, 59). A number of flint artifacts, a few limestone objects and some bone tools were found in Stratum -XX.[13]

The flint tools looked at in retrospect seem to be typologically mixed as is so much of the material in the lower strata at Megiddo. There were several tanged arrowheads retouched by pressure-flaking in this stratum and others which were leaf and diamond shaped (Crowfoot, 1948a, 141). All closely resemble examples from Munhatta. 13 sickle blades were found in the cave which were segmented and deeply denticulated. This type is characteristic of the next stage of the Neolithic rather than Neolithic 2. There were several finely-denticulated blades of Neolithic 2 type which may have been used as sickle blades in the unpublished material in the Oriental Institute, Chicago; these should be typologically contemporary with the arrowheads. The remaining tools consisted of an end-scraper, burin, denticulates and a small flaked tranchet axe (Crowfoot, 1948a, 142). A few pieces of obsidian were also found in this stratum.

Some unusual bone tools were recovered from Stratum -XX. These were long spatulae made from rib bones and they were interpreted as needle shuttles used in weaving (Bate, Crowfoot, 1948, 140).

The typology of the arrowheads and the absence of pottery both suggest that Cave 4067 was occupied late in Neolithic 2. The segmented, denticulated sickle blades would indicate a more recent date but these may have been made after the arrowheads. I believe that this cave was inhabited towards the end of Neolithic 2 and was contemporary with Munhatta and Beisamun. We do not know how extensive this site was since only a relatively small area of bedrock has been exposed at Megiddo but it is possible that a larger area than this single cave was occupied in Neolithic 2.

Jordan valley

Beisamun

This site lies on the west side of the upper Jordan valley on the shores of Lake Huleh. It covers an enormous area of about 12 ha but the archaeological deposit is only 0.8 m thick (Ferembach, Lechevallier, 1973, 223). Part of the site consisted of rectangular stone-walled buildings with plaster floors which were widely spaced along the lakeside. One of these had two rooms with a hearth and the remains of two plastered skulls and several secondary burials were found beneath the floor. One of the plastered skulls could be identified as an adult female (Ferembach, Lechevallier, 1973, 225). The associated flint industry[14] included tanged, notched and pressure-flaked arrowheads, sickle blades and flaked and polished axes that can be paralleled on other Neolithic 2 sites in Palestine and at Tell Ramad. It would appear that the site was first occupied in the late 7th millennium. Four pieces of obsidian from this deposit have been analysed; three of them came from Çiftlik (2b) and one from Nemrut Dağ (4c) (Wright, Gordus, 1969, 81). Material has also been collected from the surface over many years and much of this is slightly later in date so it seems that the site continued to be occupied until early in the 6th millennium. Although the area of the site is very great by no means all of it was occupied at the same time.

Kfar Giladi Quarry

The Kfar Giladi quarry site is a surface station in the extreme north-west corner of the upper Jordan valley (Lechevallier, Dollfuss, 1973, 9*). No structures have been found here but a basalt bowl, basalt grinding tools and a diagnostic assemblage of flint tools have been collected from the surface.

Most of the flint tools were made on blades struck off double-ended, pyramidal or prismatic cores (Lechevallier, Dollfus, 1973, 19*). 40 arrow-heads of several types were picked up. 11 were tanged and one of these was winged. Some were pressure-flaked but most were finished by abrupt retouch. The remaining 29 arrowheads were leaf-shaped and partly pressure-flaked. These arrowheads are similar to those found at Munhatta.

Most of the sickle blades had finally-denticulated or nibbled cutting edges. A few were segmented and four of these were made on broad blades as much as 2.5 cm wide (Lechevallier, Dollfus, 1973, fig. 2, 20*); segmented sickle blades similar to these were found at Tell Ramad in Level I (de Contenson, 1971, 280).

Among the other flint tools were eight burins and seven flaked axes (Lechevallier, Dollfus, 1973, 20*). The latter were almond-shaped, triangular or rectangular in outline. There was also a chisel and a pick. These heavy tools are like some from Beisamun.

These tools are sufficiently similar to those from Munhatta to indicate that the site was occupied quite late in Neolithic 2. The almond-shaped and rectangular axes are types that began to be used late in Neolithic 2 but were more common in this area during the next stage.

Sheikh Ali

Sheikh Ali is a low mound which lies a little to the south of the Sea of Galilee near the right bank of the Jordan at the point where Wadi Yavneel joins the river. Evidence of Neolithic occupation was found scattered over a wide area of terrace on which the site stands. The site itself had between 2 and 3 m of occupation deposit which was divided into four levels, strata I and II with Late Neolithic remains and III and IV from the aceramic Neolithic (Prausnitz, 1970a, 96). The building remains in strata III and IV consisted of fragments of stone walls and pebble paving with traces of plaster floors. A headless burial was also found.

The flint tools were made on blades struck off pyramidal and double-ended cores. They included long finely-denticulated sickle-blades and tanged arrowheads of both notched and winged varieties (Prausnitz, 1970a, 105, a, fig. 45). Some of the arrowheads were retouched by pressure-flaking.

Although the remains from these levels were so scanty there seems little doubt on the evidence of the flints that the site was inhabited in Neolithic 2.

Teleilat Ghassul

The mound of Ghassul lies in the Jordan valley about 5 km east of the river and 4 km north of the Dead Sea. A number of flint arrowheads were found in the first excavations at the site which did not belong to the normal assemblage of the Chalcolithic settlement (Mallon et al., 1934, 62). These included tanged arrowheads with notches or wings which are typical of Neolithic 2. Since then other Neolithic 2 flints have been collected at the site (Stockton, 1971, 80). Hennessy has been able to show in his recent excavations that there were earlier levels of occupation at the site (1969, 24) so it would appear that these Neolithic 2 flints were derived from these earlier deposits which must underlie the Chalcolithic settlement.

Judean hills

Tell el Far'ah

Traces of Neolithic occupation were found on the bedrock beneath the Bronze Age mound of Tell el Far'ah at the head of the Wadi Farah in northern Judea. There were hearths, part of a plaster floor and a pit (de Vaux, 1961, 559ff). Associated with these were flint tools such as finely-denticulated sickle blades, both notched and tanged and winged arrowheads and flaked picks and axes with a tranchet edge as well as ground stone tools and other artifacts. These remains all indicate that the site was first occupied in Neolithic 2.

Abu Gosh

The Neolithic site of Abu Gosh lies in the Judean hills 13 km west of Jerusalem beside the road to Tel Aviv. It was first sounded in 1928 and again in 1950. A fresh campaign of excavations was undertaken in 1967 which lasted until 1971. The surface layer yielded Late Neolithic material as well as other finds (Dollfus, Lechevallier, 1969, 279; Moore, 1973, 39). Below that were two levels of a Neolithic 2 settlement, the whole deposit being from 1 to 1.7 m deep. The settlement was composed of several houses which had a single room, sometimes with other additional features. The walls were built of stone and some of the floors were plastered. Beneath the floors of these houses and in spaces between them were found the remains of collective burials from which the skulls had been removed and also skulls buried on their own (Dollfus, Lechevallier, 1969, 281; Lechevallier, 1970, 222).

The most abundant chipped stone tools[15] were sickle blades with nibbled retouch (Dollfus, Lechevallier, 1969, 282). Arrowheads were the second most common class; these were usually tanged and winged although a number of tanged and notched examples were also found. Several flaked and polished axes were recovered in the recent excavations as well as small picks, chisels and a tranchet axe. One of the most remarkable finds of the earlier explorations of the site were numerous large flaked and polished trapezoidal, oval and almond-shaped axes (Perrot, 1952b, 124ff) which have not been found in a definite Neolithic 2 context on any Palestinian site excavated since although trapezoidal flaked and polished axes have now been discovered at Beidha. The recent excavations have demonstrated that these came from the surface level at the site (Lechevallier, 1971, 227) and so belong to the last phase of the Neolithic 2 occupation or postdate it. There are good parallels for them, the oval and almond-shaped ones in particular, in the upper levels at Beisamun and on other later sites in the upper Jordan valley such as Tannur, Qat and Hagosherim.

The other finds at Abu Gosh are typical of Neolithic 2 sites elsewhere and consist of polished stone bowls, ground stone tools, bone borers, needles and spatulae and a number of clay animal figurines.

A number of Neolithic surface stations were found long ago in the environs of Jerusalem and Bethlehem by priests who engaged in prehistoric exploration. The best known site is Tahuneh which was found by Buzy. It lies on level ground beside the Wadi Tahuneh below Artas about 3 km south of Bethlehem (Buzy, 1928, 562). This is much the largest of several surface stations which were found along the wadi. Very many flint tools were collected at Tahuneh[16] and these were thought to be so typical of the earlier Neolithic in Palestine that the name "Tahunian" was given to the industry. Unfortunately the site had been used over a long period for the flints included Mesolithic 2 lunates and Late Neolithic denticulated, segmented sickle blades (Buzy, 1928, pl. XXX) and this has caused great terminological confusion ever since. Most of the diagnostic artifacts found at Tahuneh were Neolithic 2 types and as these were so numerous the site was probably a substantial settlement although no structures are known to exist there. The Neolithic 2 flint tools included tranchet axes, sickle blades, notched and winged tanged arrowheads and many ground stone pestles, mortars, rubbers and querns.

A number of other Neolithic 2 surface sites have been found in the same area[17] among them Tantur and Beit Tamir near Bethlehem, Mar Elias on the road from Jerusalem to Bethlehem, Tell el Ful 5 km north of Jerusalem on the road to Ramalla, Tell en-Nasbeh a little beyond Tell el Ful and a station on the road from Nablus to Rafidiyeh (Mallon, 1925, 190, 192ff). The most common finds on these sites were flaked tranchet axes while picks and sickle blades, scrapers and borers were also found but little else which was diagnostic. A much richer site was Etam which is situated west of Artas (Mallon, 1925, 196ff). Abundant flints of several periods were found here scattered over a wide area on what was apparently a factory site. The finds included flaked tranchet and flaked and polished trapezoidal axes of Neolitic 2 type.

Neolithic 2 surface stations have also been found in the dunes along the present Palestinian coast. Several were discovered long ago by Neuville[18] south of Jaffa (1929, 116) but these are now either lost or have disappeared beneath new buildings. Others have since been discovered by Burian and Friedmann (1963-64, III) who have surveyed much of the coast between Hadera and Ashdod. Two of their sites, 26 and 26A, are just north of Nahal Alexander and six others, 62/0, 62/1, 64, 64A, 70 and 71 are to be found between the mouths of the Nahal Sorek and Nahal Lachish. These two groups of sites are clustered together quite markedly which indicates that the areas in which they are found were chosen repeatedly for occupation.

The surface collections from these sites consisted of modest quantities of flint tools for the most part among which were tanged arrowheads, sickle blades, flaked axes and other common Neolithic 2 types. Site 26 had a richer collection than the others which included 265 tanged arrowheads, some of which were also notched. There are close parallels for the tools in these assemblages on other Palestinian sites so all may be included in the same regional group.

It has been known for many years that Neolithic 2 sites were to be found in the extreme south of Palestine for Petrie and his collaborators had found Neolithic 2 flints on some of the sites they excavated around Tell el Fara (south) on the Wadi Ghazzeh, now Nahal Besor. The most diagnostic pieces were several tanged and notched or winged arrowheads from Site D2[19] (Macdonald *et al.*, 1932, pl. XXVII, 82). Several tanged and winged arrowheads retouched with squamous pressure-flaking of Neolithic 2 type (Macdonald *et al.*, 1932, pl. XVII, 59, XX, 13) and other flints that could be associated with these diagnostic pieces were also found there. These flints, while suggestive, indicate only that Neolithic 2 groups had passed this way and possibly camped along the wadi.

Negev and Sinai

A decade ago hardly any Neolithic sites had been discovered further south in the Negev or Sinai. Several surveys of prehistoric sites have since been carried out in the Negev which have brought to light a number of Neolithic sites and a survey in northern Sinai has located several more there. Rothenberg has carried out extensive surveys of later sites throughout the Sinai Peninsula in the course of which other Neolithic sites have been discovered.

The Halutza dunes are situated to the south of the Nahal Besor in the northern Negev. Traces of Neolithic 2 occupation were found here by Noy in 1966 who picked up characteristic tanged and winged arrowheads on the surface of the subsoil between the sand dunes (Noy, 1970, fig. 3, 3-5). Burian and Friedmann surveyed the same area of the northern Halutza dunes in the following years and found at least four more Neolithic 2 sites, numbers 83, 86, 87 and 89 (Burian, Friedmann, 1973, 28ff). The assemblages from these sites consisted principally of tanged arrowheads, some of which were notched and winged, and blades and borers. There were very few flake tools and no sickle blades or axes. Two more Neolithic sites have been found by the same workers around Nizzana on the south side of the Halutza dunes. The one found by Noy had tanged and winged arrowheads and burins on blades struck from double-ended cores (Noy, 1960, 39, 41). A third new site recently discovered by Burian and Friedmann has "over 800 arrowheads and a considerable amount of other material" (letter, 5th July, 1976).

More sites have been discovered around Nahal Boqer and Nahal Zin due south of Beersheba in the northern Negev. The Nahal Boqer site lies on a hill above the wadi on the south side. The chipped stone industry from this site was quite comprehensive with numerous tanged and notched arrowheads, a few sickle blades, borers and end-scrapers on blades as well as burins, flake scrapers and flaked tranchet axes (Noy, Cohen, 1974, 16ff).

Another site, Nahal Divshon, lies on the floor of the Nahal Zin below Sede Boqer. This site has been known for several years and a collection of tanged arrowheads with wings or notches and tranchet axes from the site was published by Cohen and Noy in 1968 (Cohen, Noy, 1968, 14). Nahal Divshon was excavated by a team from Southern Methodist University in 1969 and 1970. They found a dense concentration of artifacts in an area of 90 sq m but calculated that the site extended over 2500 sq m altogether (Servello, 1976, 349). The occupation deposit was extremely thin but a firepit and several hearths were found. Almost all the artifacts were chipped stone tools, two grooved stones being the only other finds. The flint assemblage had a very high proportion of cores and waste which indicates that the cores themselves were prepared on the site as well as the artifacts. This is a feature of a number of Negev sites but not of the Neolithic 2 settlements further north in Palestine and Syria. Most of the cores were prismatic and pyramidal and only a few discoid or double-ended. Blades and retouched blades were not particularly common but there were some pressure-flaked tanged and winged arrowheads (Servello, 1976, fig. 12-7). The most numerous tools were the burins; many were dihedral burins but there was much variation in the types. End-scrapers on blades and flake scrapers were another major group of tools and there were many flake tools such as notched pieces and denticulates. A few flaked axes were found but no sickle blades were recovered at all. Servello thought that the specialised nature of the artifact assemblage and the absence of dwelling structures indicated that the site was a seasonal hunter's camp (1976, 369). Carbon 14 determinations were obtained from three charcoal samples which gave dates of 6220 ± 120 B.C. Tx-1125, 6670 ± 140 B.C. I-5501 and 6950 ± 180 B.C. SMU-3. All the samples were obtained from near the present ground surfaces which probably accounts for the uncomfortably large span of time between the dates. They do all fall within the 7th millennium and so place the occupation on the same horizon as dated Neolithic 2 sites in Palestine and further north.

One possible Neolithic 2 site was found by the Southern Methodist team on the heights of the Har Harif (Marks et al., 1972, 83). The site, G2, consisted of a thin scatter of artifacts on a steep slope of Har Romam. The main tool types were end-scrapers on flakes, denticulates and notched flakes but there were a few blade tools including backed sickle blades and fragments of bifacially retouched arrowheads. This assemblage is Neolithic and has some characteristics in common with Nahal Divshon so the site may also have been occupied by a Neolithic 2 group.

A number of Neolithic sites have also been found in the recent survey of Jebel Meghara in northern Sinai (Phillips et al., n.d., 10). It is known that their assemblages included burins, end-scrapers and arrowheads with some grinding stones and on this evidence they have been assigned to the Neolithic. As other Neolithic 2 sites are now known in Sinai it is likely that some of these in the Jebel Meghara are also Neolithic 2 but we cannot be sure until we know more about them.

Rothenberg has now discovered Neolithic sites as far west as the Suez Canal, on the south edge of the Jebel el Egma and in southern Sinai (Rothenberg, 1972, 32, 35). Several of these sites consisted of stone structures with remain of burials as well as scatters of flint implements and one in the Wadi Sa'al lay next to malachite deposits which may have been exploited by the inhabitants of the settlement. There were indications at some stations that turquoise was also extracted. The dating of these sites rests entirely upon the typology of the artifacts for no organic material is available for ^{14}C determinations. I have seen the flints from a few of these sites and have ascertained that they consisted of numerous blades, some of which were struck off double-ended cores, pressure-flaked tanged arrowheads and other types. These pieces definitely appear to be Neolithic 2 types but there is other material in the collections which may be later in date. It is not possible to say yet whether all the sites described as "Neolithic" or "PPNB" are in fact that early. Nevertheless, these recent discoveries do extend the known distribution of Levantine Neolithic 2 sites over a much wider area than hitherto, possibly as far as Suez.

I have associated all these sites in the Negev and Sinai with the Palestinian group but it is apparent that their material remains are somewhat different. In the first place they have fairly small artifact inventories consisting for the most part of flint tools. Although some of the arrowhead types and axes are the same as on Palestinian sites others are not. Pyramidal and prismatic cores were used much more frequently on these sites than further north and flake tools were more common. The sites themselves were usually surface scatters of flint with little or no occupation deposit and so different from the substantial settlements and tell sites found in Palestine. Our knowledge of all Neolithic 2 sites in the Negev and Sinai is too scanty as yet for us to declare that they fall into another regional group of their own but they are sufficiently different to be classed as a sub-group associated with the Palestinian sites.

Transjordan plateau

Several Neolithic 2 sites have been discovered east of the Rift valley in the mountains and on the plateau of Transjordan. One of these is Abu Suwan at Jerash which covers a large area of hillside to the east of Hadrian's Arch (Kirkbride, 1958b, 9). Flint implements[20] of several periods were found here but the most abundant were Neolithic 2 types. These were scattered all over the surface and included pressure-flaked tanged arrowheads and leaf-shaped points, burins, end-scrapers on blades and flake scrapers, sickle blades with finely-denticulated edges, flaked tranchet and other axes and a piece of obsidian. The cores were both discoid and double-ended, the latter accompanied by typical core-tablets and crested blades. Kirkbride excavated a small trench at the site (1958b, 14) in which material from the same industry was found stratified with bone pins, animal bones and hearths. The variety of the flint artifacts and the other material indicate that Abu Suwan was a settlement which was occupied for a significant length of time. The flint artifacts from Abu Suwan match those from PPNB Jericho and other Palestinian Neolithic sites quite closely although one notes the absence of winged and notched tanged arrowheads.

Kirkbride found several other Neolithic 2 surface sites with similar artifacts around Jerash, some of which yielded collections of material quite as varied as that from Abu Suwan. Both double-ended and keeled cores were found at the Middle Field station, the only occurrence of the latter type of core known to me in Transjordan. Several of these sites were probably also true settlements but the smaller ones may have been factory sites or temporary camps.

Another Neolithic 2 settlement is known as Jisr Shueib on the road from Salt to Jericho (Zeuner, 1957, 23). The site is a large settlement mound in which a section was exposed during roadworks. Several red-painted plaster floors could be seen in the section and associated with them were flint tools of Neolithic 2 type.

Wadi Dhobai B

The Wadi Dhobai is in Transjordan south-east of Amman beside the road from Qasr el Mushatta to Qasr et-Tuba. Site B is situated at the junction of a tributary wadi with the main valley floor. Remains of several circular huts were found at the site (Waechter, Seton-Williams, 1938, 175, pl. XXVI) constructed of stones set upright in the ground. These presumably served as foundations for a light superstructure of poles, brush and skins. There were two hearths in an occupation layer associated with these huts.

A few beads were found in the excavations but most of the artifacts were flint tools. Many of these were made on blades struck from double-ended cores with crested blades as characteristic by-products. The most numerous tools were angle and dihedral burins (Waechter, Seton-Williams, 1938, 176ff). End and side-scrapers on flakes were also quite common.

Tanged arrowheads were the third major class of tools, the tang being defined with a notch or pronounced narrowing of the blade in most instances. A few foliate examples were thinned a little at the tang end. Most of the arrowheads had a little abrupt or squamous retouch around the tang and under the tip. There were very few other tool types and no sickle blades.

This industry is in the Neolithic 2 tradition but when the site was excavated it was thought that it did not exactly resemble the known contemporary material found on sites in Palestine (Waechter, Seton-Williams, 1938, 297) and for this reason it was given its own name, the Dhobaian industry. The artifact types can now be closely paralleled at Beidha. The core technique is the same at both sites and the Dhobai arrowheads are similar in shape to those at Beidha. They have the same pronounced shoulders and retouch. No winged arrowheads of the Palestinian kind were found at either site and no notched arrowheads at Dhobai although these are known from Beidha. Several similar stations, <u>sites A</u>, <u>C</u>, <u>D</u> and <u>E1</u> were found along the Wadi Dhobai (Waechter, Seton-Williams, 1938, 174) but not excavated; all had the same structures visible on the surface and surface finds like those from Dhobai B.

Several surface stations with Neolithic material have been found by Harding, Parks and others around <u>Qasr Kharaneh</u> in the desert south-east of Amman.[21] <u>Sites 1</u>, <u>2</u> and <u>3</u> (Zeuner, 1957, 54) yielded Neolithic 2 artifacts similar to those at Abu Suwan. Other stations found by Parks had Neolithic 2 artifacts with an abundance of burins like the assemblage from Wadi Dhobai B. A great deal of unusual material was found by Harding at one other site in this group, <u>Kharaneh IV</u> (Zeuner, 1957, 42). This site is a very large mound composed of stone rubble. The material included a number of thin bifacial ovates, end-scrapers on blades, discoid and other flake scrapers, burins and blades. The affinities of this material were uncertain when published although Harding believed the site to have been occupied in Neolithic 2. This attribution has since been confirmed by Garrard and Stanley Price who made further collections at the site in 1975.

Four more Neolithic stations were found by Field in his early explorations of north and north-eastern Transjordan. The sites were Qasr el Hallabat east of Zerka, Site 220 near Landing Ground H, Sites 212 and 213 near Qasr el Uweinid just south of Azraq and Site 243 near Landing Ground K (see loose-leaf map in Field, 1960). These were described as "arrowhead sites" by Garrod in her report on the finds (1960, 122ff) because each of them contained tanged arrowheads retouched with pressure-flaking. The exact affinities of such small surface collections are unclear but it is probable that some of the material can be assigned to Neolithic 2.

Much more material has been found by others on what may be another site near Qasr el Uweinid.[22] Among the implements were tanged arrowheads, some of which had squamous retouch, end-scrapers, borers on blades, burins and flake scrapers. There were also a large number of blades and some crested blades. This seems to have been another Neolithic 2 site which was used as a camp or settlement for a time.

Following surveys made by Kirkbride, Parks and others it has been known for many years that there were Neolithic 2 stations in the Azraq basin and more were found in 1975 by Garrard and Stanley Price. The sites with varied artifact inventories would have been camps or settlements which were occupied for weeks or months at a time while those with very few tools are likely to have been hunting stations. Enough sites are now known in northern Transjordan to indicate that the area was occupied by semi-sedentary and sedentary groups in Neolithic 2 at least as far east as Azraq and possibly beyond.

Beidha

Beidha enjoyed its most flourishing period as a settlement during the occupation of levels VI to I. The buildings of the settlement were made of stone because this was the material most readily available in the neighbourhood but superstructures and roofs were made of timber, clay, brushwood and reeds. These materials were all used in the structures of Level VI. A ring of posts about 4 m in diameter was first erected then a stone wall built around to form an irregular circle (Kirkbride, 1967, 6). The interior face of the walls and the posts were plastered over to give a smooth surface. The floors of these rooms were below ground level and there was a post in the middle which supported the roof. These circular rooms were built so close together that they formed a cluster with interlocking walls. Four such clusters have been found separated by open spaces with plastered surfaces. There were other less substantial structures in these open courts.

A wall at least 1 m high ran along the south-east side of the village (Kirkbride, 1968, 92). It acted as a terrace wall to support the buildings of the village which stood on the sandy deposits of the earlier levels. A stairway in the wall gave easy access from the outside up into the village.

At the extreme eastern end of this wall beyond the limits of the village there was a group of three single-chambered structures unlike the buildings within the settlement (Kirkbride, 1968, 93ff). One was sub-circular and the others sub-rectangular in shape. The walls were built of stone and the floors were paved with stones or gravel. In and around these structures were several large flat slabs of sandstone and a shallow basin. There were indications that these buildings had been modified over a period of time but we do not yet know during which levels of occupation in the settlement they were used. This group of structures with its associated slabs and basin is different from the dwellings within the settlement and so presumably served another purpose. Kirkbride has suggested that the structures may have been shrines in which ritual activities were performed (1968, 96). There seems no particular reason why this should have been the case but it is quite likely that the remains may have been connected with some industrial or craft activity such as tanning or dyeing cloth which the inhabitants preferred to carry out beyond the limits of the settlement. These processes can be unpleasant and so are best conducted at some distance from any houses. The slabs could have been used as surfaces on which to dress hides or stretch and dry cloth and the basin for tanning or dyeing.

One complete building has been excavated in Level V that incorporated some of the construction techniques of the Level VI structures. This had a single room 6.5 m in diameter with a paved floor sunk below ground level like all the structures at Beidha (Kirkbride, 1967, 8). The room was constructed of posts set in a stone wall but the structure as a whole was free-standing. The roof was made of wooden poles, brushwood and clay supported by a vertical post in the floor and the entrance was down a flight of steps. Other buildings constructed in a similar way were found in Level V but there were also approximately rectangular structures whose walls were built of stone without the ring of posts.

There were three types of building in Level IV, all with a single room but different in size and shape. The first group was situated on the eastern side of the settlement. These were rectilinear structures, some of which had slightly curved walls and rounded corners (Kirkbride, 1966, 18). The buildings were entered down a flight of three stone steps. The floors and walls were plastered over and there were plastered hearths on the floors. Some of these structures were separated from each other by open yards.

A much larger rectangular building was found towards the centre of the mound. This was 5 m wide and 6 m long with a plastered floor, hearth and walls (Kirkbride, 1967, 8). Two stone bowls were set in the floor on either side of the hearth (Kirkbride, 1966, 17). One large circular building, House XXXI, was found in this level (Kirkbride, 1967, 9), the only one resembling the plan of the structures in earlier levels. Although most of the buildings in Level IV were thus rectangular rather than circular several of them still had rounded corners. Much less timber was used in their construction than before and hearths were set inside the buildings for the first time.

There was another change in architecture in Level III. Two of the three types of building in Level IV were completely superseded although the third, the large rectangular structure, may have been rebuilt (Kirkbride, 1966, 18). All the other buildings were a new type, rectangular in overall shape but with unusual interior arrangements. These new buildings, though characteristic of Level III, were not well preserved because only a few courses survived beneath the Level II structures.

Exactly the same buildings, many of them orientated north-south, were found over much of the site in Level II (Fig. 34). They were about 6 m long by 5 m wide and entered down a flight of three steps. The interior had a central passage about 1 m wide from which usually three pairs of chambers opened off, each about 1.5 m by 1 m in size (Kirkbride, 1966, 14). These chambers were separated from each other by massive stone buttresses which took up a good deal of the floor space within the buildings. The buttresses stood about 1.5 m high and their tops were capped with plaster (Kirkbride, 1960b, 138). Plaster fragments and artifacts which had fallen fron an upper storey were found in the fill of these chambers (Kirkbride, 1966, 15). These buildings were really the ground floors of two-storeyed structures, the upper floors of which were supported by the buttresses. The upper storey was probably where the inhabitants lived while the ground floors had another function. Kirkbride has suggested that because the basements contained many artifacts they were really workshops. Certainly interesting collections of animal bones, rubbers and other artifacts (Kirkbride, 1960b, 139) were found in several of them but as most of these objects seem to have fallen in from above it is more likely that the cramped basements were used simply for storage and that the crafts and domestic activities for which the artifacts provide evidence were carried out on the floors of the dwellings above.

These houses were grouped around a large rectangular building which was 9 m long and 7 m wide (Kirkbride, 1966, 11). The building had a single room with a plaster floor entered down a flight of steps. To the left of the doorway was a hearth with a stone seat or table beside it. This building was surrounded on two sides by an L-shaped yard or room. The nature of this

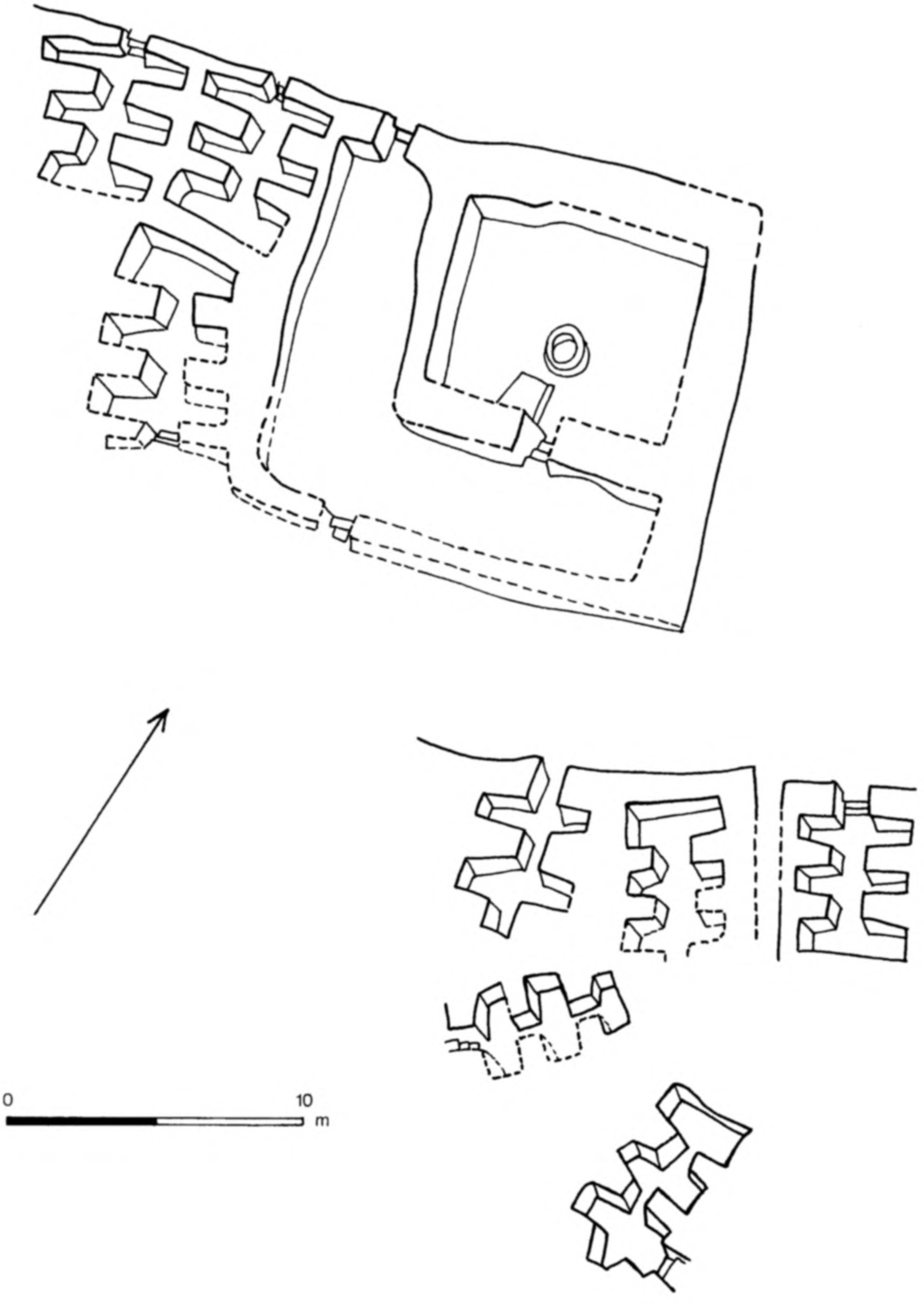


Fig. 34 Beidha - Level II buildings (after Kirkbride and Perrot)

complex is not clear but as only one example was found in Level II it may have been a communal building.

Level I has been disturbed by later human activity and erosion so that not much could be learned about its layout. One building, 4 by 3 m in size, had a single room with a plaster floor. This may have been a house, in which case another major change in architecture had taken place, or some other kind of building.

The dead at Beidha were buried beneath the floors of the houses, in abandoned buildings and in the open spaces between (Kirkbride, 1966, 23). Most of the children were buried complete but the skulls of several of the adults were detached and buried separately. Some of the skeletons were also in disorder following secondary burial but most were intact. The teeth of the adults were heavily worn (Kirkbride, 1966, 16).

The flint tools were made from nodules obtained from the nearby wadi and tabular flint from Jebel Shara to the east (Mortensen, 1970a, 14). The industry was predominantly one of blade tools and the blades were struck off double-ended cores. Some of the flakes came from discoid cores but prismatic flake cores were much more numerous and many of these had been re-used for chopping.

Arrowheads were the largest single class of tool, forming 20 to 29% of the retouched artifacts (Mortensen, 1970a, 45). Most of these had pointed tangs which were formed either by a simple narrowing of the blade or with a notch at either side to make a shoulder. A few of the arrowheads had short tangs and pairs of notches like those from Tell Aswad and Tell Ramad. Most of the tanged arrowheads were retouched around the tang, under the tip and occasionally along part of the blade. Pressure-flaking was used on some of the tangs and a few arrowheads had quite extensive squamous retouch; this technique became more common at Beidha later in the occupation sequence (Mortensen, 1970a, 26) as on the Damascns basin sites.

Borers were another particularly oommon tool at Beidha, forming a higher percentage of the retouched tools here (15-25%) than on most other contemporary excavated sites. They were made on both blades and flakes and could be divided into three functional categories. The first was short points on flakes and blades (Mortensen, 1970a, fig. 20) which could be used for making wide holes in thin materials. The second was very thin long points, a numerous class particularly suitable for drilling holes in beads (Mortensen, 1970a, fig. 22 type B7). The third group also had a long point but it was more robust and frequently blunt (Mortensen, 1970a, fig. 22 type B9, fig. 23 type B10); these borers were probably drills or reamers.

The third major class of tools (13-20%) was retouched blades and flakes described as knives (Mortensen, 1970a, 32). This was not a homogeneous group and it is doubtful if all these tools were used in the same way. Most of them had only a little edge retouch.

Sickle blades and flakes were not very numerous but present in much the same proportions (8-12%) throughout the sequence. There were a few sickle flakes in Levels VI and V (Mortensen, 1970a, fig. 38) but blades were usually preferred. The blades had nibbled or finely denticulated retouch along the cutting edge.

Burins were quite rare tools at Beidha. They were all dihedral and angle types (Mortensen, 1970a, 29), the usual varieties found on other contemporary sites. Scrapers were also quite uncommon (7-11.). Most of these were end-scrapers on blades and flakes. There was also a group of notched flakes and blades (Mortensen, 1970a, 36ff).

Two interesting groups of tools were identified at Beidha which have so far been recognised at very few other sites. One was interpreted as firestones or strike-a-lights (Mortensen, 1970a, 38ff). These were thick blades and flakes with signs of heavy battering at one end or along part of the side of the piece. Mortensen has identified similar tools at Labweh. The other group was retouchers thought to have been used in pressure-flaking (Mortensen, 1970a, 40ff). These were blades and crested blades with signs of heavy wear at the proximal end.

Large core tools were rare at Beidha as on the Euphrates sites but in contrast with those in the West Syrian Group. The axes and adzes were usually trapezoidal or oval in shape with a flaked or polished cutting edge (Mortensen, 1970a, 42). A few had been sharpened with a tranchet blow. Some core tools which had a narrow cutting edge have been interpreted as chisels (Mortensen, 1970a, 41). The other types of core tools were picks and spherical hammerstones (Mortensen, 1970a, 43). The hammerstones were flint spheroids covered with heavy battering marks. These may indeed have been used as hammers but could also have been used as weights, perhaps for bolas. This class of artifacts was abundant at Abu Hureyra and examples have been found on other Neolithic 2 sites although they were not common everywhere.

Only three pieces of obsidian were found at Beidha. When analysed the two pieces in Levels IV and V were found to be from Çiftlik and the one in Level II to be from one of the 4c sources in eastern Anatolia (Renfrew _et al._, 1968, 325).

The inventory of other artifacts from Beidha was rich, the greatest variety of types coming from the upper levels. Stone grinding tools were uniquitous and rubbers and querns especially numerous (Kirkbride, 1966, 32ff). Some of the querns were open-ended and the remainder had a depression worn in the centre. Most of the rubbers were oval with a plano-convex section and some had been used for grinding ochre. A few pestles and mortars were found but stone bowls were quite rare at Beidha. These heavy stone tools were made of limestone, basalt and granite all of which were available in the vicinity of the site.

One or two small polished axes were found (Kirkbride, 1966, 35) but almost all the other axes and adzes were larger tools about 10 cm long made of basalt. These were pecked out and the cutting edges ground down to produce a straight or rounded edge.

Among the other stone tools were a number of weights which had a large hole bored at one end. An identical example was discovered at Tell Ramad (de Contenson, 1969b, 33). Their function is uncertain although their size tells us something about their likely use. They were too small to have been used as roof weights, for example, but about the right size for loom weights in an upright loom which is one possible explanation of their purpose.

The remaining stone tools included several types hardly known elsewhere. There were a number of thin rectangular pieces of sandstone with a hole for suspension bored at one end. These were polished on both sides and one had been scored repeatedly with a flint tool as it it has been used as a cutting surface. Another unusual artifact found in small numbers was a stone slab with two rows of small holes in the surface and other markings which may have been used as a gaming board or simply as a base for a bow drill.

Bone tools were numerous throughout the Beidha sequence from Level VI up. The usual kinds were borers of varying sizes (Kirkbride, 1966, 30) but spatulae were also quite common. A few of the latter were quite delicate as were several other small bone pins and spoons.

Beads and other decorative objects were also common at Beidha. Shell was a particularly favoured raw material (Kirkbride, 1966, 28) and was imported from both the Mediterranean and Red Sea. Cowrie, mother-of-pearl, dentalium, cockle and other species were all used for this purpose. The bone and stone beads were usually cylindrical in shape but some flat amulets were also made.

Clay figurines were not very common at the site but both humans and animals were modelled. Several fragments of ibex were particularly naturalistic (Kirkbride, 1966, 26). One or two small clay vessels were also found. Some of these objects were baked but whether intentionally or not was unclear.

Good evidence was found for the use of wooden containers and baskets at Beidha (Kirkbride, 1967, 10). Traces of several wooden boxes were noticed in the sandy occupation levels, one of which had contained 114 flint arrowheads and points. Some of the baskets had been lined with plaster or bitumen either to make them watertight or more resistant to penetration by rodents.

The raw materials used at Beidha were quite as varied as on contemporary sites elsewhere. Pumice from the Mediterranean was used as an abrasive (Kirkbride, 1966, 51), haematite for polishing, ochres and malachite as colouring matter. Few of these materials, however, were imported from far away because they could be obtained from the vicinity of the site. The exceptions were the marine products, obsidian, and a little steatite. Beidha, therefore, enjoyed less extensive regular contacts through exchange than other sites further north.

The length of time that Levels VI and I were occupied has been determined fairly satisfactorily from a series of 14 carbon 14 dates. The dates are as follows:

Level VI	6990 ± 160 B.C.	K-1086	(*Radiocarbon* 10, 1968, 323)
	6900 ± 150 B.C.	K-1410	(Mortensen, 1970a, 13)
	6820 ± 150 B.C.	K-1411	(Mortensen, 1970a, 13)
	6770 ± 150 B.C.	K-1412	(Mortensen, 1970a, 13)
	6765 ± 100 B.C.	P-1378	(*Radiocarbon* 11, 1969, 152)
	6760 ± 130 B.C.	K-1082	(*Radiocarbon* 10, 1968, 324)
	6596 ± 100 B.C.	P-1379	(*Radiocarbon* 11, 1969, 152)
Level V	6690 ± 160 B.C.	K-1083	(*Radiocarbon* 10, 1968, 324)
Level IV	7178 ± 103 B.C.	P-1380	(*Radiocarbon* 11, 1969, 152)
	6840 ± 200 B.C.	BM-111	(*Radiocarbon* 10, 1968, 4)
	6815 ± 102 B.C.	P-1381	(*Radiocarbon* 11, 1969, 152)
	6780 ± 160 B.C.	K-1084	(*Radiocarbon* 10, 1968, 324)
Level II	6942 ± 115 B.C.	P-1382	(*Radiocarbon* 11, 1969, 152)
	6600 ± 160 B.C.	K-1085	(*Radiocarbon* 10, 1968, 324)

These dates cluster close together over four centuries between 6600 B.C. and 7000 B.C. The earliest date, P-1380 from Level IV, takes the sequence a little further back but one might still estimate that Level VI was first occupied about 7100 or 7000 B.C. and the site finally abandoned about 6500 B.C. If one attempts to date each level in the archaeological sequence from these determinations considerable difficulties arise. This is because the dates from individual levels, particularly VI and IV, are spread over several centuries. The reason for this is in part the nature of the material analysed which ranged from carbonized pistachio nuts to oak and juniper charcoal (Radiocarbon 10, 1968, 323ff). The nuts might be expected to have been buried about the year they were harvested but the timber could have already been old when it was burned. This makes it impossible to date the occupation sequence in more detail even though so many determinations have been made unless much more information about the nature of the carbon samples and their stratigraphic location becomes available. One more point should be remembered and that is that the Neolithic occupation at Beidha probably began well back in Neolithic 1 so that the settlement may already have been several centuries old when the first Level VI buildings were constructed.

We must now consider the relationship between the occupation at Beidha in Levels VI to I and other sites in the Levant. From Level V on the inhabitants began to construct rectilinear buildings with plaster floors and this development links Beidha with Neolithic 2 sites further north such as Jericho, Tell Ramad and Abu Hureyra. Burial customs at Beidha also have much in common with these other sites. The flint industry, based as it is on large blades usually struck from double-ended cores, is in the Levantine Neolithic 2 tradition. The range of tools and the arrowheads in particular can all be matched on Neolithic 2 sites further north. Most tools had very little retouch, a link between Beidha and sites like Aswad II which like Beidha is dated early in the 7th millennium.

The richness of the remainder of the artifacts is another hallmark of Neolithic 2 sites when compared with those of Neolithic 1. As elsewhere the bone tools are particularly abundant. The typology of the flints, the evolution of the architecture and the ^{14}C dates all indicate that Beidha VI to I was inhabited in the first half of the 7th millennium early in Neolithic 2.

The general relationship between Beidha and other Neolithic 2 sites in the Damascus basin and the Euphrates region is clear but there are certain aspects of the remains at Beidha which are unique to the site. The most obvious example of this is the development of the architecture. The circular houses of Level VI, while bearing a general resemblance to the circular stone huts of Neolithic 1 Nahal Oren and the mud-brick houses of PPNA Jericho, are built differently with a ring of posts set in the walls. Some of the simple rectilinear buildings are like those at Tell Ramad, Labweh and elsewhere but the two-storeyed houses with chambered basements are unique to Beidha. The changes in building types took place rapidly yet there is no suggestion that the sequence of occupation at the site was interrupted. On the contrary the preliminary study of the flint industry shows only gradual changes through time as though the same group of people continued to inhabit the site throughout the occupation sequence (Mortensen, 1970a, 47). The architectural sequence at Beidha thus appears to have been a local phenomenon even though in the most general sense it mirrors a trend apparent throughout the Levant in the 8th and 7th millennia.

Kirkbride carried out a surface survey around Beidha and found three more Neolithic 2 sites in the area. Two, Shaqaret M'siad and Adh Dhaman, were in the hills near Beidha. Shaqaret M'siad lay in a valley a little to the north (Kirkbride, 1966, 54). The site was about 1.8 ha in area and consisted of the remains of rectilinear stone buildings some of which had plaster floors. The finds included querns and stone grinders as well as an abundant flint industry with tanged and notched arrowheads.

Adh Dhaman lay south of Beidha near a spring (Kirkbride, 1966, 55ff). The site was perhaps 1 ha in area with the remains of rectilinear stone-walled structures on the surface, some of which had plaster floors. Among the finds were rubbers, querns and tanged and leaf-shaped arrowheads.

The third site, Bir et-Taiyiba, lay almost due west of Beidha near a spring on the floor of the Wadi Arabah. There were traces of occupation deposit here but no structures and among the finds were tanged arrowheads.

These three sites appear to belong to Neolithic 2 and should be 7th millennium in date. Their precise cultural affinities are unknown but Shaqaret M'siad and Adh Dhaman seem to have much in common with Beidha and Bir et-Taiyiba was probably also occupied in the 7th millennium.

Another Neolithic 2 site in this region is Ain Abu Nakheileh which lies in the Wadi Rum at the foot of Jebel Rum near the spring which gives the site its name (Kirkbride, 1960c, 231). Much of the plan of the site could be discerned from the surface. It was composed of stone-walled multi-roomed buildings of both circular and rectilinear plan; the floors of the circular ones at least lay below ground level. The chipped stone industry was composed of blade tools of which pressure-flaked leaf-shaped arrowheads were the dominant type. Hollow querns, grinders, pestles and other ground stone tools were also found. The typology of the arrowheads would suggest that the site was occupied late in Neolithic 2 while the plans of the buildings can be paralleled at Beidha and Wadi Dhobai B.

The German expedition to Kilwa in the Jebel Tubaiq discovered at least one surface Neolithic station, site 19. The inventory consisted of numerous flake tools as well as blades and blade tools. The blades had been struck off double-ended and prismatic cores (Rhotert, 1938, 91, 92) with crested blades as a by-product (Rhotert, 1938, 98, 99). These can be exactly paralleled at Beidha as well as on sites further north. Among the blade tools were angle and dihedral burins (Rhotert, 1938, 96, 97), abruptly retouched reamers (Rhotert, 1938, 104:1) and tanged arrowheads (Rhotert, 1938, 114). The arrowheads had well-defined shoulders and one or two were winged but none was notched. Several had extensive squamous retouch. There were also a number of small oval points that may have been arrowheads.

The flake tools included a number of scrapers (Rhotert, 1938, 91, 105, 118, 119), some of which were on tabular flint. There was also a series of bifacial ovates and other flake tools which may have been scrapers (Rhotert, 1938, 106) together with triangular, trapezoidal and oval axes and picks (Rhotert, 1938, 110, 112). A number of other flake tools were found which had been extensively retouched with pressure-flaking (Rhotert, 1938, 117).

This assemblage appears to be homogeneous and good parallels for the blade tools and some of the flake tools can be found at Beidha and other excavated Neolithic 2 sites. The general shape of the Kilwa arrowheads conforms very well to those at Beidha but they are more extensively retouched than most Beidha examples. The numerous bifacial tools, also extensively retouched, are not so readily matched at Beidha or any other excavated site although they are similar to surface finds from Kharaneh IV. The use of so much pressure-flaking suggests that site 19 may postdate Beidha and so have been occupied relatively late in the 7th millennium but many tools in the assemblage are clearly in the same tradition as those at Beidha and Wadi Dhobai B.

Fewer Neolithic 2 sites have been found in southern than in northern Transjordan because the area is relatively remote and much of it difficult of access but since sites with quite rich remains have been found as far to the south-east as Kilwa it is probable that the whole area was occupied. It is also likely that occupation extended into northern Arabia in regions not yet examined for Neolithic remains.

Although so many sites are known in Transjordan only Beidha has a long sequence of occupation, well-preserved buildings and a comprehensive artifact inventory. All the others lack the full cultural assemblage and without this one cannot assign them with certainty to Neolithic 2 regional groups. It is fairly clear that the flint industries from most of the stations have much in common with Palestinian Neolithic 2 sites even if in certain details such as the rarity of winged or notched tanged arrowheads there are differences. Much of the material at Beidha can also be paralleled on Palestinian sites yet, as we have seen, there is much individuality in the buildings and certain of the artifacts from the settlement. If we knew more about the remains from Neolithic 2 sites other than Beidha in Transjordan we might be able to define another regional group but as we lack such detailed information it is best for the moment to note such differences as there are between the sites in

Transjordan and Palestine and to place all the Transjordanian sites in a sub-group closely linked with Neolithic 2 sites in Palestine.

Principal cultural characteristics of Neolithic 2 settlements

I have now reviewed most of the known Neolithic 2 sites in the Levant and described their material remains. Before going on to discuss the economy and society of their inhabitants it will be useful to consider some of their general cultural characteristics in order to understand more clearly the differences between Neolithic 2 and the preceding stages.

One of the principal features which distinguished Neolithic 2 settlements from those of Neolithic 1 was the shape and construction of the dwellings. Almost everywhere these were rectilinear in shape and built of stone or mud-brick or the two combined. Mud-brick was now used commonly as a building material on sites in Syria and quite often elsewhere. The plans of these buildings varied from place to place but the new style was adopted throughout the Levant early in Neolithic 2. It has remained the usual mode of domestic building in the villages of the Levant down to the present day.

The rooms of these buildings often had floors made of lime plaster coloured with red ochre or a black pigment. Occasionally designs were painted on the floors and the plaster or whitewash of the walls. This is the earliest evidence we have for the decoration of the interiors of buildings in the Levant, itself part of the elaboration of culture that took place as a sedentary way of life became established.

A second important constituent of Neolithic 2 material remains was the chipped stone industry. Most of the tools were now made on large blades and the tool types themselves were clearly separated from each other in form and probably function as well. Flake scrapers and a few other distinct types of flake tools were quite common on many sites but rarely a major component of the industry. This stone industry differed markedly from that of the Mesolithic and Neolithic 1, having more in common with the Levantine Aurignacian, a coincidence at present difficult to understand because we know so little about the uses to which Aurignacian flint tools were put. Neolithic 2 blade tools were heavier and more robust that in Neolithic 1 and some of the tool types were quite different, technological changes that should reflect modified activities and new needs. These tools would have been more suitable for repeated use in specific tasks than the much slighter equipment of Neolithic 1. Lighter tools composed of microliths were not now made at all.

Most Neolithic 2 sickle blades were made on complete blades rather than segments. It is possible to determine how they were hafted from the lustre found on the cutting edge. Many still seem to have been hafted with other sickle blades to make composite sickles with a straight cutting edge but some were apparently hafted at the butt end only and used as knives. Segmented sickle blades were made on a few sites and hafted to form composite tools with a curved or even jagged edge as at Tell Aswad (Balikh) (Cauvin, 1973, fig. 3). Sickles armed in this way had a much tougher cutting edge than anything made in Neolithic 1. I think it is probable that these tools were used for harvesting cultivated cereals on sites where they have been found in large numbers. Cereals, as we shall see, were a major constituent of the diet on many sites in Neolithic 2 and so new types of sickle were developed to cut the larger quantities that now had to be harvested every year. At sites like Abu Hureyra where there is no clear association of the few robust sickle blades that were found with the ample evidence of cereal agriculture it is more probable that the sickle blades were used for other regular tasks such as gathering reeds for roofing or to make baskets.

The different types of Neolithic 2 arrowheads were almost all variations of tanged blades. They were relatively heavy and strong with considerable penetrating power. These arrowheads were probably adopted in preference to Khiamian points or composite arrowheads because changes were taking place in hunting practices. The lighter arrowheads of Neolithic 1 would have been more suitable for killing small game and birds. It may be that heavier arrowheads were now required because less small game was being hunted and more larger ruminants. The effectiveness of small arrowheads would have been much increased with the use of poisons; it may be that poisons were not now used and that heavier arrowheads which would have wounded animals more effectively were substituted instead. The large tanged arrowhead found imbedded in the chest of a human skeleton at Abu Hureyra provides vivid evidence of violence in Neolithic 2 society. It may be that heavier arms were now preferred as more effective weapons in fighting between Neolithic 2 communities.

The other common Neolithic 2 tool types such as end-scrapers and burins were also larger and more robust. This may be an indication that they were now used for particular crafts which were practised more regularly. Flaked axes and adzes were made much more frequently in Neolithic 2 than before. There were many varieties of these, some made of flint and others of tougher exotic stones. Many were simply flaked but others had polished edges to increase their cutting effectiveness. These tools were probably used to trim timber and fashion it into shapes suitable for building or for boxes, platters and tools. This evidence for an increase in woodworking is another indication of the flowering of crafts in Neolithic 2.

Flaked and polished axes of all kinds were rare on the Middle Euphrates sites but common at Tell Ramad, Tall Labweh and other sites in the West Syrian group. They were also numerous at Beisamun, Munhatta, Abu Gosh, on surface sites in Judea and other sites in the Palestinian group as well as at Beidha. In the 7th millennium all these sites lay within the Mediterranean forest zone whereas the Euphrates sites did not so there is a definite correlation here between a specific type of tool and an environmental area. Timber would have been more readily available for human use in the Mediterranean forest zone than elsewhere but the presence of so many axes on these sites in Neolithic 2 may be an indication that more forest clearance was taking place than before.

Rubbers, querns and other ground stone tools were more abundant on Neolithic 2 settlement sites than in Neolithic 1. This increase in the amount of heavy equipment used is another concomitant of a more sedentary way of life. The great increase in the use of querns and rubbers also correlates with the widespread adoption of cereal agriculture in Neolithic 2 so it is probable that most of these tools were used for grinding cereals for food.

Neolithic 2 burial practices were quite similar throughout the Levant. Most skeletons were buried in a crouched position with few, if any, grave goods. Skeletons were frequently deposited incomplete in collective graves after the flesh had decayed in a primary burial or through exposure. Skulls were often detached from the bodies to which they belonged and buried apart sometimes after receiving special treatment. These customs began in Neolithic 1 and were adopted by the inhabitants of almost all settlements in Neolithic 2 although there were some variations in the exact form of burial from site to site.

In Neolithic 2 the same general cultural characteristics, that is burial practices, style of dwellings and classes of artifacts were to be found on sites throughout the Levant. This broad cultural uniformity is an important feature of Neolithic 2 as it implies that the communities which shared these traits were in close contact with each other. From the large quantity of artifacts and other material collected and excavated from Neolithic 2 sites we can discern three regional groupings of sites, one of which had two sub-groups, defined by local variations in artifacts and other remains. These Neolithic 2 regional groups, Middle Euphrates, West Syrian and Palestinian correspond to those established for Neolithic 1: Middle Euphrates, Damascus basin and Palestine, while one of the Neolithic 2 sub-groups, the Negev and Sinai, is in the same area as the Harifian group of Neolithic 1. We have already seen that Neolithic 2 evolved from Neolithic 1 in the three main regions so the same regional pattern is a feature of both Neolithic 1 and Neolithic 2.

The duration of Neolithic 2 has been established fairly certainly by the ^{14}C determinations made in recent years. In the south Level VI at Beidha began about 7100 or 7000 B.C. Jericho was resettled about 7000 B.C. or a little before at the beginning of the PPNB which should be early in Neolithic 2. In the Damascus basin the transition from phase I to phase II at Tell Aswad took place about 6900 B.C. or a little later. From these dates we can see that Neolithic 2 began throughout the Levant within only a century or two of 7000 B.C. The new cultural configuration thus crystallized very rapidly all over the region.

The end of Neolithic 2 is signified by the beginning of potting on sites in Syria and Lebanon and certain other cultural changes. This happened at Buqras in level III which began about 6000 B.C. or a little after. The same change at Tell Ramad also took place in the transition from Level II to III at the same time as at Buqras. The two best dated sites in Palestine and Transjordan, Jericho and Beidha, were both abandoned in the mid 6th millennium well before the end of Neolithic 2. On consideration of typological comparisons it seems that other Neolithic 2 settlements like Munhatta continued to be occupied as late as those further north and that the period ended about 6000 B.C. in Palestine as it did elsewhere. In the central and northern Levant Neolithic 2 ended as swiftly as it had begun and was rapidly followed by a new cultural configuration which, however, was derived from Neolithic 2 and with which its material remains had much in common.

Distribution of sites

Neolithic 2 sites have been found in almost all geographic zones throughout the Levant. There are sites in the Sinai valleys, Jebel Meghara in northern Sinai, the High Negev (Har Harif G2), the Negev valleys (Nahal Divshon) and the lowlands of the northern Negev (Halutza dunes, Nizzana). Others have been found in the dunes along the present coast of Palestine and Lebanon (Jaffa, Ashdod, Tell aux Scies); these sites were still some distance inland from the sea in Neolithic 2. The uplands of Mt. Carmel (Nahal Oren, Iraq el Barud) and the Judean hills (Abu Gosh, Tahuneh) were densely occupied and at least one site is known on the lower slopes of the Lebanon mountains (Dik el Mehdi II).

There are several sites along the whole length of the Jordan valley (Jericho, Munhatta, Besiamun) and also one in the Beka'a (Saaideh). Many have now been found on the Transjordan plateau, in the extreme south-east at Kilwa, in southern Transjordan (Beidha, Ain Abu Nakheileh), in Gilead (Jerash) and far out on the eastern desert (Wadi Dhobai, Azraq). The Hauran and the Damascus basin (Tell Ramad, Tell Aswad) were occupied as well as the Anti-Lebanon (Nacharini, Mugharet el Abde). In the north there is a site at Ras Shamra on the Syrian coast, further inland from the sea than it is now, and in the Jebel Alawiye (Slenfe). Many sites have been discovered on the Syrian plateau around Palmyra and in the passes leading to the middle Euphrates (El Kum). Several more are now known in the Euphrates valley (Abu Hureyra, Buqras) and others in the Jezireh on the Balikh (Tell Aswad) and as far to the north-east as the Jebel Abdul Aziz and the Khabur (Tell Fakhariyah).

All regions were now occupied except the highest mountains of Lebanon, an area which was avoided now as it had been in the Mesolithic and Neolithic 1. There were also still relatively few sites at lower altitudes in the Lebanon, possibly because the country was rugged and still densely forested so unattractive for settlement. The Judean hills were much more intensively occupied than they had been in Neolithic 1. This was an area of Mediterranean forest which had already begun to thin out because of climatic changes. Sites in this area have yielded many stone axes, an indication that man was accelerating the natural decline of woodland through forest clearance, so helping to make the area more attractive for settlement.

Settlements in Neolithic 2 were much more widespread than in Neolithic 1. They extended beyond the open forest zone into the steppe on the Syrian plateau, in Transjordan and Sinai and in the extreme south-east of the Levant into the desert. These areas had not attracted settlement in Neolithic 1 and only rarely in the Mesolithic. The environmental changes of the 7th millennium brought about an expansion of the steppe at the expense of the forest zones. It might be thought that this trend would inhibit settlement in these semi-arid regions yet the reverse happened. The explanation for this paradox will become clear when we consider the changes that were taking place in the population of the Levant and its economy.

Sites in Neolithic 2 were more varied in type than in Neolithic 1. Some were simply stations occupied briefly by small groups engaged perhaps in hunting or foraging. The second type of site was a camp with remains of huts and a fuller artifact inventory testifying to longer occupation. Sites such as these were the Wadi Dhobai camps, Ain Abu Nakheileh, Nahal Divshon, Tell el Far'ah and Sheikh Ali. They were occupied by larger groups which were perhaps semi-sedentary or sedentary. A third type of site can be identified which had a more specialised function. These were factory sites for the preparation of flint artifacts. Duara, Abu Suwan and Etam are sites of this kind; they are all large for the Neolithic 2 knappers exploited the raw material over a wide area and returned to these sites time and again.

The fourth type of site was a settlement composed of a nunber of dwellings which was probably occupied all the year round. Beidha, Abu Gosh, Munhatta, Tell Ramad and Buqras were all sites of this kind. These were the typical villages of Neolithic 2 situated in the Mediterranean forest and open forest zones for the most part. The exceptions such as Buqras which was in the steppe zone were in particularly favourable local environments like the Euphrates valley.

One more type of site may be defined which is much larger than the typical village. I would include here sites such as Abu Hureyra, Jericho and possibly Ras Shamra. The remains found on these sites do not differ very much from those in the villages but their inhabitants would have had to accept a much greater degree of community organization in order to live together in such crowded conditions. It is the different level of community organization of these settlements, a function of their size, which distinguishes them from the villages. Size alone, however, is not enough for a site to be included in this group. Beisamun, for example, covers about 12 ha but the buildings are dispersed in such a manner that they could not have formed a tightly-knit settlement nor does it appear that the whole area was occupied at one time.

The variations in size of Neolithic 2 sites were even greater than in Neolithic 1. A few like Nacharini which covered 90 sq m were very small but most of the surface stations and camps were a little bigger. Wadi Dhobai B was about 250 sq m (Waechter, Seton-Williams, 1938, pl. XXVI) while the largest of the surface sites near Abu Hureyra, site III, was of much the same size. Nahal Divshon which extended over 2500 sq m was several times bigger than these but still smaller than many of the villages. It seems that most of the surface stations and camps ranged from about 100 sq m up to 2000 or 3000 sq m.

The smaller villages were about the same size as some of the camps. Munhatta was somewhat more than 2000 sq m (Perrot, 1966c, 271) while the core of the village at Beidha was about 2500 sq m although the total area occupied here was probably 5000 sq m. El Khiam may have been about the same size but Adh Dhaman (1 ha) and Shaqaret M'siad (1.8 ha) were bigger. The largest villages like Tell Ramad and Buqras were 2 or 3 ha in size. The very large settlements also varied greatly in size from the 4 ha of PPNB Jericho to the 11.5 ha of aceramic Abu Hureyra. The larger sites in this group were much bigger than any Neolithic 1 settlement.

Neolithic 2 sites thus ranged in size from a few tens of square metres up to 10 ha or more. It is possible to define settlement types within this enormous size range but each type grades into the next and there are no distinct groups defined on size alone. The pattern is thus more complex than in Neolithic 1 or Mesolithic 2 where groups of small, medium and large sites could be distinguished. There was also a general increase in the size of settlements in Neolithic 2, the villages, for example, being larger than all but the biggest Neolithic 1 sites.

Neolithic 2 villages were occupied for much longer than most Neolithic 1 sites. This is clear from the substantial depths of deposit on these sites formed by the ruins of successive multi-roomed mud-brick and stone houses.

We can see from the evidence of the ^{14}C determinations that these sites were often continuously occupied for several hundred years: Buqras for 400 years; Tell Ramad, Jericho and Beidha all for 500 years and Ras Shamra for about the same length of time; Ghoraife for 800 years and Tell Aswad perhaps 1300 years altogether from 7800 B.C. in Neolithic 1 down to about 6500 B.C. in Neolithic 2.

Neolithic 2 settlements were not only bigger and occupied for longer than Neolithic 1 sites but they were also much more numerous. I have listed 123 sites and alluded to several others. More have been found in surveys that are still taking place which have not yet been reported while the whereabouts of others found long ago is no longer known. These sites would considerably augment the list I have given so I would estimate that the true total of Neolithic 2 sites discovered exceeds 150 and probably approaches 200. These sites were all occupied in the millennium from 7000 to 6000 B.C. whereas the 23 Neolithic 1 sites known are all we have to fill the 1500 years of Neolithic 1 from 8500 to 7000 B.C. The flint artifacts on Neolithic 2 sites are easier to identify in surface surveys than those of Neolithic 1 and the Neolithic 2 village sites are more conspicuous than Neolithic 1 surface stations. Neolithic 2 sites tend to be larger and so easier to recognize than Neolithic 1 stations. For these reasons a greater proportion of Neolithic 2 than Neolithic 1 sites has been found of the total that once existed so one should not compare the sample we have of Neolithic 2 sites directly with those of Neolithic 1. Nevertheless when all allowances are made it is obvious that the landscape of the Levant in Neolithic 2 was much more thickly populated than in Neolithic 1. We have seen that Neolithic 2 developed from Neolithic 1 in each region of the Levant so there can be no doubt that this increase in the number and size of sites was caused by a great expansion of population. This growth of population was more rapid and more substantial than any which had occurred before. It came about partly as a result of changes that had taken place earlier in Neolithic 1. As the population grew in Neolithic 2 this process would have created new pressures on the economy and pattern of settlement. We might expect that the human response to these pressures would have included experiments in new ways of extracting sustenance from the environment. The increase in numbers might also have been partly accommodated by an expansion of settlement into land hitherto unoccupied. Almost certainly we have here an explanation for the spread of sites into the steppe of the Syrian and Transjordan plateaux and into Sinai.

Economy

Middle Euphrates sites

More evidence about the economy has been recovered from Neolithic 2 than from Neolithic 1 sites and in consequence we have a clearer idea of how people lived then. One of the best documented sites now is Tell Abu Hureyra so it will be convenient to consider the economy of this settlement first. Flotation was used to recover plant remains at Abu Hureyra (Moore, 1975, 55). A sample of soil from every level dug in the main trenches was washed in a flotation machine. In this way plant remains were obtained from many different contexts which, when fully analysed, will give a detailed picture of what plants were exploited by the inhabitants and how they were processed and used.

Several cereals were cultivated at Abu Hureyra (Hillman, 1975, 73). Seeds of domestic emmer were quite common in the flotation samples and wild emmer was also present. Domestic and wild two-grained einkorn were also found. Domestic barley was another common crop plant, occurring in both naked and hulled six-rowed forms. Rye (Secale cereale) was also present but Hillman tells me that this was probably a weed in the cereal crops and not cultivated separately. Both emmer and barley could have been domesticated not far from Abu Hureyra. Wild-type einkorn was found in Mesolithic levels at Abu Hureyra and in the Neolithic 1 settlement at Mureybat so it was used for a long time before the cultivated varieties were developed. This makes it likely that einkorn too was domesticated locally although the process probably took place over quite a wide area of the Eastern Mediterranean and Near East (Renfrew, 1973, 44).

Lentils were the most common legume grown. Both domestic and wild-type seeds of this species were found which Hillman suggests may have been deliberately cultivated together. Among other species were chick-peas (Cicer arietinum), horse bean (Vicia cf. faba) and common vetch (Vicia cf. sativa). Several other plants such as capers and prosopis were collected for food. Grapes were also gathered on the Euphrates flood-plain and may have been cultivated.

The barley and legumes were probably grown on the moist alluvium of the flood-plain. Some of the weed seeds indicate that the steppe was also cultivated, as it is today, and it is likely that wheat was grown there. The two principal environmental zones in the vicinity of the site were thus exploited for agriculture.

The climate was slightly more favourable for agriculture at Abu Hureyra during the 7th millennium than it is now. Rainfall seems to have been more regular and the temperature was still several degrees cooler so the rainfall was more effective, even if little more fell than today. Crops grown on the steppe would have flourished in most years whereas now they quite often fail. The crops grown on the flood-plain would have benefited from the moister conditions there and given quite high yields. Hillman tells me that, even so, some of the lentils and other seeds are so large that they resemble seeds of plants grown today with the aid of irrigation. After the spring floods the water table of the flood-plain remains high until mid-summer although the level of the river drops sharply. The regime of the river and the seasonal rise and fall of the water table were probably much the same in the 7th millennium so that cereals grown on the flood-plain may have grown well without irrigation in most years. Irrigation, however simple, would have been useful for the cereals in dry years and would have considerably increased the yields of the legumes.

Irrigation along the Euphrates today depends on motor pumps which lift the water from the river as much as 6 or 7 m up to the level of the flood-plain.

The gradient of the river is so gentle that a gravity system of irrigation would require large canals many kilometres long. Such engineering works were not constructed in the Neolithic. The unique topography of Abu Hureyra made possible irrigation by another method which would have been well within the capabilities of the Neolithic inhabitants. I have already remarked that the site lay near the mouth of the Wadi Hibna, a stream which flows seasonally now but which was probably perennial in the 7th millennium. It would have been quite simple to dam this stream higher up and to tap this supply with a small channel which could have been led along the side of the wadi to irrigate land near the site. In this way crop yields could have been substantially increased, as it appears happened to the legumes, and so a much greater plant food supply be obtained than would otherwise have been possible. The Euphrates valley near Abu Hureyra was quite a favourable region for early farming but not naturally sufficiently well-watered to support settlements of unusual size. The tapping of the Wadi Hibna for irrigation would have transformed the agriculture of the site so that enough food could have been grown to feed its large population.

The agricultural economy of Abu Hureyra was modified somewhat during the life of the settlement. Cereal agriculture became more important and more legumes were cultivated. There are also indications that the developed strains of cultivated cereals were more common in the later levels of the site. As time passed fewer edible plants were collected from the wild to supplement the plant diet.

A number of steppic plants were found in the Mesolithic and Neolithic deposits which had been brought into the site for fodder and fuel. There were differences in the species present in each phase and from these Hillman has deduced that some disturbance of the natural vegetation of the steppe took place between the Mesolithic and Neolithic (1975, 70). This was caused by over-grazing, tillage and clearance of the trees which had grown on the plateau. The inference that some of the damage to the vegetation was caused by over-grazing is important as it implies that animals were being herded on the steppe at the beginning of Neolithic 2 on the Euphrates.

So far relatively few animal bones have been examined of the great number that were excavated but already these have given us some idea of what species were exploited by the inhabitants of the Neolithic settlement. Trench D was excavated in deposits that belong to an early stage of the aceramic Neolithic settlement and the faunal assemblage from here has distinctive characteristics (Legge, 1975, 74). Over 80% of the bones are from Gazelle (Gazella subguturossa) and the remainder from an equid, sheep, goat and cattle as well as small quantities of other species. The few samples which have been examined from the Mesolithic settlement also have a great preponderance of gazelle so this may be a continuation into Neolithic 2 of a long-lived pattern of exploitation. It seems likely that these gazelle were being controlled by man and that they were responsible for the over-grazing of the steppe detected in the plant remains that took place between the occupation of the Mesolithic and Neolithic settlements.

The proportions of the fauna in the aceramic Neolithic levels in trench E were quite different. Sheep and goat accounted for over 70% of the total, sheep being about three times as common as goat (Legge, 1975, 75). Most of the goats were Capra aegragus but a few were Capra ibex. Only about 18% of the total were gazelle and 7% cattle while equid, pig and other species were present in small numbers.

A sample of bones has also been examined from the ceramic Neolithic deposit, the last phase of occupation, in trench B. The proportions of the species in this sample were almost the same as in the aceramic Neolithic of trench E. Nearly 69% were sheep and goat and 21% gazelle. Cattle were about 6% and other species represented by a few bones only.

Two kinds of faunal assemblage are represented in these three Neolithic samples, one in which gazelle predominates with the balance composed of sheep, goat and equid and a second dominated by sheep and goat with gazelle and cattle accounting for much of the remainder. The sample from trench D with a high proportion of gazelle is certainly early in the Neolithic sequence while that from trench B composed principally of sheep and goat is late. The trench E sample which also has a high proportion of sheep and goat is probably also relatively late in the sequence. What this suggests is that when the Neolithic settlement was founded the animal exploitation depended principally upon gazelle and then later there was an abrupt change to sheep with goat also playing a significant part. Legge believes that such a rapid change implies that the sheep and goat were domesticated in the later stages of the settlement (1975, 76). These species had been present in the area at least since the Mesolithic and so could have been domesticated locally.

Cattle were eaten in significant numbers throughout the duration of the Neolithic settlement. Some of these were the large Bos primigenius. They would have been more important in the diet than the percentages of their bones suggest because of their size. Several other species were present in the faunal samples and may have been eaten, among them roe and fallow deer, hare, fox and cat. The inhabitants of Neolithic Abu Hureyra also caught birds and fish and collected shellfish from the river. Most of their meat was obtained from animals that were probably herded but they also ate a significant amount of several wild species. It is interesting that the diet was supplemented in this way by such a variety of animals for the same seems also to have been true of the plants.

Neolithic Abu Hureyra depended upon agriculture and the close control of certain animals for its food supply. One can see that this basic pattern was modified with the passing of time as the inhabitants concentrated on more productive crops and at a certain moment took up sheep and goat herding. The two latter species would have provided milk and hide products as well as meat and so have been more use to man than gazelle. Sheep and goats could have been herded on the steppe during the winter and spring, perhaps some distance away from the settlement. When the level of the river fell in the summer a large area of the banks were exposed which provided good pasture near ample water at a time when pasture on the steppe dried up. The arable fields were another source of pasture after the harvest. The Neolithic herdsman could have brought their animals down to the river during the summer and autumn to tale advantage of these conditions so maintaining larger flocks than would otherwise have been possible.

Most of the Neolithic inhabitants probably lived at Abu Hureyra all the year round on the evidence of the plant remains. They were there in the late summer and autumn to prepare the ground and sow the cereals and legumes. These plants were harvested in May and June. Some of the weeds and wild fruits like capers ripened in the late summer when they were collected and brought to the site. Winter occupation is not definitely attested yet but some of the inhabitants had to tend the crops and it is likely that most of the others remained there.

Having considered the economy of Abu Hureyra in some detail it will be useful now to examine the economic evidence from the contemporary site of Buqras. This settlement was in the steppic zone in an area that was probably too arid for successful dry farming during the Neolithic. No plant remains were recovered in the excavation (de Contenson, 1966b, 152) but a report has been published on the animal bones which were found. The most abundant remains were of sheep (Ovis orientalis) and goat (Capra aegagrus) and of these sheep were more numerous than goat (Hooijer, 1966, 194). There were no morphological indications of domestication in the bones of the sheep but some of the goats were thought to have been domesticated. Cattle were next in importance after the ovicaprines; most of these were the large Bos primigenius but smaller, possibly domesticated cattle were present in level I (Hooijer, 1966, 193). Only one equid tooth was found and no gazelle bones at all. The few other bones were from a jackal or fox and a vulture.

This assemblage resembles that from the later aceramic and ceramic Neolithic levels at Abu Hureyra. The inhabitants of both sites depended principally upon sheep and goat for their meat with cattle as a major supplement. It is probable that the ovicaprines at Buqras were herded as they appear to have been at Abu Hureyra. The absence of gazelle and the other supplementary species at Buqras is surprising but the faunal sample appears to have been small and has, in any case, not yet been fully published.

The absence of cereals but presence of sickle blades and grinding tools led de Contenson to the conclusion that the inhabitants ate some vegetable foods but did not engage in agriculture (1966b, 152). On the evidence of the animal bones he decided that they were pastoralists. Since the pattern of animal exploitation at Buqras is similar to that at Abu Hureyra one might well ask if in fact the plant economy may not also have had some features in common. The absence of plant remains in the excavation need not be significant for soil conditions may not have permitted the preservation of such material even if it once existed at the site. Buqras was excavated before flotation was widely practised so that the likelihood that plant remains would have been recovered, even if they were there, was less than it would be now. Buqras is a substantial site which was occupied for several centuries so its inhabitants must have had a dependable food supply. Since the region was so arid they could not have subsisted on wild plants alone but must have engaged in regular agriculture, probably with cereals as the staple crops. These would have been grown on the Euphrates flood-plain for the steppe was too arid for anything but the occasional planting. Higher yields may have been obtained using a simple irrigation system. The economy of Buqras would thus have resembled Abu Hureyra in most respects except for certain modifications occasioned by its more arid environment. A Dutch team is now carrying out new excavations at the site, partly to learn more about its economy so we should know shortly if this suggested reconstruction is correct or not.

Some plant and animal remains were identified during the brief excavations at El Kum and these give us an idea of the economy of the site. Both wheat and barley seeds were found and also bones of gazelle, an equid, large cattle which may have been _Bos primigenius_, sheep and goat (Dornemann, 1969, 70). It is said that the animals were probably wild but the status of the plants is not known. These species of plants and animals were all important in the economy of Abu Hureyra and may have been exploited in similar ways at El Kum despite the different location of the two sites. El Kum was a large, long-lived settlement whose inhabitants needed a regular, substantial food supply. They could only have obtained this from herded animals, perhaps supplemented by hunting, and from agricultural produce. It seems probable, therefore, that some of the animals at El Kum were controlled and that the wheat and barley were cultivated. El Kum is quite high up and the hills nearby receive more rainfall today than the surrounding plateau. The site would have been situated in a relatively well-watered area in the 7th millennium so that agriculture certainly could have been practised in the vicinity.

West Syrian sites

The economy of settlements in the West Syrian group was a little different. These sites were in the Mediterranean or open forest zones and enjoyed a higher rainfall than the Euphrates settlements. One such site was Tell Ramad in an area of open forest vegetation. The inhabitants cultivated several kinds of wheat, principally emmer but also einkorn and the relatively complex club wheat (Triticum compactum) (van Zeist, Bottema, 1966, 179ff). Two-row hulled barley and lentils were also grown. Many of the Neolithic skeletons had worn teeth because the inhabitants were eating so many cereals ground on stone querns (Ferembach, 1969, 70). Several other legumes and grasses, hawthorn fruits (Crataegus azarolus), almond and pistachio nuts were collected. This combination of cultivated cereals and legumes with the addition of wild supplements is quite similar to the plant economy of Abu Hureyra although several of the species are different. The cereals were grown without irrigation because of the higher rainfall. The wild nuts and fruits collected at Ramad were not present in the Neolithic levels at Abu Hureyra because they were not growing near the site then.

The main food animals of Ramad I and II were gazelle and deer, particularly red deer, although pigs, an equid and caprines were also present (de Contensen, 1971, 279; Hooijer, 1966, 195). De Contenson thought that the gazelle and deer were hunted but the gazelle may have been subject to a form of human control as on other sites. The pigs certainly seem to have been herded since most of them were killed young. Red deer disappeared from this region at the end of Neolithic 2 and none of their bones was found in the settlement of Ramad III. This decline is linked with the continued rise in temperature and thinning out of the forests in this stage and later.

From the evidence available so far it would appear that the inhabitants of Neolithic 2 Ramad depended for food upon cereal and legume agriculture and the hunting or herding of gazelle, deer and pigs. This pattern of exploitation would have provided a fairly secure food supply during the centuries when the Neolithic 2 site was inhabited.

The information available for the economy of Neolithic 2 Ras Shamra is scanty at present. All we know is that bones of domesticated cattle, goat, pig and wild boar (de Contenson, 1963, 35) and also a large fish vertebra (de Contenson, 1962, 509) were found. This list of the major species suggests that the pattern of animal exploitation was somewhat different from any of the Euphrates sites.

Palestinian sites

The basic economy of the principal settlements in the Palestinian group was quite similar to that of West Syrian and Middle Euphrates sites although there were differences in detail. The economy of PPNB Jericho depended upon agriculture and many of the same species were grown as on sites further north. Two-row hulled barley and emmer were both cultivated as they had been in the PPNA but two-grained einkorn was also planted now (Hopf, 1969, 356). Hopf thought that the domesticated einkorn was introduced from further north because it was believed then to have been domesticated in southern Turkey (Harlan, Zohary, 1966, 1079), an area where the wild form grows prolifically today.

Wild einkorn probably grew in the Levant in the 7th millennium as well as in Anatolia, northern Mesopotamia and the Zagros, the regions where it is found today, because the cooler and moister climate would have suited it. We have already noted that einkorn was probably domesticated over a wider area which included northern Syria than was thought likely a decade ago. It is possible that the area of domestication even extended into Palestine, in which case the Jericho cultivated einkorn could have been developed near the site.

Peas, chick-peas, lentils and horse beans were all grown at Jericho in this phase. No legumes were found in PPNA levels so they may not have been cultivated that early. Almonds, figs, capers and Salvadora charcoals were found (Western, 1971, 36) so the edible nuts and fruits of these species were probably collected for food. Ash, plane and tamarisk charcoals were also identified which help us to reconstruct the environment of the site. Ash, plane, almond and fig would all have grown in the wooded Judean hills a little to the west of the site. The ash, plane and fig probably grew in the well-watered wadi bottoms and so may not be truly typical of the vegetation of the surrounding hills which probably now carried a thin tree cover of the open forest type. The tamarisk, capers and Salvadora would have come from the semi-arid steppe of the Jordan valley bottom.

The plant economy of PPNB Jericho was based upon the growing of at least three cereals and several legumes, all of which were cultivated further north. A number of wild nuts and fruits were also collected in season to supplement the diet. We may deduce from these plant remains, as we did at Abu Hureyra, that Jericho was inhabited all the year round.

Far fewer gazelle were eaten in the PPNB than in the PPNA for they constituted only 17.86% of the total meat available (Clutton-Brock, 1971, 46). More goats were killed, and this species came to replace the gazelle as the major food animal (Clutton-Brock, 1971, 53). Most of the goats were thought to have been the wild Capra aegagrus but two with twisted horn cores were believed to have been domesticated. Several sheep bones were also found in the PPNB levels (Clutton-Brock, Uerpmann, 1974, 261), more than in the PPNA but sheep were still far less common than goat.

Pigs of a type thought to be the wild Sus scrofa were another important source of food. These animals would have been common in the thickets along the Jordan and its tributary wadis. Some bones of the large Bos primigenius were also found (Clutton-Brock, 1971, 46), enough to suggest that this species also made a significant contribution to the meat diet.

Considerable quantities of fox and other carnivore bones were found in the PPNB at Jericho (Clutton-Brock, 1969, fig. 1) although they were less numerous than in the PPNA. If the hypothesis that they were caught for their pelts is correct then this activity was still important. Leopards were also killed, perhaps for their skins or because they were dangerous predators.

The replacement of gazelle by goat with sheep as the most important meat source of PPNB Jericho closely parallels the change from a gazelle to a sheep-dominated economy at Abu Hureyra. The goats at Jericho were probably herded for otherwise they could not have provided the regular supply of food that the inhabitants required. Cattle and pigs were an important additional source of meat at Jericho as the latter had been at Tell Ramad. Jericho combines aspects of the animal exploitation on both Middle Euphrates and West Syrian sites.

A report has recently been published on the animal bones found at Sheikh Ali which makes it clear that the inhabitants were living in much the same way as people on other settlements in Palestine. Ovicaprines were the most numerous animals killed (Jarman, 1974, fig. 1) with cattle second in importance. Meat was also obtained from pigs and gazelle but there were relatively few of these. The cattle varied in size, a few being so large that they may have been Bos primigenius while others were much smaller. Jarman believes that the ages at which the sheep, goats, cattle, pigs and gazelle were slaughtered indicates that all were controlled by man (1974, 55). He suggests that the ovicaprines were exploited for their milk and wool products because most were killed in their third year. The cattle were also slaughtered at about the same age because it took them that long to reach their full weight. In contrast most of the pigs were killed in their first or second year. Pigs breed rapidly and so most could be killed young for their meat without reducing the reproductive capacity of the herd (Jarman, 1974, 57).

Such close control of several herds of animals has not yet been noticed on other sites but that may simply be because the animal bones have not been examined in sufficient detail. The general pattern of large numbers of ovicaprines being killed is the same as at Jericho, Munhatta and on sites in the Euphrates valley while the still important if secondary place held by cattle, pigs and gazelle accords with the evidence from Ramad and other Palestinian and West Syrian sites.

No plant remains were recovered at Munhatta but a sample of animal bones from the site has been studied. Ovicaprines accounted for 33% of the bones and of these sheep were about twice as numerous as goats (Ducos, 1968, 85). Gazelle (27.3%) were the second and wild boar (22.6%) the third major source of food. Cattle (12.7%) also contributed much meat to the food supply. These were very mixed in size, some being as large as Bos primigenius and others somewhat smaller. The only other food animals were a few roe deer, the remaining bones all being attributed to carnivores.

Ducos thought that on morphological grounds all these animals were wild and therefore hunted yet the pattern of exploitation has much in common with that of Jericho, Sheikh Ali and Tell Ramad. Most of the ovicaprines were killed between one and three years of age (Ducos, 1969, fig. 4) with the peak falling in the third year. This is the same distribution as at Sheikh Ali where it has been suggested that the ovicaprines were herded. It is likely that the gazelles were also controlled in some way at Munhatta as they seem to have been at Jericho and elsewhere.

Some information has been published about a collection of animal bones from Beisamun. The precise phase of occupation from which the sample was obtained has not been made clear but it is likely that the material came from deposits that were laid down either late in Neolithic 2 or early in the next stage. Cattle bones were the most numerous (35.9%) and ovicaprines (29.4%) second in importance; these have been identified as Capra hircus aegagrus and Ovis orientalis (Ducos, 1969, table 1). Pigs (24.4%) were also important in the diet but gazelle (7.2%) and deer (1.7%) were killed in very small numbers. Ducos's studies make it clear than many of the cattle were killed at maturity between four and 6.5 years (1969, fig. 3). This pattern, which to some extent resembles that at Sheikh Ali, suggests that the herds were controlled by man. Most of the ovicaprines on the other hand were killed when they were quite young which probably also indicates control by man as we have seen on other sites although Ducos believes on the same evidence that they were hunted in the wild (1969, 271). The ages at death of the pigs do not indicate that they were domesticated or controlled even though so many were killed (Ducos, 1969, 270).

Animal exploitation in the Neolithic 2 levels at El Khiam depended almost entirely upon caprines (Ducos, 1968, 79). Gazelle, cattle, an equid and wild pigs were also killed but only in very small numbers. The dependence upon caprines here was more marked than at other Palestinian sites. This was partly because the caprines were better adapted to the broken country around El Khiam than other species.

The inhabitants of El Khiam would not have been cultivators as there was no agricultural land in the neighbourhood yet the site was quite extensive and the artifacts were typical of a well-established settlement. The wild plant foods in the area would not have been sufficient to have supported the inhabitants all the year round. They were probably a semi-sedentary group who engaged in herding and practised transhumance like their predecessors.

The plant remains and animal bones provide fairly clear evidence that the economy of the settlement sites in Palestine depended upon cereal agriculture and herding. This helps us to interpret the way of life of the inhabitants of other sites from which no organic material has been recovered. A number of the surface sites in Palestine have yielded a fairly broad range of stone tools indicating that the people who lived on them carried out many different activities. The inhabitants of several of these camps and settlements such as Tahuneh, Tantur, Tell el Ful and Tell en-Nasbeh certainly lived principally by some combination of cereal agriculture and herding. The same was probably true of the excavated settlements at Abu Gosh and Tell el Far'ah.

The economy of Nahal Oren in Neolithic 2 was an interesting variation of the pattern on other sites in Palestine. Emmer and barley were both eaten and the emmer, at least, was cultivated (Noy et al., 1973, table 6). Lentils and vetch were probably also grown. The fruits of the olive, carob and pomegranate were eaten; the last is particularly interesting as it supports the identification of pomegranate charcoal in PPNA levels at Jericho and proves that the tree grew in Palestine much earlier than has been thought hitherto. These trees and the holm oak which is also attested are all Mediterranean species confirming that the site was surrounded by Mediterranean forest. The cultivated cereals and legumes suggest that the inhabitants of the small Neolithic 2 settlement grew several crops which probably provided a good deal of their food.

They still killed considerable quantities of gazelle, 76.7% of the bones in this phase (Noy et al., 1973, table 3), but fewer than in Neolithic 1. A smaller proportion of the gazelle were young animals indicating that gazelle herding was being given up. 13.9% of the bones were from goats, an increase which suggests that this species was slowly being substituted for gazelle in the diet. Even so, the percentage of caprines at Nahal Oren was much lower than at settlement sites elsewhere in the Levant, another indication perhaps that Nahal Oren was occupied early in Neolithic 2 before goat and sheep herding was adopted elsewhere or simply that the change took place much more gradually here. The only other animals eaten in any numbers were pig (4.4%) and cattle

(2.4%) while a few fallow and roe deer were still hunted. The proportions of swine and cattle killed increased slightly in Neolithic 2, a trend which was much more marked at Jericho.

It is possible that the inhabitants of Nahal Oren still practised transhumance but the evidence suggests that, if it took place at all, it was much less important than in earlier phases. The settlement was smaller than in Neolithic 1 and its inhabitants could have obtained much of the food they needed in the vicinity of the site. Now that they were growing several crops they would have had to spend much of the year on the site. Some herdsman might still have left the settlement to watch the gazelle but if the goats were herded, as seems probable, they could have been pastured quite adequately all the year round in the neighbourhood.

The nearby site of Iraq el Barud has produced a fairly limited range of material indicating that very few activities were carried out there. Such a site may have been simply a herdsman's camp used by a small group whose homes were at another larger settlement. Rakafet, which has produced exiguous Neolithic 2 remains (Noy, Higgs, 1971, 225), may have been a similar herdsman's camp.

I now wish to consider the economies of two settlements, Beidha and Nahal Divshon, belonging to sub-groups of the Palestinian cluster of sites but which lie well to the south-east and south of Palestine.

The inhabitants of the Neolithic 2 settlement at Beidha depended upon farming for their existence. Information about the plants they used was obtained from imprints of vegetable matter left in the clay of the walls and roof of one building (Helbaek, 1966, 61) which may not give a truly representative picture of the plant economy of the whole settlement. The most common imprints were of two-row hulled barley. This was the wild form (Hordeum spontaneum) but the grains were larger than those of the truly wild plant, a morphological change which led Helbaek to suggest that the plant was being cultivated (1966, 62). Emmer was the other cereal grown. Considerable quantities of wild pistachio nuts, acorns and several legumes, among them vetch (Vicia narbonense), medic (Medicago sp.) and cock's comb (Onobrychis crista-galli) were collected. The bulb of the bulbous barley (Hordeum bulbosum) was eaten, a plant which was also collected at Abu Hureyra.

Helbaek has pointed out that for barley and emmer to have been cultivated the rainfall around Beidha must have been higher than it is today (1966, 66). This problem has been studied by Raikes who, while conceding that the rainfall may have been a little higher, believes that because the run-off from the surrounding hills was concentrated in the valley in which the site was situated the soil would have been moist enough for farming even if the mean rainfall was quite low (1966, 68ff). In fact as we have seen from other evidence the effective rainfall in this region would have been significantly higher in the early 7th millennium than it is now so that the environs of the site would have been quite favourable for early agriculture.

Caprine bones at Beidha comprised 86.5% of the total collected (Perkins, 1966, 67) so there is no doubt that these were the main source of meat. Both bezoar and beden were present and a high proportion of the remains were of young animals from which Perkins has deduced that they were domesticated. Both had been common in the area since the Pleistocene because they were well-adapted to the rugged terrain. The other possible food species killed were Bos primigenius, gazelle, wild boar, an equid, hyrax, hare and also some birds.

These studies have established that the inhabitants of Beidha were growing barley and emmer and probably herding goats. They still collected many other food plants and hunted other animals in the vicinity of the site so that agriculture was not perhaps so broadly based as on some of the settlement sites further north. Nevertheless it is interesting that cultivated emmer and barley and flocks of goats formed the basis of the economy at Beidha for the same combination has been found on other settlement sites in the Levant.

Nahal Divshon had much less substantial remains than Beidha and relatively little organic material was found there. Nevertheless the pollen and faunal samples that were collected are of much interest. A little of the pollen proved to be from olive, almond, Aleppo pine and pistachio trees (Horowitz, 1976, 66), all Mediterranean species that were growing in the area during the 7th millennium. Most of the pollen was from grasses, Chenopodiaceae and Compositae. Some of the grains of grass pollen were very large and are thought to have come from domesticated cereals that might have been cultivated around Nahal Divshon. The site lies at the bottom of the Nahal Zin where run-off from the surrounding hills was concentrated. This would have been one of the most favourable spots in the area for simple farming.

A few faunal remains of four ruminants have been identified from Nahal Divshon. One was a Bos primigenius tooth, four were horn core fragments of fallow deer and the others bones of ibex and gazelle (Tchernov, 1966, 69). Fallow deer prefer a wooded environment and their presence in the Nahal Divshon area thus accords well with the arboreal pollen evidence. It is not known if any of these animals were herded although on analogy with sites elsewhere it is possible that the ibex and gazelle were.

The economy of Nahal Divshon cannot be described with certainty because of the paucity of evidence. The site was inhabited by a small group who may have been cultivating cereals and who doubtless collected other edible plants. It remains possible that they herded ibex or gazelle but the other animals were probably hunted. The pattern of life may not have differed much from that on other small settlement sites further north like Nahal Oren.

I have discussed settlements throughout the Levant for which there is some economic evidence from organic remains. There is still a large group of sites to be considered which in the 7th millennium were situated in the open forest and steppe bordering the heavily wooded areas of the Levant. These are the surface sites in Sinai and the Negev, on the Transjordan plateau, around Palmyra and in the Jebel Abdul Aziz. All were occupied during the expansion of settlement that took place in Neolithic 2. Few of these sites have been excavated and there is very little direct evidence for their economies. In consequence it is necessary to consider other sources of information in order to determine how their inhabitants lived.

Some of the sites were small, that is less than 500 sq m in area, with few types of chipped stone tools and hardly any other artifacts. I think it probable that these were stations occupied briefly by small groups of hunters or foragers. Examples of such sites are Sheikh Abdul Aziz and Khazne Cave I in the Jebel Abdul Aziz and some of the small stations near Palmyra, in the Azraq basin and in the Jebel Meghara in Sinai. Nacharini, several of the small stations found by Neuville near Jaffa and sites 62/0, 64A and 70 near Ashdod are similar kinds of site in the Mediterranean zone. These stations were used by people who probably belonged to larger groups inhabiting camps or settlements either in the surrounding region or further away. Hunting and collecting still played a part in the Neolithic 2 economy providing a useful supplement to the diet even on large settlement sites.

Most of the other surface sites had another function. A few like those in the Wadi Dhobai were as small as the hunting stations but others were much larger. All had a fairly wide range of chipped stone tools and on some there were remains of structures. A few bones of fox, badger (Meles sp.), gazelle and rock partridge (Alectoris cf. graeca) were found at Wadi Dhobai B (Bate, 1938, 294) but these do not throw much light on the economy of the site although the badger bones are useful supplementary evidence that its environment was more wooded than it is now.

These camps and settlements were occupied for longer than the hunting stations by groups that were sometimes about the size of the bands of earlier stages but which were often much larger. These larger groups could not have stayed together very long in the steppe if they were existing solely by hunting and gathering. It follows that they must have lived in some other way that enabled them to exploit the resources of the steppe for perhaps several months of the year at a time. In Neolithic 1 quite large semi-sedentary groups seem to have lived off herds of animals which they controlled. Such transhumant groups may now have extended their range into the steppe as the agricultural population of the Mediterranean and open forest zones grew. One major economic development which seems well-attested on Neolithic 2 settlements would have been important here and this is the domestication of the goat and possibly the sheep in the Euphrates region. The goat and sheep would have been able to graze satisfactorily on the steppe and by providing milk as well as meat were more useful as a regular source of food than herded gazelle would have been. These groups would have depended upon their herds for much of their food but would also have hunted wild animals and collected edible plants in season. They may even have grown a few crops in more favoured areas.

Such pastoral groups may have been able to live at their camps and settlements for quite extended periods as even the steppe was a richer source of grazing and edible plants in the 7th millennium than it is now. This might have been the way of life of the people who lived on the sites near Palmyra. The hills of Jebel el Abyad and Jebel Abu Rujmein would have carried open forest and even some of the valleys would have been lightly wooded while the broader valleys and open plains were covered with park-like steppe. Such an environment would have been particularly suitable for pastoral groups. Others may have been transhumant following a seasonal progression from camps in one region to camps in another with complementary resources. This may have been the way of life of the inhabitants of the sites around Nizzana and the Halutza dunes who wintered in the lowlands then moved into the Negev highlands to sites like Nahal Boqer and G2 in the Har Harif during the summer, a continuation of a way of life practised in the same region in Neolithic 1. The same may also have been true of the inhabitants of the larger sites on the coast of Palestine. There are several clusters of these as though particular areas were visited repeatedly by transhumant groups.

Pastoralism is still the way of life of the Beduin in the Levant today, a testimony to its efficiency in exploiting the resources of the steppe over many millennia. Some Beduin move frequently from place to place while others are almost sedentary. Most engage in hunting and collecting in due season and some may plant crops so in these respects their way of life has a certain amount in common with the model I have suggested for the economy of the Neolithic 2 surface camps and settlements in the open forest and steppe zones. It would be wrong, however, to press the analogy very far because the Beduin of the Levant today and for at least the last two millennia have been true nomads. Nomads in this sense exist in symbiosis with settled farmers, exchanging the products of their flocks for the fruits of cultivation. They will spend part of the year on agricultural land grazing their flocks on stubble after the harvest. They depend upon the towns and cities for manufactured goods which are essential to their way of life. Some elements of the symbiosis between pasturalists and farmers may have originated in Neolithic 2 but nomadism in the strict sense did not develop in the Levant until much later.

The most important economic development in Neolithic 2 was the adoption of agriculture throughout the Levant. At the same time a series of villages were established which were occupied all the year round. These villages were in general larger than settlements in Neolithic 1 and their inhabitants more numerous.

Agriculture in most of these villages was broadly based since several cereals and legumes were grown. Varieties of emmer, barley and einkorn were the principal cereals and lentils and vetch the most common legumes although peas, chick-peas and horse bean were also cultivated.

On most Neolithic 2 sites far more ovicaprines were killed than in Neolithic 1 and the proportion of gazelle meat in the diet was much reduced. This change in preference seems to have taken place during the aceramic Neolithic phase at Abu Hureyra but at most sites the new pattern coincided with the beginning of Neolithic 2 occupation. Along the Euphrates sheep were preferred to goat but in Palestine at Jericho and Sheikh Ali and to the east of the Rift valley at Beidha goats were the main animal eaten. An exception was Munhatta where sheep outnumbered goats. On some sites in the Jordan valley there are indications that other species were as important in the diet as the ovicaprines. Cattle bones were abundant at Sheikh Ali while quite common at Munhatta; at Beisamun they were the most numerous animal. Pigs were also eaten in considerable quantities at these sites and at Jericho. On all sites a number of other species were eaten as well and their meat contributed significantly to the diet.

There are differing views about the manner in which these animals were exploited. Very few bones have been found which show the morphological changes traditionally associated with domestication. The ages at which animals are killed is now thought to be a more reliable indication of man's control of herds of animals. There is abundant evidence from Neolithic 2 sites at which this has been studied that goats, gazelle, cattle and pigs were being killed in a regular manner. The abrupt change to goat and sheep-dominated economies early in Neolithic 2 and the ages at which the goats were killed suggest that man was controlling these animals particularly closely. Almost certainly they were being herded as if they were domesticated. The other principal food animals were probably also being herded at some sites. At other sites the exploitation of these animals varied from some form of loose herding to selective hunting. The other animals eaten in smaller quantities were probably hunted.

Since a number of Neolithic 2 settlements are known to have been occupied continuously for several centuries their economy must have been stable. Cereals quickly exhaust the soil of essential nutrients but this problem was overcome without recourse to shifting cultivation. The likely system of cultivation in this case was short fallow in which part of the land around the village was left fallow for a few years between crops. The alternation of cereals with legumes would have helped maintain fertility for the legumes are important fixers of nitrogen in the soil. The herds of animals belonging to the settlements would have been grazed on the fallow and the cultivated fields after the harvest. In this way the land would also have been manured.

The transhumant and pastoral groups would have depended more upon their herds. The transhumant groups were semi-sedentary, following a seasonal pattern of movement in search of grazing and wild foods. Not all the pastoral groups seem to have moved so frequently but they too were essentially semi-sedentary. Pastoralism as a way of life seems to have been established for the first time in the Levant in Neolithic 2.

Discussion

Farming as a way of life began in Neolithic 1 but did not become the mainstay of the economy until Neolithic 2 when it spread throughout the Levant. This process was accompanied by a considerable growth of population and increase in the density of settlement. The first agricultural settlements were founded early in Neolithic 1 and so preceded the growth in population by several centuries. Agriculture made possible the great expansion of population in Neolithic 2 but this did not happen immediately after the first farming settlements were established. The spread of sedentary settlements with a farming economy and the growth of population in Neolithic 2 took place together.

The widespread adoption of agriculture, growth in population and new cultural configuration in Neolithic 2 were accompanied by changes in climate and vegetation. These environmental changes were not themselves the cause of the great alterations of man's way of life in Neolithic 2 for they only took effect during the 7th millennium and not at the beginning. The gradual opening up of the Mediterranean forest would have facilitated the spread of agriculture and herding in this region but the evidence indicates that this process was considerably hastened by man's own efforts. The environmental changes began to have a major effect only towards the end of Neolithic 2 and were partly responsible for the alterations in the settlement pattern which took place in the 6th millennium.

There was a greater range of settlement types in Neolithic 2 than in Neolithic 1. Almost all were nucleated and since they tended to be larger the social relations of their inhabitants would have been more complex than before. It is likely that the peoples of the Levant were by now all members of tribes. They also shared many cultural traits which implies that there was much intercourse between them. The boundaries between the tribes are difficult to define partly because of these cultural similarities. The three cultural groups which I have distinguished, Middle Euphrates, West Syrian and Palestinian, include several environmental zones and are too extensive to be equated with single tribes. Each probably represents several tribes united by a common culture.

Since many Neolithic 2 settlements were larger than those of Neolithic 1 and occupied all the year round their inhabitants would have had a greater degree of social intercourse and communal organization. This would have been most marked in the very large settlements of Abu Hureyra and Jericho although at Jericho the pattern may not have differed very much from that which had already developed in Neolithic 1 as the settlement was quite similar in type.

The social organization of Neolithic 2 settlements probably created the need for public buildings for meetings and to house guests which would have been centres of village affairs. Buildings found at three excavated Neolithic 2 sites could be interpreted in this way: the unusual rectilinear building in PPNB levels at Jericho, the large circular structure in level 3 at Munhatta and the large rectangular building in Level II and possibly also in Levels III and IV at Beidha. Very few Neolithic 2 settlements have been excavated extensively so it remains to be seen if such buildings were a regular feature of other villages. The strong senses of territoriality and of belonging to a particular community engendered among the inhabitants of such settled villages were reflected in the burial rites in which many of the dead were buried within the settlement, often under the floors of the houses which they had perhaps occupied. The same feelings found expression in the special ways skulls were treated.

The normal buildings found on most Neolithic 2 settlements had certain general characteristics in common. They were usually rectangular in plan, sometimes with a large single chamber but more often with several small rooms. On Levantine sites these buildings were always separate from each other and were apparently the houses in which most people lived. In the ethnographic record such buildings are usually inhabited by nuclear families living in settled farming villages and this has probably also true of Neolithic 2 settlements (Flannery, 1972, 29, 39). We have seen that the nuclear family was probably the basic form of social organization at PPNA Jericho but not on all Neolithic 1 sites. In Neolithic 2 it is likely that the inhabitants of all settlements and probably also camps at which dwellings have been found belonged to nuclear families.

We can infer something of the patterns of residence and descent among the inhabitants of Neolithic 2 settlements from their chipped stone industries. The technology and typology of the flint industry at Abu Hureyra changed very gradually throughout the occupation sequence. Most of the tool types found in the earliest aceramic Neolithic levels were present throughout the sequence. Mortensen noted the same continuity at Beidha and it seems to be a characteristic feature of all other Neolithic 2 sites with lengthy sequences of occupation. If we assume as we did for Neolithic 1 that the flint knapping traditions were handed down from father to son then we may deduce that residence and descent were patrilocal on Neolithic 2 sites. The same rules thus applied to Levantine society in both Neolithic 1 and 2.

The houses within each Neolithic 2 settlement were of a similar kind and size; no single household inhabited a much larger dwelling than the others. Few grave goods were deposited in Neolithic 2 burials and there was little to differentiate between one grave and the next. There is thus no evidence that certain individuals or families had a higher social position or possessed greater wealth than the others from which we may conclude that society was still egalitarian. Chiefdoms, the most developed form of tribal organization, had not yet come into existence. Society in a chiefdom is arranged hierarchically and the chief himself will accumulate surplus goods produced by the community (Sahlins, 1968, 24, 91). Nothing like this seems to have developed in Neolithic 2 although there are very great differences in the scale of the settlements. The largest ones like Abu Hureyra and Jericho must have been regional centres, the foci economically and socially of the surrounding area. Yet it is only their size and the degree of communal organization which may be inferred from this which distinguished them from other Neolithic 2 settlements for their dwellings and burial customs were the same as on other smaller sites.

Where today tribal societies are based on nuclear families in separate households these form the fundamental economic unit. Each household produces sufficient for its needs in what Sahlins has called the "domestic mode of production" (1974, 83). Since this form of social organization was characteristic of Neolithic 2 settlements it is likely that the economy was organized in the same way.

Neolithic 2 households were clustered together in nucleated villages. We saw in the last chapter that the land around such villages or at least the right to work it is usually apportioned equally among the households and it seems likely that this pattern of land distribution continued in Neolithic 2.

Before taking the enquiry further it will be helpful to restate succinctly how I believe Neolithic 2 society was organized. Each settlement was composed of nuclear families which formed the basic economic unit. The families enjoyed equal status and no individual was endowed with political authority which gave him preferential access to the settlement's resources. For the first time the landscape of the Levant was peopled with communities of settled peasant farmers. The settlements and their inhabitants were grouped in tribes which appear to have been in close contact with each other since they shared so much of their material culture. This reconstruction is based partly upon ethnographic analogy but is supported by the archaeological evidence we have at the moment.

An important feature of these Neolithic 2 farming settlements and one of great significance for the future was that their inhabitants were sedentary. They were tied to their homes by the regular cycle of the agricultural year in preparing the land, sowing the seed, perhaps weeding and then harvesting. Under a simple fallow system this would not have been very time-consuming. The number of hours a Neolithic 2 farmer spent in agricultural activities may have been about the same as a hunter-gatherer needed to collect enough food to eat. The difference was that the farmer's year was divided into periods of intense work and others of extended leisure whereas the hunter-gatherer had to go in search of food every day or two. Since the farmer lived in one place and had months at a time with little to do he was able to develop more complex social activities and crafts than the hunter-gatherer.

The material remains from Neolithic 2 settlements were richer than in Neolithic 1 because a greater range of crafts was being practised. The interiors of buildings were decorated and furnished to an extent not seen in the Levant before. Workers in stone produced fine bowls in coloured stone of greater quality and variety than in Neolithic 1. A number of other decorated stone objects were made such as gaming boards and "stamp seals" which were new. The decorative beads and amulets were much more elaborate than in earlier times. The butterfly beads from Abu Hureyra and elsewhere are good examples of these but many other types were made, often from exotic materials. Dried and baked clay were frequently used for figurines and other objects while the first large non-perishable containers were made in white plaster. Lime plaster was produced in great quantities for house floors and other uses. Basketry was probably a very old craft but there is more evidence for it in Neolithic 2 than in earlier periods. Semi-sedentary and mobile groups would have travelled as light as possible with few containers but sedentary farmers wanted baskets in which to store and carry produce. Wooden containers and tools were almost certainly made in earlier times but again it is only in Neolithic 2 that there is evidence of wooden boxes being made in some numbers and of specialised ground stone tools being devised to shape them.

All these artifacts took much time to produce and so could only have been made when the population had extended leisure time. On some sites places have been found where the artifacts were fashioned. These working floors were in and around the houses but such objects were not made in every house. Some households were specialising in the manufacture of these artifacts in their leisure time. The same was probably true of the lime burning and perhaps even the making of mud-bricks, processes that may have been organized as modest industries in order to produce the quantities needed. More of these crafts were carried on at the bigger settlements than on other sites, an indication of the greater cultural diversity that could be achieved in larger communities.

The growth of crafts in Neolithic 2 was accompanied by an increased demand for exotic materials. Certain objects such as marine shells had been valued as far back as the Aurignacian but it was only in Neolithic 2 that a wide range of exotic materials was found on sites far removed from their sources. The traffic in Anatolian obsidian is well-known but jadeite, serpentine, agate and native copper were all obtained from the same region, steatite perhaps from the Zagros and turquoise and malachite from Sinai and the Wadi Arabah. No great weight of these materials was imported because they originated so far away from where they were used but other materials such as bitumen, basalt and coloured limestone which occur in many areas of the Levant were used in considerable quantities. The exchange of these materials which reached a climax in Neolithic 2 was facilitated by the frequent contacts which took place between settlements in the Levant during this stage. These contacts obviously extended to Anatolia from whence so many materials originated.

The raw materials from distant sources found on sites in the Levant were not obtained by trade of the kind we know in historic times. The quantity of materials was too small for this sort of transaction and there is no evidence that merchants or markets existed let alone transport other than on a man's back. In tribal societies today it has been found that desirable objects are exchanged between individuals to strengthen social relationships (Sahlins, 1968, 81) and it is likely that exotic materials passed from hand to hand for the same reason in Neolithic 2. Although materials from distant sources were obtained in such small quantities they were found on many sites not only in Neolithic 2 but later as well. The traffic in obsidian was the most regular and long-lasting of all since it began in Neolithic 1 and continued into the Bronze Age. Such persistent if small-scale exchange indicates that the items traded continued to be much prized over a long period.

We do not know how the exchange of obsidian and other materials took place even if we can suggest what the context is likely to have been. Renfrew and his colleagues thought that there was an exponential fall-off in the quantities of obsidian reaching Neolithic sites the further away one travelled from the sources (Renfrew et al., 1968, 327). They suggested a model of "down-the-line" exchange to explain this in which each community would pass on some of the obsidian it received to a neighbouring settlement more distant from the sources (Renfrew et al., 1968, 329). This hypothesis fitted the facts as they were known then but no longer accounts satisfactorily for the latest evidence of the distribution of obsidian in the Levant. When Buqras was excavated about 29% of the chipped stone industry was found to be of obsidian which fitted the Renfrew model well. Abu Hureyra is approximately the same distance from the Anatolian obsidian sources yet only 4.35% of the chipped stone from trench B was obsidian, very much less than the Renfrew model would have predicted. It is still true to say that in general the further away a site was from the obsidian sources the less obsidian it received but the picture is now more complex than was thought at first.

The distribution of obsidian from each source has also been proved to be more complicated than expected. The results of the earlier work suggested that most of the obsidian found on Levantine sites west of the Euphrates came from Çiftlik (Renfrew et al., 1968, 326). The Bradford analyses have now thrown doubt upon this conclusion for about half the obsidian at Tell Aswad and two thirds at Ghoraife came from eastern Anatolia. It has been shown that grey obsidian hitherto thought to be characteristic of the Cappadocian sources could have also originated in eastern Anatolia so that the source of some of the obsidian classified visually as having come from Çiftlik may have been in the east. Now we know that obsidian from at least six sources was reaching Abu Hureyra the distribution is even more complex. The way in which obsidian was exchanged is less clear now that was thought when the first analyses were made but it is hoped that new patterns will emerge from the new analytical work in in progress.