Becoming Neolithic

*Becoming Neolithic* examines the revolutionary transformation of human life that was taking place around 12,000 years ago in parts of southwest Asia. Hunter-gatherer communities were building the first permanent settlements, creating public monuments and symbolic imagery, and beginning to cultivate crops and manage animals.

These communities changed the tempo of cultural, social, technological and economic innovation. Trevor Watkins sets the story of becoming Neolithic in the context of contemporary cultural evolutionary theory. There have been 70 years of international inter-disciplinary research in the field and in the laboratory. Stage by stage, he unfolds an up-to-date understanding of the archaeology, the environmental and climatic evidence and the research on the slow domestication of plants and animals. Turning to the latest theoretical work on cultural evolution and cultural niche construction, he shows why the transformation accomplished in the Neolithic began to accelerate the scale and tempo of human history. Everything that followed the Neolithic, up to our own times, has happened in a different way from the tens of thousands of years of human evolution that preceded it.

This well-documented account offers a useful synthesis for students of prehistoric archaeology and anyone with an interest in our prehistoric roots. This new narrative of the first rapid transformation in human evolution is also informative to those interested in cultural evolutionary theory.

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Becoming Neolithic
The Pivot of Human History

Trevor Watkins
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As I finally – finally – complete the writing of this book, I am deeply aware of the help, support, and encouragement that I have had over the years that I have struggled with it. The incentive was planted when I was invited by the Society of Antiquaries of Scotland to give the six-lecture series of Rhind Lectures in Edinburgh in 2009. Out of that came the invitation to submit a paper summarising the lectures to the journal *Antiquity* (Watkins 2010). There is a long tradition that encourages a senior scholar to turn their Rhind Lectures into a book that records his or her mature understanding of their subject. It has taken me too long, but I express my gratitude to the Society for the encouragement that the Rhind Lectures invitation gave me and apologise for my dilatory response.

Initially, I was fortunate in forming a friendship with Klaus Schmidt, the excavator of Göbekli Tepe until his sudden death in 2014. We worked together on the idea of a research project that sought to understand what drove the profound cultural and social changes that marked the beginning of the Neolithic period, producing monuments and complex symbolism such as that of Göbekli Tepe and other sites in the region. For both of us, the project was the challenge to follow up on the ideas of Jacques Cauvin (1994, 2000) and his provocative hypothesis of ‘the birth of the gods’ in a ‘psycho-cultural’ revolution at the core of the new world of the Neolithic. Our research proposal was welcomed by the John Templeton Foundation. Part of their funding enabled the Göbekli Tepe excavation project to carry out a radiocarbon dating programme that demonstrated categorically that the monumental structures and the extraordinary sculptured symbolism indeed belonged in the early Pre-Pottery Neolithic. Another part of the project was a workshop held in Urfa, the city in Turkey close to the site of Göbekli Tepe. That enabled a group of Neolithic specialists to meet and talk with several scientists from other disciplines and to spend a day at the site of Göbekli Tepe in the company of Klaus Schmidt. That workshop certainly excited the thinking of a number of us, myself especially. We also planned a multi-authored book about the Epipalaeolithic–Neolithic period, to be launched through the medium of a workshop in Berlin. In the wake of Klaus Schmidt’s sudden death, we did manage to hold the workshop; but, in the difficult situation of the Göbekli Tepe project for the German Archaeological Institute consequent on his death, the plans for the book fell apart. I recall that our proposal to the Templeton Foundation included our hope that through our project we could ‘devise new inter-disciplinary modes in prehistoric research, and seek to change
the way that archaeologists and the public understand an important formative period in human history’. I hope that this book will, to some extent, stand in for the big book that was at the core of our project and help to advance how we recognise the importance of the Epipalaeolithic–Neolithic transformation in human history.

I am very happy to acknowledge my debt to the John Templeton Foundation, whose staff continued to help and encourage me.

I am equally happy to acknowledge my debt of gratitude to many of my archaeological friends who have helped and encouraged me over recent years that have been difficult for me personally. I am especially grateful to all those colleagues who have sent me images from their field research archives to be used as illustrations; their names can be found in the credits in the picture captions. And finally, I wish to record my deep gratitude for the love and support of my family through hard times of recent years. Without their positive encouragement, this book could easily have been stillborn. And I dedicate the book to my wife Antoinette, with deep regrets that I was not able to complete it for her before she died.
Introduction

The Neolithic in southwest Asia (or the Neolithic revolution in the Near East, as it used to be called) has been a major focus of research for more than 70 years. The idea that the Neolithic, or agricultural, revolution was a pivotal moment in the whole of human history, comparable in importance to the industrial revolution of the nineteenth century, has been ‘general knowledge’ for many people over generations. However, throughout all this long time, since Gordon Childe (1936, 1942) proposed the idea, there have been questions, debates, and arguments about the nature of this so-called Neolithic revolution. These continuing arguments suggest that, despite the decades of research, a satisfactory conclusion had not been reached. Is that because we still need more information to answer our questions? Why did arguments continue about what really happened to make this revolution? Why did it happen then (roughly, at the beginning of the Holocene era, starting 12,000 years ago), and why not earlier?

This book has been gestating over decades, but it has been completed at a critical moment, when four trends have converged to make a new solution to these questions possible. Firstly, because of all the exploration and excavation that has been going on, of course we have so much more information, and fewer blanks on the map of exploration. Secondly, because the researchers working on all this new data have applied new and increasingly sophisticated analytical tools, we have been rewarded with new and often unexpected insights. Thirdly, because academic debate among archaeologists has refined our understanding: some theories have failed to stand up to criticism. Fourthly, and most importantly, the advances in our understanding of the Neolithic have converged with recent advances in evolutionary theory. In the last 20 years, cultural evolutionary theory has blossomed and grown into an exciting new sub-field that offers a quite different take on the story of human evolution. I have been following the developments in cultural evolutionary theory since the 1990s and attempting to write about new ways to integrate these developing ideas into the archaeology of the Neolithic. The last chapters here show how cultural evolutionary theory and cultural niche construction theory enable us to make sense of the Neolithic as the critical turning point in the whole of human history.

There are two matters that it would be good to deal with before we go on into the core of the book. The first concerns the necessary technical terms, like ‘Neolithic’,
that I have to use, and the commonly used terms that I avoid. The second is an outline of the structure of the book, so that the reader may know where they are and what lies ahead.

The archaeological period known as the Neolithic, both in Europe and what used to be called ‘the Near East’, has long been identified with the name of Gordon Childe (who in 1927 founded the Archaeology Department at the University of Edinburgh, where I spent most of my career). Childe produced academic books that became the standard texts for students for 30 years. But he also published popular paperbacks that established the fundamentals of his Neolithic and urban revolutions in the public mind (Childe 1936, 1942). The Neolithic revolution, he said, was a prehistoric transformation that saw the emergence and spread of the first village-societies and the first farmers. Before Childe, the Neolithic, the New Stone Age, was defined by new kinds of stone tools, and the appearance of new craft skills, such as pottery, the plough, and the weaving of textiles. For Childe, the Neolithic revolution was a social and economic transformation equivalent in its historical importance to the industrial revolution, which had so impressed Friedrich Engels and Karl Marx.

The Neolithic revolution has frequently been referred to as ‘the origins of agriculture’ (to name but a few: Bar-Yosef & Meadow 1995; Peake 1928; Rindos 1984) or ‘the agricultural revolution’ (e.g. Barker 2006). It is true that there has been a great deal of productive research on the domestication of plants and animals, but I take exception to the reduction of this major transformation to the switch from foraging to farming. I reject that approach for three reasons. Firstly, farming, as we commonly understand the term, did not begin in the Neolithic. As will become clear in Chapters 2 and 3, while people began to cultivate crops even before the Neolithic began, and to manage flocks of sheep and goat in the Neolithic period, farming as we usually think of it – with fields that were ploughed with ox-drawn ploughs, producing harvests that were brought home in carts or wagons – began after the end of the Neolithic of southwest Asia. What developed within the Neolithic period itself was effectively horticulture, or ‘garden agriculture’, where people began to work the land by hand to produce enough for their needs. Secondly, to reduce the transformation to a change in the subsistence economy is like explaining the industrial revolution as the replacement of water wheels by the steam engine. There is so much more to the transformation process than simply the change from hunting and gathering to agriculture and the keeping of animals.

The transformation that is our subject here happened in southwest Asia, and in five or six other parts of the world, according to Bruce Smith (1994), or as many as ten different regions according to Fuller (2010). Price and Bar-Yosef (2011) introduced a supplement to *Current Anthropology* with a battery of papers on ‘The Origins of Agriculture: New Data, New Ideas’ worldwide. The southwest Asian transformation, beginning ten millennia before the end of the Pleistocene period, was the earliest, and it has been under the most intense investigation over the longest time. It has been the field of research where technical and scientific advances have been pioneered, and it has become the paradigm for the process.
I deliberately avoid Childe’s term ‘Neolithic revolution’ and the word ‘revolution’, which some people misunderstand as implying that it happened suddenly, and other people find suspect and politically provocative, largely because of Gordon Childe’s engagement with Marxist historical materialism (and socialist politics). I also prefer the term ‘southwest Asia’ rather than the traditional ‘Near East’. The term the Near East has dropped out of usage, submerged in modern political and journalistic parlance by the Middle East, and the Middle East is loosely applied to great areas of Asia. Chapter 1 starts off by defining southwest Asia as a sub-continental region, within which the transformation began and developed. One antique geographical term is essential, however: I continue to refer to the lands on the eastern littoral of the Mediterranean as the Levant, a word that originally referred to the land of the rising sun (when seen from a European or Mediterranean perspective). Within our subject, the Levant (Israel, the Palestinian territories, Jordan, Lebanon, western Syria, and the adjacent part of southeast Turkey) frequently forms a coherent cultural region, and I know no other simple way of labelling that part of southwest Asia.

This book is not simply a statement of the present state of research, although I hope that it tells an up-to-date story. And I do not propose to take the reader through a lengthy discussion of the theoretical debates. The first two parts of the book present a summary of information, the first setting the geographical and biological scenario, the second showing what the archaeology looks like, what it tells us, what the problems have been, and what important discoveries have been made along the way. It is an inconvenient fact that the transformation with which this book is concerned did not happen neatly within the chronological boundaries of the Neolithic period (from 9600 to 6000 BCE). The beginnings of the process are first observed around 23,000 years ago, and there are important developments documented in the archaeology of the final part of the Palaeolithic period, which in southwest Asia has been labelled the Epipalaeolithic. The transformation is better labelled the Epipalaeolithic–Neolithic transformation, therefore; that is such an uncomfortable mouthful that I have generally abbreviated it as the ENT.

The third part of the book presents a new way of understanding this transformation, and a way seeing it as of pivotal importance in human history. One of the features of prehistoric archaeology all around the world has been the expansion of the range of scientific disciplines that have been brought to bear on archaeological questions. Archaeologists have always been borrowers and collaborators, and in the research on the Neolithic, they have devised new hybrid sub-disciplines, such as archaeo-botany and archaeo-zoology (the study of the plant and animal remains from archaeological sites). The accidents of my own career have led me in the particular direction of cultural evolutionary theory which, until recently, had been developing without reference to the archaeology of prehistory. The bundle of disciplines within the field of cultural evolutionary theory are now finding that archaeology can offer hard (that is, cultural material) evidence in support of, or contradicting, theories. Archaeology is also useful for its ability to fix things in an absolute time-scale. As well as helping cultural evolutionary scientists, archaeology
can exemplify cultural evolution in process and produce new kinds of explanation of the archaeological record.

The last section of the book sets the period at a pivotal point within the multi-million year long term of human cultural history, setting the transformation within the context of contemporary cultural evolutionary theory. A great deal of speculative and imaginative stuff has been written in recent years, purporting to elaborate on the religious beliefs and practices of Neolithic communities in southwest Asia (just as much has been written over the last hundred years about the religious beliefs that supposedly underpin Neolithic monuments like Stonehenge in southern England). Authors are making reputations – and, presumably, a living – writing, for example, about the Gods and Temples of the extraordinary archaeological site of Gobekli Tepe in southeast Turkey. Having become involved in the arguments, I have interposed a chapter in the final section of the book which seeks to locate the place of the Neolithic within the emerging studies of the cultural evolution of religion.

The book ends with a final chapter that sets out to reverse the perspective with which we have been considering the ENT, the Epipalaeolithic–Neolithic transformation. There is good reason for us to know about the beginnings of the radically new way of life that first emerged around 12,000 years ago; I believe that it represents the initiation of the Anthropocene period. The Anthropocene as a geological period was proposed by climate scientists, biologists, and geologists who had become alarmed by the clear signs of the accelerating impact of human activities on the concentrations of carbon dioxide in the atmosphere, the acceleration in the warming of global temperatures, rising sea levels, and accelerating biodiversity loss (Crutzen & Stoermer 2000). The Anthropocene was the title of a new, ‘human-dominated, geological epoch’ (Crutzen 2002: 23). I argue in that final chapter that the conditions at the root of the Anthropocene are to be identified in the way that the Neolithic way of life depended on and promoted accelerated population growth, expanding the capacity for cultural innovation, and requiring the continual expansion of the exploitation of Earth’s natural resources of all kinds. The Epipalaeolithic–Neolithic transformation is important for us today, because we still depend on the cultural conditions and that were initiated then, and we need to change those characteristics that have been ingrained over more than 10,000 years.

From the start, archaeological research on the ENT, the Epipalaeolithic–Neolithic transformation, has been an international field: there are archaeologists from many countries of the world for whom some aspect of this subject has been the driver of their research. But field research in the twentieth and twenty-first centuries has not moved forward in a simple, straight line. Geo-political events, revolutions, conflicts, and wars have abruptly ended fieldwork projects in first this country and then in that. Those conflicts have also prevented would-be researchers from working where they would most like to direct their investigations. There have been sudden switches of the regional focus of interest, easily explained by the effects of regional politics on the geo-political stage from the 1950s onwards. In consequence, archaeological research in some regions within southwest Asia, the
southern Levant in particular, plays a starring role, while other key regions have been underexplored and are scarcely mentioned here.

Since 1970, some of the most interesting and unexpected discoveries have been made in areas that had always been big blanks on the archaeological map. The construction of massive dams on the major rivers of the region, first the Euphrates in Syria, then upstream in Turkey, and then on the Tigris and its tributaries both in north Iraq and southeast Turkey, has meant the drowning and destruction of many ancient archaeological sites. The archaeological and cultural heritage offices of the governments of those countries called for international help to locate sites in the areas behind planned dams and salvage as much archaeological information as possible before enormous areas behind the dams were drowned. Many archaeologists, myself included, have been drawn to conduct their field research by means of salvage excavations; the sites have chosen the archaeologists, rather than the archaeologists have chosen where to work. For different and changing reasons, the course of primary research on the ENT in southwest Asia has been anything but a thoughtfully planned straight line. While we have an uneven database, there is now an extraordinary amount of information; and I hope to show that it makes an extraordinary amount of sense.

Archaeological Terms for Chronological Periods

Prehistory is like history in that it is necessary to get things into chronological order in order to be able to perceive the historical process. Unlike historians, who can name periods after kings, pharaohs, or dynasties, prehistoric archaeologists had to invent labels for their chronological periods, preferably scientific-sounding technical terms. As they have acquired more information that enables them to be more precise, they have had to refine (and complicate) the existing terms. We end up today with a load of chronological jargon that deserves a little explanation. At the end of this section is a (simplified) table of the chronological periods and their approximate dates, as used in this book.

Since the nineteenth century, archaeologists have been spending a great deal of effort identifying and dating the material that they have found. The naming of prehistoric periods followed the example of the early geologists. Thus, the oldest period, the Old Stone Age, the Palaeolithic, coincided with the Pleistocene; and the New Stone Age, the Neolithic, followed in the geological Holocene. The time-span of this book encompasses the last thirteen millennia of the Palaeolithic period (which conventionally ends with the end of the geological Pleistocene around 11,600 years ago, or 9600 BCE), and the Neolithic. Archaeologists working in southwest Asia have adopted the label Epipalaeolithic for those last millennia of the Palaeolithic. They have also devised different labels for the sub-periods that they have been able to define, largely on the basis of the chipped stone tools and the way that they were made at different times and in different regions. For the purposes of this book, I have simplified the chronology of the Epipalaeolithic into two phases, a long early period and a much shorter late Epipalaeolithic, and three phases within the Neolithic. The date-ranges are based on calibrated radiocarbon dates.
The process of Becoming Neolithic requires us to start the account with the developments within the Epipalaeolithic that lead into the Neolithic. So, it is referred to throughout as the Epipalaeolithic–Neolithic transformation, which, for the convenience and comfort of readers, is collapsed into the tag the ENT.

When in the 1950s Kathleen Kenyon began working her way down through the enormously deep stratified remains of Tell es-Sultan, ancient Jericho, she found that there were several metres of deposit that were clearly Neolithic, but which lacked pottery. The Neolithic had been conventionally defined in Britain and Europe in terms of the addition of pottery and other craft-made things to the simpler chipped stone repertoire of earlier times. Kenyon needed a new label for those earliest strata that were in every way Neolithic except for the lack of pottery. She called them Pre-Pottery Neolithic, and, since the strata were clearly divided into quite different earlier and later cultural traditions, she labelled them Pre-Pottery Neolithic-A and Pre-Pottery Neolithic-B. When similar cultural remains were identified at other sites in the southern Levant, they were identified as PPNA or PPNB. Since those labels have come to be used as tags for chronological periods, but also for identifying cultural groups, it can be confusing. So here the terms PPNA and PPNB are avoided, and the chronological sub-periods are called the earlier and the later Pre-Pottery Neolithic. Those periods are followed by a Late (or Pottery) Neolithic, which does have pottery. The table below shows the period names that will be used here, and the approximate dating in years BC (or Before the Common Era).

<table>
<thead>
<tr>
<th>Period</th>
<th>Date-range</th>
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<tbody>
<tr>
<td>Early Epipalaeolithic</td>
<td>21,000–13,000 BCE</td>
</tr>
<tr>
<td>Late Epipalaeolithic</td>
<td>13,000–9600 BCE</td>
</tr>
<tr>
<td>Early Pre-Pottery Neolithic</td>
<td>9600–8800 BCE</td>
</tr>
<tr>
<td>Later Pre-Pottery Neolithic</td>
<td>8800–6900 BCE</td>
</tr>
<tr>
<td>Late Neolithic</td>
<td>6900–5500 BCE</td>
</tr>
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References


1 A Concentration of Opportunity

In this chapter, we need to set the stage and sketch the scenario. Southwest Asia is a region on a sub-continental scale, within which there is a great variety of landscape and climate. One of the purposes of this chapter is to define where within the wider map of Southwest Asia the Epipalaeolithic-Neolithic transformation was generated. The chapter begins, therefore, with a simplified sketch of the physical map of the region complemented by an outline of the present-day climatic variation across the region. For the period with which we are concerned, people’s daily lives, their reproduction, and long-term survival or prosperity were very much concerned with the food resources offered by the particular environment within which they lived. Large parts of southwest Asia were endowed with a great diversity of plant and animal species that provided a rich support for mobile foraging societies of the Palaeolithic and Epipalaeolithic periods. Among those plant species were the wild cereals and legumes such as lentils, peas, beans, and chickpeas; these nutritious and storable seeds were valued by the mobile foragers of the Upper Palaeolithic and Epipalaeolithic and began to be cultivated, leading to the domesticated wheats, barley, and legumes of the Neolithic. Southwest Asia also boasted an extraordinary range of animal species for hunters, large, medium, and small mammals; birds; reptiles; and fish, among them were the wild sheep, goat, pig, and cattle that were the first to be domesticated.

This set of relations between population, resources, and environment was a complex and dynamic relationship on two fronts. On the one hand, human populations, like other animal populations, tend to over-reproduce in ways that seek to ensure the reproduction of the population despite loss through infant mortality, disease, and accidents. Scientists can estimate the rate at which a human population would tend to increase if those factors were removed; if we could estimate the actual population density of a region, it might be possible to see how it changes over time. On the other hand, across the period with which we are concerned, there were great climatic changes. Our period begins at the time of the Last Glacial Maximum of the Pleistocene, and it ends several millennia into the Holocene, when climate similar to that of today had become established. Between the Last Glacial Maximum and the establishment of the Holocene climate was not a smooth improvement as temperatures recovered and amounts of annual rainfall (or snowfall) changed. As climate changed, the basic subsistence resources – the plants and
animals from which people could support life – would have changed. This chapter sets out to explore this dynamic relationship between the natural tendency for a human population to grow, the resources that they could obtain from the environment to support life, and the changes in that environment occasioned by climate change.

The Physique, Climate, and Environment

Southwest Asia between 24,000 and 8000 years ago has the same recognisable outline and shape as today’s maps but was a series of very different landscapes. We can dispose of the frontiers of the contemporary states, which were drawn and re-drawn in the twentieth century. We can forget about the present-day centres of population, as well as those of historic and ancient historic times. Indeed, we have to imagine a landscape stripped of modern population levels. We should start with a map of the physical shape of the region (Figure 1.1). For readers who have not travelled in the region or thought about its physical geography, the starting point is to recognise that we are looking at a large region at the east end of the Mediterranean that is sub-continental in scale. In total, it is somewhat less than the area of Europe. Both physically and climatically, it is a very varied region.

There are major mountain ranges. Starting from Turkey in the west, there are mountain ranges along the north and south sides of Anatolia, the Asian landmass of Turkey. Between the Black Sea mountains in the north and the Taurus mountains in the south, the centre of Anatolia is a plateau with a base altitude of about 1000 m (3300 ft). The term plateau normally conjures to mind an extensive, flat upland

Figure 1.1 Physical map of southwest Asia. (Courtesy of ASPRO, MOM, Université Lyon II)
A Concentration of Opportunity

area, but the Anatolian plateau is often hilly and even mountainous. The Konya plain, where there are some important Neolithic settlements, is at the very centre of Anatolia and is extremely flat; it is the silted up floor of a former, shallow lake that dried out before the end of the Pleistocene period. The eastern half of Anatolia becomes more and more mountainous and rugged. The Taurus chain snakes through the southeast of Anatolia, with many peaks reaching heights in excess of 3000 m, only a little less than the tallest of the Alps in Europe or the Rocky Mountains in North America. The eastern end of the Taurus mountain chain runs north of the modern frontier between Turkey and Syria, swinging southeast to become the Zagros mountains, a chain of more than 1600 km (1000 miles) whose highest peaks top 4400 m (almost 15,000 ft). The frontier between modern Iraq and Iran runs down the Zagros chain. Beyond the Zagros mountains, most of inner Iran is another high, semi-arid plateau. Behind the Mediterranean coast of Syria, Lebanon, and Israel there are lesser mountains and hills running north-south. Those mountains and hill ranges form two main ridges, in Lebanon called the Lebanon and anti-Lebanon mountains. Further south, the divide between the Mediterranean hill country of Israel and the Jordanian highlands is a northward extension of the African Great Rift Valley and the Gulf of Aqaba. Parts of that rift around the Dead Sea are well below sea level. The rift continues north as the Jordan valley. Near its northern end is the Sea of Galilee (also known as Lake Kinneret). Further north again, overshadowed by Mount Hermon and the Golan Heights.

Climate

The weather systems tend to travel from west to east across the Eastern Mediterranean. In winter, cold weather systems from inner Eurasia tend to press southwards, affecting winter temperatures and snowfall, especially in Turkey and Iran. The Aegean coastlands of Anatolia receive a reasonable amount of rainfall, but the central Anatolian plateau tends to be dry, relying on winter rain and snow. The Mediterranean coastland of Syria, Lebanon, and Israel has enough mountain and hill country to ensure fair amounts of annual rainfall from the incoming weather systems, especially in winter. Amounts of annual rainfall reduce rapidly as one moves east across and beyond the Jordan valley or from western to eastern Syria. Much of Jordan, southern Israel, and eastern Syria is technically semi-arid or arid. These semi-arid and arid regions are the northern end of the deserts that occupy much of the Arabian Peninsula. The eastward-moving weather systems have enough moisture left to deliver moderate amounts when they encounter the Zagros mountains and their piedmont hills; but inner Iran quickly becomes arid.

In general, summers are hot and dry, and rain (and snow) is mostly confined to the winter months. In large parts of our region, amounts of rainfall are on average just about sufficient to support farming, but climate records (and historical accounts) show considerable variation from one year to the next, and there have been bad times when rainfall was below average for several years together (as is happening in parts of the region, as global warming is reducing rainfall over recent decades).
Fed by the melting snows of the mountains of eastern Turkey, the great rivers Euphrates and Tigris with their substantial tributaries gather massive flows that pour out of the Taurus mountains into the piedmont and then the plains of north Mesopotamia (another antique term for the lands between the rivers). However, after they have left their narrow valleys in the mountains, these two great rivers have cut down channels with very narrow floodplains as they flow through Syria, for the Euphrates, and northern Iraq, for the Tigris; they do nothing to water the land through which they flow until they come close together in southern Iraq, the heartland of ancient Babylonia. South of modern Baghdad the land between the two rivers is alluvium. All the way to the present head of the Gulf, south of modern Basra, the alluvium is a massive delta region that is squeezed between the Zagros mountains to the east and the limestone shield of the great Syrian desert to the west. In ancient southern Mesopotamia, there was plenty of water and vast amounts of alluvium, but the waters needed to be distributed and spread by irrigation canals and channels. The waters of the Tigris and the Euphrates, draining from limestone mountain ranges, carry dissolved salts that can easily turn areas of over-watered alluvium into saline desert.

**Defining the Hilly Flanks of the Fertile Crescent**

Field research on the origins of agriculture began in 1948. The American archaeologist Robert Braidwood had become interested in the subject when he was a student at the University of Chicago in the 1930s. He was excited by the ideas of Gordon Childe, the Australian professor of prehistoric archaeology at the University of Edinburgh, who had proposed the idea of a Neolithic or agricultural revolution. Childe, sitting at his desk in Edinburgh, hypothesised that farming in the ancient Near East began in what was called the Fertile Crescent. The idea of the Fertile Crescent was originated by an early twentieth-century ancient historian and archaeologist, James Henry Breasted (1916), who noted that the great civilisations of the ancient world had arisen in a great arc stretching from the Nile in Egypt, up the Mediterranean coastlands, homeland of the Biblical kingdoms, across northern Mesopotamia south of the Taurus, homeland of the Assyrian empire, and southeast through southern Mesopotamia, where first Sumer and Akkad had arisen, before Babylon became the centre of power.

At a time when there was very little palaeo-climate data and no absolute dating methods, Childe had adopted the then current hypothesis that the wetter climate of the Pleistocene for southwest Asia had given way to a much drier regime with the coming of the Holocene period. He therefore reasoned that hunter-gatherers had adapted to these changed climatic times by concentrating around the Fertile Crescent. He had read of the work of an extraordinary American mining engineer and geologist, who in later life had explored in central Asia, and had found and excavated mounded prehistoric sites located in oasis areas where streams from the Kopet-Dag mountains in eastern Turkmenistan run out on the arid steppe (Pumppelly 1908). Childe took the oasis model, substituting the Nile valley and delta, the green Levant and the Euphrates and Tigris valleys for the oases. There,
without any archaeological or environmental evidence, he proposed that people
found themselves confined by the increasingly arid conditions, spurred to turn to
the cultivation of crops of cereals and the herding of the animals that, like the hu-
mans, were concentrating in the Fertile Crescent. It was a remarkably resourceful
hypothesis.

When Robert Braidwood planned to test and refine Childe’s Neolithic revolution
theory in the field, he took a geologist colleague, H. E. Wright, with him to look
for geomorphological information that might bear on climate and environmental
change. Later the team was joined by the Dutch palaeo-botanist Willi van Zeist.
Their task was to identify any evidence of late glacial and early Holocene climate
change. When Braidwood moved his fieldwork from the piedmont of northeast
Iraq to the intermontane valleys of the Zagros in western Iran, his team rapidly
found Lake Zeribar and obtained a core from the lake-bed that produced good pol-
len evidence of the environmental conditions over the period of their interest. Not
surprisingly perhaps, they found that the final Pleistocene in the high valleys of the
Zagros was a cold treeless steppe. Kinder conditions returned only after the begin-
nning of the Holocene period. It appeared therefore that in that region agriculture
had begun in the Neolithic, when warmer, more moist conditions had replaced the
arid cold of the final Pleistocene: this result turned the climatic schema of Childe’s
‘oasis theory’ upside-down, but it did not resolve the question that continued to
bug Braidwood’s research, namely what had triggered the adoption of cultivation
of crops and animal herding. And it was clearly unsatisfactory to reconstruct the
effects of late Pleistocene to early Holocene climate across the varied physique and
environments of Southwest Asia from a single pollen core from a high-altitude lake
in a valley of the Zagros mountains.

Braidwood also wanted to identify the environmental zone within which he
could reasonably expect to find archaeological sites that would document the tran-
sition from hunting and gathering to farming. The plants that were cultivated and
the animals herded by farmers in Southwest Asia were wheat and barley, legumes
such as peas, beans, lentils, and chickpeas, and sheep and goat, and, to a lesser
extent, cattle and pig. When Braidwood asked where the wild ancestors of these
domesticated species would have been found in the pristine environment of South-
west Asia at the end of the Pleistocene period, the answer for all of those wild plant
species was that they were annually that were still to be found in the moderately
watered hills of the Levant, around the arc of piedmont south of the Taurus moun-
tains, and down the piedmont and intermontane valleys of the Zagros. Wild cattle
and wild pig were probably to be found more widely, but wild sheep and goat were
definitely animals of the hills and, in the case of the goat, of the mountains. The
physical map helped, but the rainfall map (Figure 1.2) made it clear. The palest blue
areas in this map are classified as arid, and the next level of pale blue, with less
than 200 mm of annual rainfall, is semi-arid. The wild cereals and other grasses,
the legumes, the pistachio and almost that could provide nuts, and the landscape
that would provide the grazing for wild sheep and goat, lie in that middle blue zone,
which is the region that Braidwood identified as ‘the hilly flanks of the Fertile Cres-
cent’, where there is more than 200 mm of annual rainfall.
The climate of Southwest Asia is diverse, as one would expect for such a large and varied region. Summers are hot or very hot, and mostly dry; winters are cool, except in the mountains and plateaux, where they can be extremely cold. As well as enjoying moderate rainfall, Cyprus and the east Mediterranean coastlands benefit from the moderating effect of the sea. The defining characteristic of the climate is seasonality. Plants and animals need to be able to cope with long, hot and dry summers, when the rate of water evaporation far exceeds the small amounts of rainfall. In Braidwood’s ‘hilly flanks’ zone the natural environment at the end of the Pleistocene and the beginning of the Holocene period showed that the grasses included wild barley, two species of wild wheat, as well as wild legumes such as lentils, beans, peas, vetches, and chickpeas. These were also the reconstructed habitats of wild sheep, as well as wild goat, gazelle, fallow, and red deer, a now extinct species of wild ass, wild cattle, and pig. For hunter-gatherers the hilly flanks zone offered a remarkable concentration of plant and animal resources. For the first cultivators, the wild cereals and legumes were the focus of their attention; and the sheep, goat, cattle and pig were species that were found throughout most of the hilly flanks and were capable of breeding under human control; they were in effect pre-adapted for domestication.