by the same author

EXCAVATIONS AT SALIAGOS NEAR ANTIPAROS
(with J. D. Evans)

THE EMERGENCE OF CIVILIZATION:
THE CYCLADES AND THE AEGEAN
IN THE THIRD MILLENNIUM B.C.

THE EXPLANATION OF CULTURE CHANGE:
MODELS IN PREHISTORY

COLIN RENFREW

BEFORE CIVILIZATION

The Radiocarbon Revolution and Prehistoric Europe

JONATHAN CAPE
THIRTY BEDFORD SQUARE LONDON

2

The Problem of Dating

How old is old? The question is certainly not a new one; indeed, it was already being asked by the ancient Egyptians. Well before 2000 B.C. they were taking great care to list their kings, and the duration of the reign of each, so that an accurate chronology could be maintained. So too were the Chinese, the ancient Assyrians, and many early civilizations. This same desire for a calendar, for some way of reckoning and making intelligible the mysterious and intangible passage of time, is reflected in many human societies. The Maya of Mexico, for instance, went to considerable pains to bring the chaos of the world into rational order by means of a meticulously accurate calendar (cf. Fig. 54). And there is no doubt now that our own Stonehenge is a solar observatory and calendrical device some 4,000 years old.

The archaeologist faces much the same problem of measuring the passage of time, but his task is made more difficult since the desired chronology must order past events and not serve simply as a calendar for the present. Dating is crucial to archaeology. Without a reliable chronology the past is chaotic: there is no way of relating or ordering people, events and cultures into the coherent narrative which the prehistorian seeks to construct.

Until a century ago, before the development of scientific dating methods, there seemed no way of piercing the obscurity of the unimagined centuries before the beginning of written history. Simple stone tools and other relics were frequently found, dimly hinting at long periods of human life in the unrecorded past, but while no means was available for measuring those remote centuries there could be no serious investigation of prehistory, and indeed no such subject of study. It is significant that the term 'prehistory' itself was not used until 1851. The Danish archaeologist Rasmus Nyerup, writing in 1806, was not being unduly pessimistic when he said: 'Everything which has come down to us from heathendom is

wrapped in a thick fog; it belongs to a space of time which we cannot measure. We know it is older than Christendom, but whether by a couple of years or a couple of centuries, or even by more than a millennium we can do no more than guess.'[3]

The European solution to this yawning void in human understanding was, until the nineteenth century, just the same as that of most earlier cultures: to rely on myth. The ancient Egyptians, the Maya, the Classical Greeks, all had their own version of the beginning of things, and the Bible likewise supplied a circumstantial account of the 'first morning of the first day'. The long genealogies of the sons of Adam, given in the Book of Genesis, permitted – when taken literally in a fundamentalist way – a reckoning in terms of generations back from the time of Moses to the Creation. The seventeenth century Archbishop Ussher set the date of the Creation at 4004 B.C., a later scholar fixing it with remarkable precision on October 23rd of that year, at nine o'clock in the morning. This convenient fixed point, printed in the margin of the Authorized Version of the Bible (Fig. 1), gave scholars an inflexible boundary for early human activity, a starting point for prehistory and the world.

Before Chriſt 4004. GENESIS. *Before* Chriſt 4004.

16 And God made two great lights; the greater light to rule the day, and the leſſer light to rule the night: *he made* the ſtars alſo.
17 And God ſet them in the firmament of the heaven, to give light upon the earth;
18 And to rule over the day, and over the night, and to divide the light from the darkneſs: and God ſaw that *it was* good.
19 And the evening and the morning were the earth, and ſubdue it: and have dominion over the fiſh of the ſea, and over the fowl of the air, and over every living thing that moveth upon the earth.
29 ¶ And God ſaid, Behold, I have given you every herb bearing ſeed, which *is* upon the face of all the earth, and every tree, in the which *is* the fruit of a tree yielding ſeed; to you it ſhall be for meat.

FIG. 1. Marginal note in the Authorized Version of the Bible setting the Creation at 4004 B.C., as calculated by Archbishop Ussher in the seventeenth century.

Nor was this belief restricted to the credulous or the excessively devout. No less a thinker than Sir Isaac Newton accepted it implicitly, and in his detailed study of the whole question of dating, *The Chronology of Antient Kingdoms Amended*, took the ancient Egyptians severely to task, since they had set the origins of their monarchy before 5000 B.C., and 'anciently boasted of a very great Empire under their Kings ... reaching eastward to the Indies, and westward to the Atlantic Ocean; and out of vanity have

made this monarchy some thousands of years older than the world'.[4] This criticism was meant literally: for an educated man in the seventeenth or even the eighteenth century, any suggestion that the human past extended back further than 6,000 years was a vain and foolish speculation.

It took two great intellectual advances before history could be set free from this very restrictive model of the past. Both are now so fundamental to our thinking that it is hard to appreciate their daring a hundred years ago.

In the year 1859, two Englishmen, the geologist Joseph Prestwich and the antiquarian John Evans, made a historic journey. It resulted in the general recognition of a concept basic to the study of prehistory: the antiquity of man. For some years British antiquaries had been excavating in the caves of Devon, finding stone tools together with the bones of extinct animals. These finds seemed to imply that man had been active on earth long before 4004 B.C., and their significance was hotly disputed as reflecting adversely upon the literal truth of Holy Writ. At the same time, Boucher de Perthes, a customs official at Abbeville in north France, had been excavating in the gravels of the River Somme, and finding hand-axes (of what is today termed the old stone age, or palaeolithic period) associated with the remains of extinct animals. He argued for the very great antiquity of his finds, and Prestwich and Evans, who went across to France to see the discoveries, were persuaded by them. Prestwich read a paper to the Royal Society announcing the significance of the finds, and Evans, in a paper delivered to the Society of Antiquaries, said: 'This much appears to be established beyond doubt, that in a period of antiquity remote beyond any of which we have hitherto found traces, this portion of the globe was peopled by man.'[5] This idea was generally accepted, and the way was now open for research into the nature of this remote period and its chronology.

The second great intellectual advance making possible the study of prehistory was the theory of evolution. In the same year, 1859, as Prestwich and Evans announced their acceptance of the antiquity of man, Charles Darwin published his *Origin of Species*. For the first time the development of the living world was presented as a continuous process which could be studied and understood. Darwin did not at first stress the position of man in his evolutionary picture, although the implication was already there that man too developed as part of this same process. With

his *Descent of Man*, published in 1871, the theory was complete: a new model of human origins had been constructed which could replace the fundamentalist biblical one. Man was not a unique creation at the hand of God, but the product of a long evolutionary process; he evolved from the same humble marine ancestors as the rest of the animal kingdom. The study of prehistory now took its place among the other humanist disciplines as a valid approach to the understanding of man and his place in the world.

Towards systematic dating

A vast new perspective was opened up by these advances. A whole uncharted span of time during which man inhabited the earth, and yet left no written records, was revealed. The archaeologist was faced with the task of building up an account of the past on the basis of the monuments and the artifacts alone, without any kind of written narrative.

The recently developed science of geology offered a first approach. Geologists, in ordering their discoveries, already used the idea of stratigraphic succession, the principle that when successive layers or strata are observed in position, the underlying ones are the earliest. Using this principle, and the characteristic remains of extinct plants and animals within the strata – the type fossils – a succession of geological periods or epochs was established and gradually extended to cover the world as a whole. Archaeologists realized that the layers of deposit on archaeological sites could be studied in the same way, and that for each site a coherent sequence of occupation could be worked out in terms of the successive strata. The stratigraphic method remains today the essential basis for archaeological excavation. By allowing the successive layers, and the finds in them, to be set in chronological order, it provides the first necessity for effective dating: a sound sequence. But this is, of course, only a relative chronology: it establishes sequence, but not absolute date. Layer A can be shown to be older than Layer B, but this does not indicate the precise age or duration of either.

The second conceptual tool of the early archaeologists was the Three Age System, put forward by the Danish antiquary Christian Thomsen as early as 1819. It at once became the basic method by which museum curators and antiquaries set their collections in order. J. J. A. Worsaae,

Thomsen's successor as Keeper of Antiquities in the National Museum in Copenhagen, described it as 'the first clear ray ... shed across the universal prehistoric gloom of the North and the world in general'.[6] It proposed the division of the prehistoric past into three ages, of stone, bronze and iron. The stone age was later divided into an old (palaeolithic) and a new (neolithic) period, where chipped stone tools and polished stone axes respectively were the most characteristic finds. This theoretical subdivision, accomplished through the study and classification of museum collections, was demonstrated in practice by Worsaae. He showed stratigraphically that finds of bronze were indeed later than the period when stone alone was used. This simple system allowed archaeological finds anywhere in Europe to be placed in their approximate period, and despite all subsequent advances, and several criticisms, 'palaeolithic', 'neolithic', 'bronze age' and 'iron age' are still used today as convenient general terms.

Here again was a method highly effective in arranging finds in terms of a relative chronology. But it did not date them in years. This now became a central problem for European prehistory.

Geological methods of a different kind offered some hope of dating 'absolutely'. Firstly, it was possible to observe the present rate of deposition in the sediments at the bottom of lakes and rivers. Assuming that these rates had remained roughly constant, geologists could estimate how long the processes had been in operation in particular cases, and thus date the beginning of the formation of various deposits. This method was used in 1909 by the geologists Penck and Brückner. Using evidence from the Swiss lakes, they were able to calculate the length of the ice age as about 600,000 years. Sir Arthur Evans, whose excavations brought to light the Minoan civilization of Crete, employed the same principle in estimating the date of the first neolithic settlement at Knossos in Crete. He was able to calculate the rate of deposition of the strata which accumulated there as a result of human occupation during Minoan (bronze age) times, since the duration of the Minoan period was known through cross-dating with Egypt. Having obtained a figure of three feet per millennium, and assuming the same rate for neolithic times, Evans used the great depth of deposit to suggest a date between 12000 and 10000 B.C. for the first neolithic settlement. The weakness of the method, however, is the untested assumption that the rate of deposition has always been a constant one.

A more sensitive and ingenious technique was developed in Sweden in 1912 by the Baron de Geer. He studied the annual deposits of sediment, called 'varves', left by the spring meltwaters of glaciers. Extensive deposits of varves are found in Scandinavia, and by comparing them carefully de Geer was able to build up a succession of varves extending back in time to the end there of the last ice age, which can thus be set about 10,000 years ago. There were – and remain – problems in tying in the more recent varves with well-dated historical events, so as to give a modern fixed point from which the chronology could be extended earlier and earlier back in time. And of course varves are found only in areas on the fringe of glaciers or ice sheets. But the beauty of the method is that it gives a result directly in years, since varve deposition is an annual event. De Geer's work remains of real value today.

Another approach to absolute dating is a purely mathematical one: the calculation of the climatic effects on earth of small changes in its orbit round the sun. The Jugoslav astronomer M. Milankovitch developed, in the 1920s, the theory that the successive ice ages were the consequence of changes in the quantity of solar radiation reaching the earth as a result of orbital changes. He was able to calculate how and when these changes in orbit occurred, and hence reach an estimate for the duration of the ice age of around 600,000 years. But the validity of his reasoning in general is now widely called into question.

Before the development of dating techniques such as radiocarbon dating, based on radioactive isotopes, the so-called 'radioactive clocks', methods such as the three just described were the only ones available for setting absolute dates, in calendar years, for man's early occupation of the earth. But while these procedures were useful enough for the old stone age, they were really of very little use after its end around 8000 B.C. Not only were there few geological events at all after that date, but the accuracy of these methods was not good – and while you can give or take a thousand years or so when dealing with finds 100,000 years old, such an error becomes proportionately larger and more serious if they are only 4,000 or 5,000 years old.

Until the discovery of radiocarbon dating, therefore, there was really only one reliable way of dating events in European prehistory after the end of the last glaciation around 8000 B.C. – only one way, that is, to date the neolithic, bronze age and iron age periods. This was by the early

records of the great civilizations, which extended in some cases as far back as 3000 B.C. The records of the Greeks did not go back before the first millennium B.C., but in Mesopotamia the Assyrians and their predecessors the Sumerians left records of kings and dynasties extending back well before 2000 B.C. The Egyptian king lists go back to the First Dynasty of Egypt, a little before 3000 B.C. Before that, there were no written records anywhere.

Here, then, was one fixed point in the uncertain world of the prehistoric past. To date prehistoric Europe it was necessary to relate it, and its culture succession, to the historical chronologies of Egypt and the Near East. This was just what Sir Isaac Newton had tried to do (when he berated the ancient Egyptians for their 'vanity'). And without the mental straitjacket imposed by the biblical dating, scholars were now free to interpret the evidence as they saw fit. In 1878 Jacob Worsaae published a chronological table in a book which represents perhaps the first systematic effort to establish the chronology of prehistoric Europe on a logical basis. He set the neolithic period of northern Europe from 2000 to 1000 B.C., and the early bronze age from 1000 to 500 B.C., assuming that the cultures of the Mediterranean were more highly developed, so that the dates for Europe could be set a little later. Subsequent chronologies put these dates a good deal earlier, but already the problem was being tackled in a methodical way.

Until the advent of radiocarbon dating, most scholars followed much the same procedure. The calendars of Egypt and the Near East were gradually understood more completely, and the links between Europe and the Near East more intensively studied. It is to these two problems that we must now turn.

The chronology of Egypt

The chronology for early Egypt depends entirely upon the records left by the Egyptians and written in their own language and script. Not until the decipherment of this script in the nineteenth century was any real progress possible in dating Egyptian civilization.

Several Egyptian historical documents have been preserved: the most useful are the royal annals, which name the kings of Egypt in order of succession and record the length of their reigns. Groups of kings are

collected together in 'Dynasties', 31 in number, which cover the entire Egyptian kingdom from its early beginnings to the time of the conquest of Alexander the Great in 332 B.C. The Palermo Stone is one of these documents that allow the Egyptian royal succession to be reconstructed. It dates from the time of the Fifth Dynasty of the Egyptian kings (now set around 2400 B.C.). The Turin Royal Canon is a further long inscription on papyrus, now in fragmentary condition, which dates from about 1300 B.C. When complete, it gave a list of kings with the lengths of their individual reigns. By good fortune the fragment giving the total for the period from the beginning of the First Dynasty to the end of the Eighth has been preserved, giving a total of 955 years for this time span, a crucial figure for the modern reconstruction.

The inscriptions which record astronomical events are of central importance for the modern interpretation. The Egyptians used a calendar of 365 days, and in the ideal year, the first day of the year coincided with the first day on which the dog-star Sothis (known today as Sirius) could be seen on the eastern horizon, just before the rising of the sun. This is known as a 'heliacal rising' of Sirius. Dr I. E. S. Edwards has explained well how these early astronomical records can be used today to give a highly accurate date, in terms of our own calendar, in years B.C. to the events they record.

> Since the dynastic Egyptians never introduced a leap year into their civil calendar, New Year's Day advanced by one whole day in relation to the natural year in every period of four years. As a result of this displacement, New Year's Day and the day on which Sothis rose heliacally actually coincided for no more than four years in every period of approximately 1,460 years (i.e. 365 x 4), the so-called Sothic cycle.
>
> By a fortunate chance the Roman writer Censorinus tells us that New Year's Day on the Egyptian civil calendar and the day on which Sothis rose heliacally coincided in A.D. 139, and by a simple arithmetical calculation it follows that this coincidence occurred previously in approximately 1322, 2782 and 4242 B.C. or more precisely 1314, 2770 and 4228 B.C. These are the first years of the three Sothic cycles which concern us.[7]

Several inscriptions record astronomical events. The earliest and most

important of these refers to the seventh year of the reign of King Sesostris III, of the Twelfth Dynasty. In this year a heliacal rising of the star Sothis was recorded on the sixteenth day of the eighth month of the civil calendar. This gives us exactly the information needed to calculate the time taken to displace the calendar from the original coincidence of New Year's Day with the heliacal rising of Sothis at the beginning of the appropriate Sothic cycle in 2770 B.C. The date in question corresponds to 1872 B.C., so that the reign of Sesostris III is now set with some confidence from 1878 B.C. to 1843 B.C.

This is, in fact, the earliest fixed calendrical date in human history. And while some uncertainties of detail makes possible an error of a decade or so, it is a date which Egyptologists accept with considerable confidence. Using the information from the annals, the end of the Eighth Dynasty, with which the so-called 'Old Kingdom' of Egypt terminated, may be set at 2160 B.C. As we have seen, the Turin Royal Canon reports a total duration for the Old Kingdom of 955 years. Some scholars think this may be inaccurate by a couple of centuries or so, but if the figure is accepted, the beginning of the Old Kingdom of Egypt – the founding of Egypt's first historic dynasty – can be set close to 3100 B.C.

King lists and other records are also preserved from Mesopotamia, but unfortunately many of them are later copies of the original texts. The Mesopotamian chronology is less reliable than the Egyptian, and it does not go back so far.

This date of 3100 B.C. thus sets the limit of recorded history. No earlier dates can be obtained by calendrical means, and indeed the dates cannot be regarded as reliable before 2000 B.C. There is thus a theoretical limit beyond which the traditional chronology for Europe, based, as it was, ultimately on Egypt, simply could not go. Any dates before 3000 B.C. could be little more than guesswork, however persuasive the arguments and the evidence after that period.

Cross-dating

Once the chronology of ancient Egypt has been established, it can be used to date any neighbouring lands which had direct trading links with Egypt. The method is known as 'cross-dating', and it depends on the recognition, in the region to be dated, of actual imports from the land

whose chronology we know – in this case, Egypt. It was first employed by the great Egyptologist Sir Flinders Petrie, who managed to date the bronze age of Crete and Greece in this way.

He recognized as 'Aegean' – that is to say, as originating in Greece or Crete, in the Aegean Sea – some of the pottery found in his excavations at Kahun in Egypt, in contexts which could be dated around 1900 B.C. Then in 1891, he visited the important prehistoric Aegean site of Mycenae, on the Greek mainland, to follow up this clue. There he recognized actual Egyptian imports which could be dated around 1500 B.C. Petrie had thus established two synchronisms, both useful for dating prehistoric Greece. He had identified Aegean (actually Cretan) pottery in a datable Egyptian context, as well as datable Egyptian material in Greece in association with Aegean finds. The Cretan pottery must obviously have been manufactured at a date at least as early as that of its findspot in Egypt. Equally the datable Egyptian finds in Greece could not have got there, or been buried with Aegean material, before their date of manufacture in Egypt. In this way a narrow, well-defined time range could be set up for the Aegean material, using the known dates of the Egyptian material.

By this double link, or cross-dating, Petrie was able to put the dating of the Mycenaean civilization of prehistoric Greece on a sure basis for the first time, linking it to the chronology for Egypt. This was a major advance for Europe, and Petrie's achievement still stands in its essentials to this day.

The earliest Egyptian finds which have any relevance for Europe are some thirty or so Old Kingdom and Predynastic stone vases which have been found in Crete. They give the only possibility of establishing a calendrical chronology for Early Minoan Crete in the third millennium B.C. Different scholars have unfortunately interpreted the evidence very differently: Sir Arthur Evans began the Early Minoan period in 3400 B.C., while Sinclair Hood has set its beginning as late as 2400 B.C. After a comprehensive survey of all the evidence, Peter Warren has suggested a date of 3000 B.C. for the beginning of the Early Minoan period, and this is very probably right to within a century or two. There is more agreement about the dating of the first palaces of Crete at the beginning of the Middle Minoan period around 2100 B.C.

These dates, of around 3000 B.C. for the beginning of the Early Minoan culture, and around 2100 B.C. for its end, are based on actual and undoubted

imports, and however few these may be, do give a foundation for Aegean chronology. By similar although less certain reasoning, the beginning of the First City at the famous early bronze age site of Troy has been set by Carl Blegen around 3000 B.C. This could be in error by a couple of centuries or more, but the various Aegean imports at Troy suggest that it is fairly sound. The method of cross-dating thus allows the Aegean to be brought reliably, although perhaps not very precisely, into the reach of the Egyptian calendrical chronology.

The idea of diffusion

These dates for early Crete and mainland Greece are based on finds of actual Aegean exports to Egypt, and Egyptian ones to the Aegean. They are therefore reliable: they do not depend on any assumptions about contacts or influences, since the contacts are undoubted. Ideally, if Egyptian exports were found in the rest of Europe, this cross-dating method could have been used for the chronology of Europe as a whole. Or indeed if actual objects of bronze age Cretan or Greek manufacture were widely found in Europe, a network of reliable links could be built up, ultimately stretching back to the historically established chronology of Egypt.

Unfortunately Egyptian exports did not go beyond the east Mediterranean and the Aegean until Classical times, nor are there sufficient finds in Europe of Aegean origin to make such cross-dating possible. If prehistoric Europe was to be dated at all, it was necessary instead to make an important assumption, which at the same time seemed to explain very satisfactorily many of the apparent similarities between the monuments and finds of Europe and those of the early civilizations of the east Mediterranean. Although its crucial significance was not widely appreciated at the time, it conditioned most of what was written about European prehistory for nearly a century.

This single and simple assumption was that the chief advances in the prehistory of Europe were the result of influences from the Near East, brought either by migrating peoples or by the peaceful process known as diffusion where contact between adjacent areas is accompanied by the transmission of new ideas and discoveries. The past was seen in terms of groups of people, of tribes and ethnic units, much as the anthropologists

had come to speak of living groups in different parts of the world – the Kwakiutl of north-west America, for instance, or the Bushmen of Africa. Successive generations of archaeologists, influenced by this approach, came to think of their prehistoric cultures – defined, of course, by the tools and artifacts found – as distinct ethnic groups, and these became the focus of study. As the leading scholar Gordon Childe wrote of prehistoric archaeology in 1957: 'It aimed at distilling from archaeological remains a preliterate substitute for the conventional politico-military history, with cultures instead of statesmen as actors, and migrations in place of battles.'[8] Prehistory was seen as a kind of global chessboard, with the various cultures as pieces shifting from square to square. The task of the archaeologist was simply to plot the moves – or, in other words, trace the path of the 'influence' as new ideas were diffused.

Nobody could prove this assumption of the diffusion of culture – without an independent dating system that would hardly have been possible. Precisely because the assumption was itself necessary to establish the dating, any demonstration of such diffusion was inescapably based upon a circular argument.

Perhaps the first serious consideration of the problem of diffusion, as it concerns European prehistory, was a treatise by James Fergusson, *Rude Stone Monuments in all Countries: their Age and Uses*, in which he discusses the origin of the prehistoric 'megalithic' tombs (Fig. 2) of western Europe. He sets the origin of megalith building in India, in pre-Roman times; from there the idea was carried westward to north Africa, and then to Europe. Fergusson assumed that the megalithic tombs of Europe and Asia are similar because they were made by a single 'race' or 'people':

> From shortly before the Christian era, till the countries in which they are found become entirely and essentially Christian, the use of monuments seems to have been continual, wherever a dolmen-building race – or, in other words, a race with any taint of Turanian blood in their veins – continued to prevail.[9]

Fergusson justified his comparison of the megaliths of the east with those of the west in what was a very frank admission: 'If anyone cares to insist that there was no connection between the two, he deprives himself of one of the principal points of interest in the whole enquiry.'[10] This is a key statement, very revealing of the diffusionist position, where the

preference of the observer rather than the evidence itself sometimes appears to dictate the conclusion reached.

Oscar Montelius, who succeeded Thomsen and Worsaae as Scandinavia's leading antiquary, used this basic idea of the diffusion of culture from a single source when he formulated his own position, achieving what was really the first coherent view of European prehistory. He began his book *Der Orient und Europa* (*The Orient and Europe*) with this assertion:

> At a time when the people of Europe were, so to speak, without any civilisation whatsoever, the Orient, and particularly the Euphrates region and the Nile valley, were in enjoyment of a flourishing culture ... The civilisation which gradually dawned on our continent was for long only a pale reflection of Oriental culture.[11]

FIG. 2. A dolmen (simple megalithic burial chamber) at Pentre Ifan, Wales, from James Fergusson's *Rude Stone Monuments* (1872).

Montelius never really questioned the validity of this basic premise, and his closest examination of it, once again in relation to the megalithic tombs, seems today stronger in polemic than logic:

> One does not have to probe deeply into the study of the ... conditions here in the north during the stone age ... to see that the original homeland of the dolmens cannot be sought in north Europe.

> They could not have spread from here to the southern shores of the Mediterranean, to Palestine and to India. The entire discussion here shows that this would be absurd. So powerful a movement, able to influence the burial customs of so many and widely distributed peoples, simply cannot have originated here, thousands of years before our era. It is indeed remarkable enough that, originating in the Orient, it should already have reached us here at so early a date.[12]

Montelius's approach, which was based on a very detailed knowledge of the finds from prehistoric Europe, was, however, sober and scholarly when contrasted with that of Sir Grafton Elliot Smith, who carried the theory of diffusion to its logical extreme, and indeed beyond. While Professor of Anatomy at Cairo in the 1920s, he became fascinated by the civilization of ancient Egypt, and gradually became convinced that all the civilizations of the world, and indeed all human progress, were due to travelling Egyptians, whom he termed 'The Children of the Sun'. He wrote:

> Practices such as mummification and megalith building present so many peculiar and distinctive features that no hypothesis of independent evolution can seriously be entertained in explanation of their geographical distribution. They must be regarded as evidence of the diffusion of information, and the migration of the bearers of it, from somewhere in the neighbourhood of the east Mediterranean, step by step out into Polynesia and even perhaps beyond the Pacific to the American littoral.[13]

This is much more sweeping diffusionism than that of Montelius, or even of Fergusson. For Fergusson, already in 1872, had seen the potential conflict between theories of diffusion and independent invention. And in an interesting statement that foreshadows much of the later discussion between evolutionists and diffusionists, he stopped short of trans-Atlantic contacts:

> No one will, I presume, contend that there was any direct communication between Europe and the west coast of South America before the time of Columbus. Yet there are similarities between the masonry of the Peruvian monuments and those of the Pelasgi [i.e. Mycenaeans] in Greece and Tyrrheni [i.e. Etruscans] in Italy which

are most striking, and can only be accounted for at present on the assumption that nations in the same stage of civilisation, and using similar materials, arrive nearly at the same results.[14]

With the grandiose theories of Elliot Smith, however, the way was open for all manner of imaginative derivations for the civilization of the Americas: pyramids, mummification, gold work, art styles, tattooing, the swastika, the use of pearls and conch-shells, trumpets, the worship of serpents, stories of dwarfs and giants – all became grist to the diffusionist mill. All were taken as indications of the migrations of these wandering

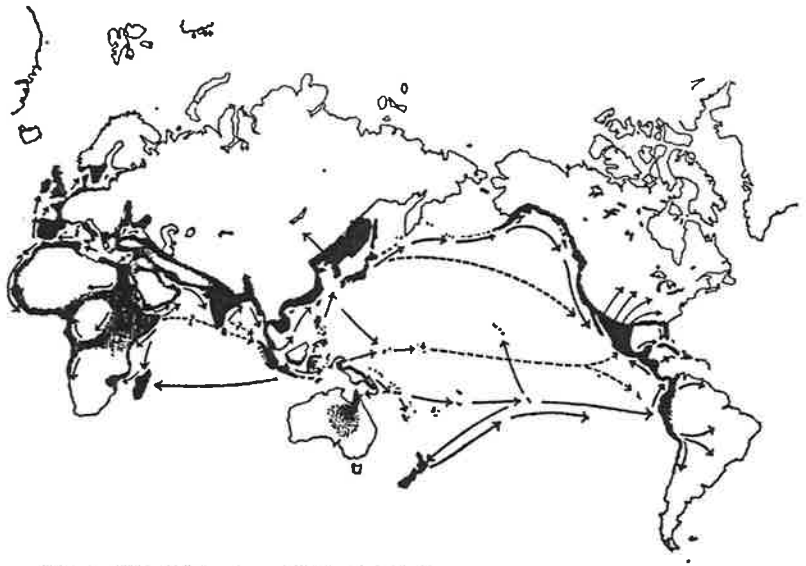

FIG. 3. The diffusionism of Elliot Smith: 'An attempt to represent roughly the areas more directly affected by the "heliolithic" culture complex, with arrows to indicate the hypothetical routes taken in the migrations of the culture bearers who were responsible for its diffusion.' Note that all the diffusion starts from Egypt. From *The Migrations of Early Culture* (1929).

Egyptians and their culture, termed 'heliolithic' (Greek *helios*, sun; *lithos*, stone) in view of the combination of sun-worship and megalith building supposedly manifested by its adherents. 'To these practices', wrote Elliot Smith, 'one might add a large series of others of a character no less remarkable, such for example, as circumcision, the practice of

marriage, the curious custom known as the *couvade*, all of which are distributed along the great "heliolithic" pathway and belong to the great culture-complex which travelled with it.'[15] The path of the global spread of the 'heliolithic' culture was plotted by Elliot Smith in maps, where all the arrows start, ultimately, from Egypt (Fig. 3).

This extraordinary and imaginative web of ideas which has survived to inspire Thor Heyerdahl's recent crossing of the Atlantic in *Ra*, a papyrus boat modelled upon those of the ancient Egyptians, has very properly been dismissed as 'academic rubbish' by Glyn Daniel on the ground that it 'neglected all semblance of scientific method'.

At the other extreme, as it were, a number of European scholars shared a view, almost precisely the opposite and no less extravagant. Their leader was Gustav Kossinna, who in 1912 published a book in which the primacy of German prehistory over that of the rest of Europe was heavily stressed. Entitled *Die Deutsche Vorgeschichte eine Herrvoragend Nationale Wissenschaft* ('German Prehistory, a Supremely National Science'), it anticipated disquietingly some of the excessively nationalistic views of the Nazi era, twenty years later. Kossinna reversed the direction of the arrows on the diffusionist map. Writing now originated in Europe and metallurgy was independently invented there. The megaliths of north Europe were still related to those of the Mediterranean and the Near East, but now they were the product of heroic Indo-European people ('Indo-Germanic' in Kossinna's vocabulary) who supposedly carried their language and their burial practices out with them from their German homeland:

> The Germans were a heroic people and have always remained so. For only a thoroughly manly and efficient people could have conquered the world at the end of the Roman empire.
>
> And how was it two to three thousand years earlier? ... The great folk movements then went out, in the third millennium B.C., from north-central Europe, from this side of the Baltic and beyond, and then further, from the middle and lower Danube, populating all Europe, and especially southern Europe and the Near East, with the people who speak our tongue, the language of the Indo-Germans. Everywhere people of central European blood became the ruling class ... and imprinted at least our language, as an external symbol of the world-historical vocation of our race, indelibly upon those lands.[16]

Kossinna's chauvinism led directly, and knowingly, to racism – Hitler is quoted at length in the 1941 edition of the book. Himmler was glad to use such arguments to give intellectual backing to Nazi policy, and is reported to have pronounced: 'Prehistory is the doctrine of the eminence of the Germans at the dawn of civilisation.'

(In our own time, perhaps only the official Rhodesian view is comparably chauvinistic in its reluctance to accept that the great stone ruins at Zimbabwe were built, as most competent archaeologists now hold, without the inspiration or aid of Eurasian architects or craftsmen.)

It was largely a very natural revulsion from the extreme racism of Kossinna which led Gordon Childe to favour an approach that Glyn Daniel has termed 'modified diffusionism'. Childe did more than any other to maintain a balance and further the international approach on the foundations laid down by Montelius. These foundations were, as he conceded, frankly diffusionist, and writing in 1939, he pointed out that Montelius's initial statement in *The Orient and Europe*, quoted above, could be 'resolved into five propositions treated as axioms':

(1) Civilisation in the Orient is extremely ancient.
(2) Civilisation can be diffused.
(3) Elements of civilisation were in fact diffused from the Orient to Europe.
(4) The diffusion of historically dated Oriental types provides a basis for bringing prehistoric Europe within the framework of historical chronology.
(5) Prehistoric European cultures are poorer than contemporary European cultures, i.e. civilisation is later in Europe than in the East.[17]

This splendidly clear statement by Childe sets out very fairly the essence of Montelius's thinking, and indeed of his own. It brings out into the open the often-overlooked assumptions which underpin the textbook accounts of European prehistory, while avoiding all the extravagances of Elliot Smith or of Kossinna. In these assumptions the problem of dating the past is inextricably mixed with the problem of the origin of the finds. If you accept that megaliths and metallurgy came from the Orient to Europe either by diffusion or by the migration of groups of people, then

you have both an explanation for them and a means of dating them. If you deny such diffusion you have a void, with no possibility of dating these things (since only the Near East offers a historical chronology), and very little of explaining them. So at any rate it seemed until recently. It was natural, therefore, that early prehistorians should choose the first alternative, and opt for diffusion.

The typological method and the chronological framework for Europe

As we saw, the first step in the dating of prehistoric Europe was the dating of prehistoric Crete and Greece by cross-dating, through direct contacts, with the historic civilization of Egypt. The next important step was the extension of this chronology to the rest of prehistoric Europe. In the absence of direct contacts, this had to be done on the basis of the similarities between the monuments and finds of Europe and those of the east Mediterranean, interpreted in the light of the diffusionist assumptions just discussed. Without the assumption that the finds of Europe were related to those in the Aegean and Near East, no chronological relationship was possible; and without assuming the direction of influence (that the finds came *from* the Near East *to* Europe) it was not possible to say which were earlier.

As well as setting out his basic diffusionist premise clearly, Montelius gave a great deal of thought to the other principles of chronology, and in 1903 he published a book on the *methods* by which the prehistoric past could be dated – one of the very first such works in archaeology. In it he presented the details of his typological method, which used the principle of diffusion. This method may not have been Montelius's own invention, but he was the first to apply it both widely and systematically. He observed that a specific tool type – a bronze axe, for instance, or a dagger – developed slowly with the passing of years, so that each newly developed form differs only slightly from its immediate predecessor. By arranging like with like in a continuous series among the various prehistoric finds, the whole development of such a type can be reconstructed using this principle (Fig. 4). Moreover, where closely similar developments are seen in other areas, the two series may be termed 'parallel', even if one or two of the forms are missing. For Montelius, a parallel evolution in two adjacent areas implied the spread of ideas and innovations from one

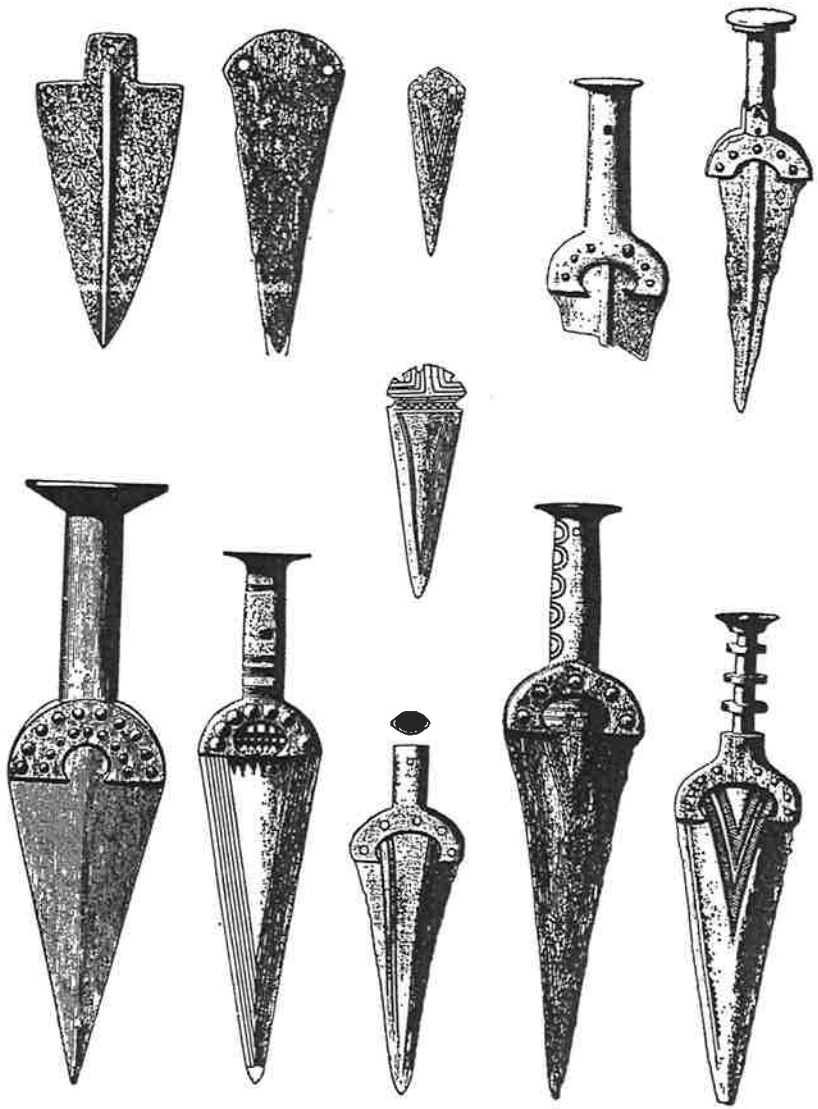

FIG. 4. A typological series, as constructed by Oscar Montelius: the copper and bronze daggers of prehistoric Italy.

to the other – in Europe generally from south to north. Closely similar forms could thus be used as a guide to dating.

Montelius focused his attention on two of the most striking developments in European prehistory: the megalithic collective burial tombs of neolithic Europe – Fergusson's 'rude stone monuments' – which had already (as we have seen) been the subject of much speculation; and early developments in the working of copper and then bronze in the succeeding period. To the considerable mass of comparative information that previous scholars had built up, Montelius applied the Three Age division of Thomsen and Worsaae, putting the megalithic tombs firmly in their neolithic setting, which earlier workers had failed to do. He no longer insisted that these impressive monuments were the work of a single 'people' or 'race'; but he accepted that they were related in origin, and gave first place to the monuments of the Orient, the 'dolmens' of Syria and Palestine. He envisaged a diffusion of the practice of collective burial along the coast of north Africa to Spain and Portugal (Iberia) in the fourth millennium B.C. (i.e. between 4000 and 3000 B.C.) 'if not earlier', reaching northern Europe early in the third millennium. The new 'passage grave' tomb form would have been transmitted along much the same path at a later date. A rather similar set of arguments explained the development of metallurgy in Europe through diffusion from the Near East, via Greece.

In the first edition of *The Dawn of European Civilisation* (1925), Gordon Childe put forward a chronological framework firmly based on this scheme proposed by Montelius; and in his later writings, it was elaborated with a masterly wealth of detail. The sometimes rather arid and algebraic comparison of artifacts of the typological method was replaced by a much more comprehensive consideration of the developments in each region and each individual culture, but the basic framework was essentially the same: the megalithic tombs were dated on the basis of their origin, through Aegean influence, in Iberia, and the techniques of metallurgy and the metal types themselves were dated on the basis of their assumed spread from the Near East to Italy and the Balkans, and so to the rest of Europe.

In the first *Dawn*, Childe emphasized above all the key position of Iberia in the origins of megalithic architecture. He accepted that the initial idea of building simple megalithic tombs or 'dolmens' probably reached Portugal from the east Mediterranean, and was carried on to

Brittany, Ireland and Denmark. Then, a little later, around 2500 B.C., actual colonists arrived in Iberia and set up trading stations, introducing metallurgy and building the first tombs with a corbelled drystone vault (Fig. 5), which is seen also in Brittany, Ireland and Scotland. 'Thus there arose in the Iberian peninsula a veritable counterpart of the maritime civilisation of the Aegean, albeit infused with original elements.'[18] Trade and other contacts, Childe argued, carried the knowledge of metallurgy, corbelled construction and other new ideas through all western Europe to Scandinavia. The supposed contacts between Iberia and the Aegean thus

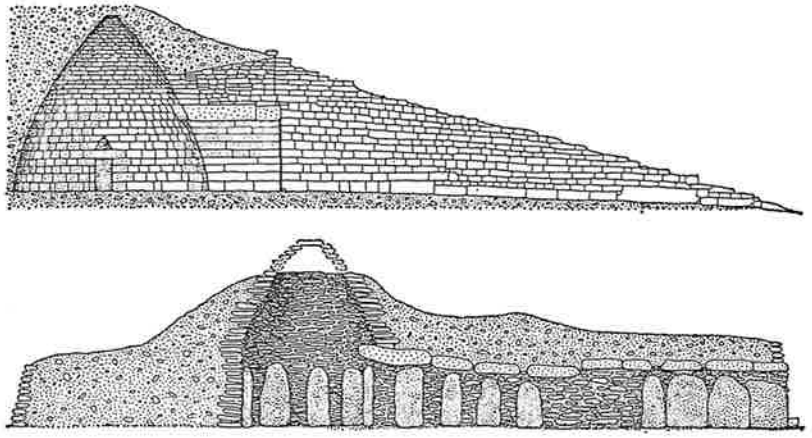

FIG. 5. Neolithic corbelled tomb at Île Longue, Brittany (*lower*), and the 'Treasury of Atreus' at Mycenae, dated to *c.* 1500 B.C. (*upper*). At first the Breton tombs were dated to the same period. Montelius and then Childe set them earlier.

formed the first essential link in Childe's picture of the diffusion of culture from the east Mediterranean to Europe. Using the same logic as Montelius, he was able to extend to Iberia the chronology established for Crete, which was itself based on that for Egypt: the first Iberian passage graves were set after 2700 B.C., which was the date ascribed to the earliest collective tombs in Early Minoan Crete.

The importance of the Danube as the second major thoroughfare for Oriental influences upon Europe was brilliantly expounded four years after the first publication of *The Dawn*, in *The Danube in Prehistory*. Like

Montelius, Childe argued that the techniques of metallurgy spread from the Near East and could be dated on the basis of this connection. However, he broke new ground in suggesting that the development of metallurgy in the Balkans (Bulgaria, Romania and southern Jugoslavia) was perhaps the earliest in Europe.

Childe was greatly impressed by the deep deposits of stratified material at the great site of Vinča near Belgrade on the middle Danube. He was influenced, too, by Sir Arthur Evans's chronological divisions for the Minoan civilization of Crete, based on the even longer stratigraphy at Knossos. So he applied the system of the latter to the material of the former. In a paper delivered to the Society of Antiquaries in March 1924 he divided the prehistoric sequence of the Danube area into four periods, later extended to seven, and dated these on the basis of supposed contacts with the Aegean. The location was different – this was the Balkan region instead of Spain – but the basic argument was the same as before. The most relevant site in the Aegean was ancient Troy, where five successive 'cities' of the early bronze age and a couple of later ones underlay the Troy of Mycenaean times immortalized in the *Iliad* of Homer. Several finds at Vinča were so like those of early Troy as to suggest the two were contemporary or 'synchronous'. These 'synchronisms' were of fundamental importance for Europe as a whole.

> Taken as a whole, the 'Aegean' features in the culture of Vinča I are too fundamental and far-reaching to be the result of mere external relations or cultural borrowing. The whole civilisation is saturated with 'Aegean' elements; south-eastern elements are interwoven into its innermost existence ... It would be vain to seek to localise the original starting point of the first colonists ... Rather we should regard Troy II and Vinča I as separate branches put forward by one ancestral trunk whose roots spread to Crete and Mainland Greece and across Asia Minor.[19]

This basic link allowed Childe to date Vinča, and hence give an early fixed point for the whole chronology of continental Europe. Vinča and its contemporary in what are now Bulgaria and Romania, the Gumelnitsa culture, were dated to the same time as the Second City of Troy, around 2700 B.C. (Fig. 8). The evidence on which Childe based this dating is reviewed in more detail in Chapter 5.

Childe's third major element in the chronological structure was of later date. He saw that the early bronze age of central and northern Europe, with its rich princely burials, possessed a number of exotic features not unlike those of the Mycenaean culture of Greece. At Mycenae the rich Shaft Graves, dated around 1600 B.C., had contained numerous swords, a wealth of gold, and quantities of amber beads which must have been imported from the Baltic area; and in north Europe, notably in the Wessex area of Britain, the princely burials in dagger graves were sometimes furnished with gold objects and frequently contained amber beads. Indeed the burials of south Britain – the so-called Wessex culture – seemed to furnish a number of indications, such as the faience beads (described in Chapter 5), of direct contact with the Mycenaean world. Childe concluded that the early bronze age of Europe was dependent on, and therefore later than, the Mycenaean civilization. As he wrote in his last book, published in 1958:

> While a distinctive bronze industry was being established around the Aegean, a neolithic economy still persisted north of the Balkans, the Alps and the Pyrenees. The Early Aegean Age corresponds in time to parts at least of Middle or Late Neolithic in Temperate Europe. But at least during the latter period, ripples generated by the Urban Revolution were already disturbing the self-sufficiency of the peasant communities. At the same time 'political events' – migrations and conquests – were preparing the sociological foundations for a Bronze Age economy.[20]

On this basis, the early bronze age Wessex culture was set around 1400 B.C., well after the beginning of Mycenaean civilization around 1600 B.C. The whole question of the British early bronze age, and of Stonehenge (which is generally set in the same period), is discussed in Chapter 11; its particular interest here is the way it was used to help build up a coherent structure for the dating of Europe.

European chronology, and hence the whole sequence of events that prehistorians reconstructed, was built on these three crucial links. Spain and the Balkans were both dated on the basis of supposed contacts with the Aegean. France and central Europe could then be tied in with their respective neighbours to the south. So, by a series of chronological steps, the whole of Europe was brought into contact with the world of the

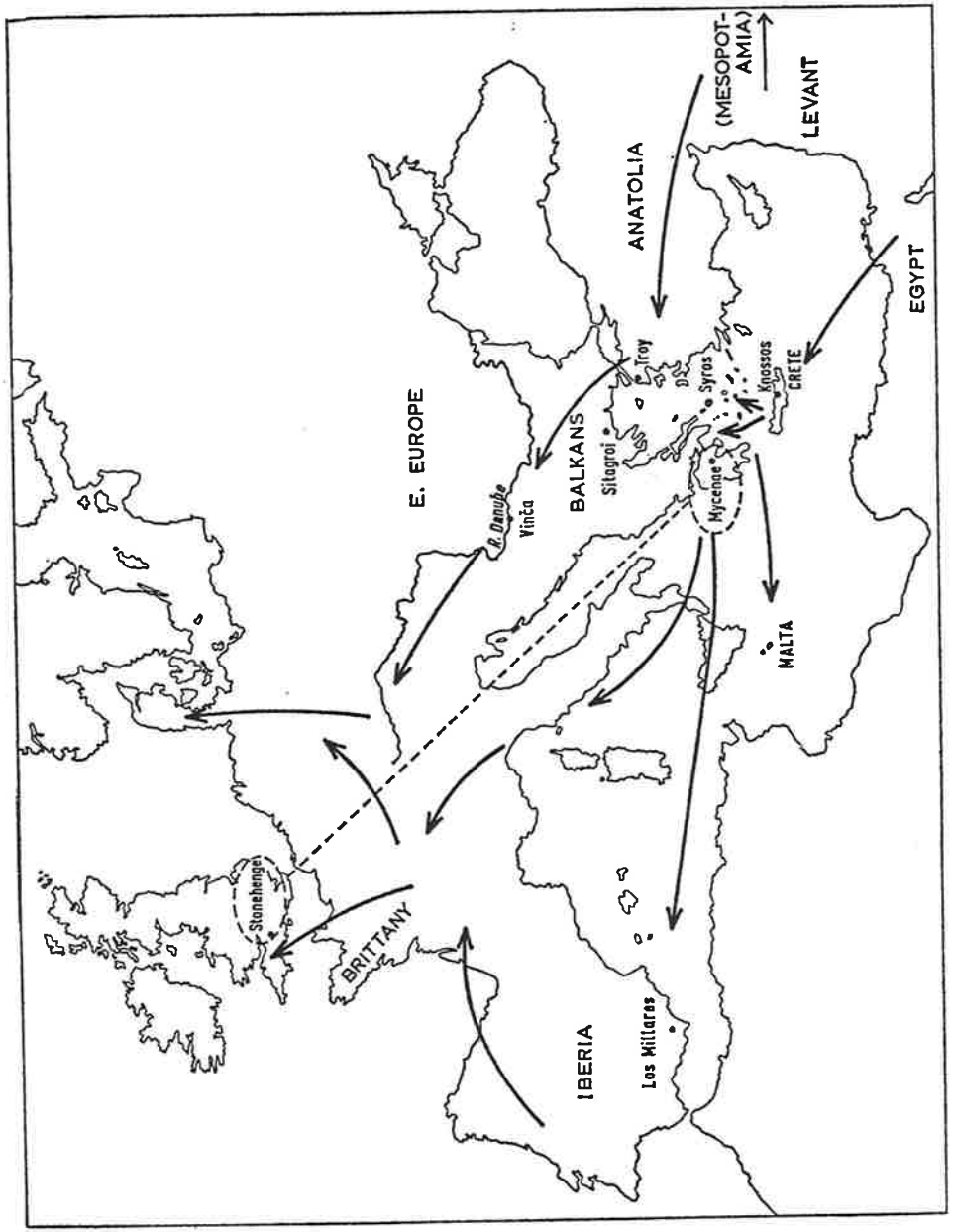

FIG. 6. Map of Europe with arrows indicating the chronological links used by Childe to date prehistoric cultures, by reference to the historical calendars of ancient Egypt and Mesopotamia.

Aegean and the east Mediterranean in general (Fig. 6). Since the absolute chronology of Egypt and the Near East had by then been worked out satisfactorily, the whole of Europe could be dated too.

The logical structure of Childe's thinking can be set out in diagrammatic form (Fig. 7). The various links form a chain of chronological connections stretching across Europe.

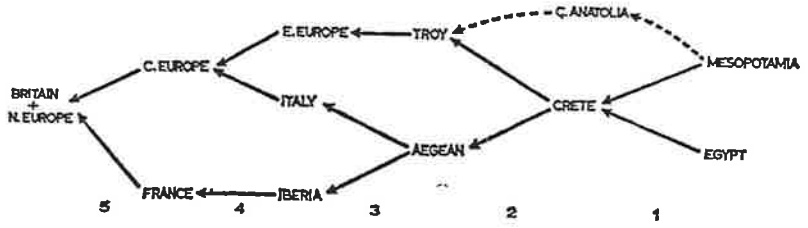

FIG. 7. The logical structure of Childe's chronological system (cf. Fig. 6).

The chronology was first comprehensively and systematically set out by Childe and Miles Burkitt in their 'Chronological Table of Prehistory' published in 1932. A revised version was incorporated into subsequent editions of *The Dawn*. Figure 8 shows five columns from the latest edition (1957). Although this looks complicated, with its detailed succession of culture names for each area, it does in fact rest on the three links discussed. The Iberian passage graves, with their connection with Early Minoan Crete (contemporary with the Early Helladic II culture of Greece), are set after 2700 B.C. Vinča and its contemporary Gumelnitsa culture begin at about the same time, which is also the period of Troy II. These are the first two links. We may note that at this time in Britain the first megaliths (indicated as 'Severn–Cotswold') are seen, as they first reach Britain from Iberia. The early bronze age Wessex culture is set around 1400 B.C., comfortably after the beginning of the Mycenaean civilization. Faience beads of segmented form, like those of the Wessex culture, are also found in the early bronze age El Argar culture of Spain, and they supposedly establish a chronological link with the Aegean. The rest of the table is fitted round these synchronisms, since the culture sequence in each individual region – the relative chronology – is well known.

As we have seen, there are no calendrical dates anywhere before 3000 B.C. In consequence the neolithic period in the Near East, and its earlier phases in Europe, could not reliably be dated by the conventional method.

Montelius set the beginning of the neolithic period in northern Europe well before 3000 B.C., and Sir Arthur Evans put the inception of the Cretan neolithic before 8000 B.C. But these bold estimates seemed too early to Childe and most of his contemporaries. In 1932, Childe placed the beginning of the Balkan neolithic around 2700 B.C., and that of Britain and Scandinavia around 2400 B.C. Only Crete was set earlier, in the fourth millennium B.C. This short chronology for the European neolithic, which depended essentially on the view that the passage graves of Iberia, and the megaliths of Europe in general, originated in influences from the Aegean early bronze age, was followed by most writers. The slightly earlier dates indicated in the 1957 table (Fig. 8) already show the influence of radiocarbon dating.

Until the advent of radiocarbon, the chronology put forward by Childe and modified slightly in later editions of *The Dawn* was almost

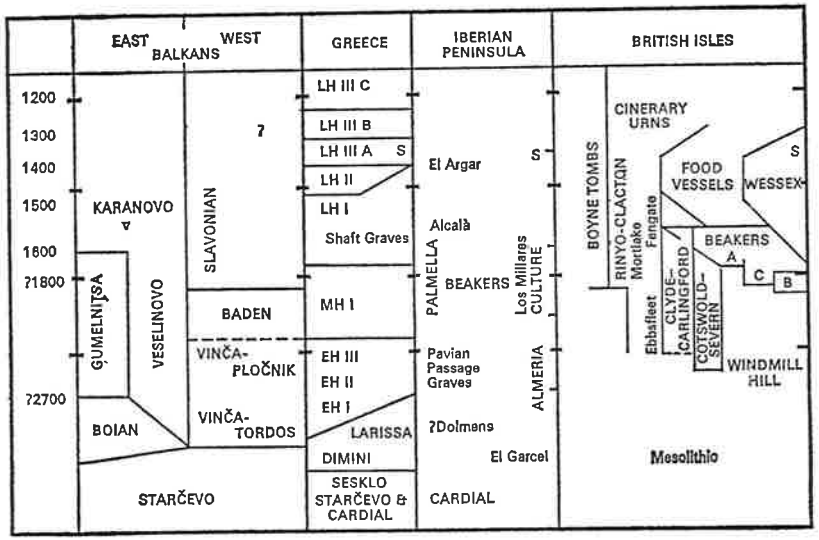

FIG. 8. Simplified version of the chronological table in the 1957 edition of Gordon Childe's *Dawn of European Civilisation*. (Note that Vinča and Gumelnitsa in the Balkans are contemporary with Troy and EH II. The first passage graves in Spain and the early Cotswold-Severn megaliths in Britain begin at the same time – the period of the first Cretan round tombs. Wessex is set around 1450 B.C. by reference to the developed Mycenaean culture, LH IIIA.) 'S' indicates segmented faience beads.

universally accepted. The chronology was further refined, and many scholars devoted detailed studies to particular aspects of it. Indeed, it became possible to dispute a matter of only fifty years when dealing with dates around 2000 B.C. This presents, then, a sketch outline of European prehistoric chronology, as it appeared up to about 1950.

FIG. 9. The modified diffusionism of Gordon Childe and his successors: a map illustrating the origins and diffusion of passage graves, published by Glyn Daniel in 1941. All the passage graves are seen as derived ultimately from the Cretan round tombs.

Childe's whole view of European prehistory has been widely followed. His theory for the megalithic tombs, for instance, was further developed and refined by Glyn Daniel, and well illustrated in a map published in 1941 (Fig. 9). Indeed this view has become firmly established in all the important textbooks. As Grahame Clark wrote in 1969, in the second edition of his *World Prehistory*, the most recent authoritative survey:

> It is hardly possible to doubt that it was from the Aegean area that the rite of collective burial, associated with belief in a mother goddess, spread widely over the Middle and West Mediterranean, or that this was associated with the voyages of exploration and prospecting already hinted at ...
>
> The diffusion of collective burial and of megalithic tomb-construction in the west, and the rise of copperworking in central Europe and north Italy ... are only symbols of the influence exerted from the Aegean towards the close of its Early 'Bronze' Age on the still predominantly Neolithic peasantries of barbarian Europe.[21]

This statement fully endorses the pattern established by Childe in 1925 of the development of European prehistory. In the next three chapters we shall see how this agreeably logical picture has been completely disrupted, first by the introduction of radiocarbon dating, and more especially by its calibration through tree-ring studies.